

Understanding and managing Traumatic Brain Injury (TBI)  
in an Adult Male Prison

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## **ABSTRACT**

The prevalence of traumatic brain injury (TBI) in prison populations has been found to vary considerably. Prisoners who have experienced TBI are reported to be less likely to be able to comply with prison rules and complete a programme of rehabilitation as a result of persistent TBI-related symptoms. Trials of rehabilitation programmes for TBI-affected individuals have demonstrated success in the community, but there are no published studies within the prison context.

This thesis comprises of two studies to answer the identified research question. Study one aimed to determine the prevalence of TBI in a prison population in New Zealand, and to identify whether age, ethnicity, offence type, security classification and sentence length were linked to TBI prevalence. Study two sought to understand whether a psychological intervention would improve symptoms, improve strategies for managing negative affect and decrease in-prison infractions. Further, participants' experiences of the intervention were explored.

In study one; all prisoners admitted to a new corrections facility over a 6-month period were screened for history of TBI. Of the 1061 eligible male prisoners, 1054 (99%) completed a TBI history screen. 672 (64%) had sustained at least one TBI in their lifetime, with 343 (32%) experiencing multiple injuries. A regression model was able to correctly classify 67% of cases, and revealed that being

of Māori ethnicity or being imprisoned for violent, sexual or burglary offences were independently predictive of TBI ( $\chi^2 = 9.86, p = 0.28$ ).

In study two, a single centre Randomised Control Trial (RCT) pilot study was undertaken with 55 consenting prisoners utilising a manualised, combined, Cognitive Behavioural Therapy (CBT)/Mindfulness Based Stress Reduction (MBSR) intervention to facilitate coping for participants. Measures of post-concussion symptoms, negative affect repair and in-prison infractions were assessed at baseline, following the intervention and after twelve weeks. A thematic analysis was also conducted to understand the participants' experience of TBI and the intervention/study process. The study found no statistical differences in the demographics between the intervention and wait list controls across the three time periods. There was reduction in the post-concussion symptoms, but no statistical differences between the groups were found across the three time periods. There were improvements in negative affect repair strategies for both groups, which were statistically significant for the intervention group following completion of the intervention, but this was not sustained at the twelve-week follow-up. Through the process of this thematic analysis, three main themes arose, namely: the journey into jail, the intervention and new understandings.

With high TBI prevalence in prison and the risk of persistent problems, routine screening for TBI may help to identify prisoners at risk of persistent difficulties. A manualised

TBI intervention has demonstrated improvement in self-management strategies within an adult male prison.

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## **ATTESTATION OF AUTHORSHIP**

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person.

Signed:

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Tracey Mitchell

## CO-AUTHORED WORKS

There is one co-authored piece of work completed as part of this thesis. I was the principal author and was responsible for the literature review, research design, data collection and analysis as well as commencing the writing of the article. My supervisors (and co-authors) were critical in terms of advice throughout the study and review of the publication submission (see Appendix F).

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|---|--|
| <p><u>Mitchell, T., Theadom, A., &amp; du Preez, E. (2017). Prevalence of traumatic brain injury in a male adult population and its association with the offence type. <i>Neuro-epidemiology</i>, 48, 164-170.</u></p> <p><a href="https://doi.org/10.1159/000479520">https://doi.org/10.1159/000479520</a></p> | <p>Mitchell-80%<br/>Theadom- 15%<br/>du Preez – 5%</p> |
|---|--|

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## **CONFIDENTIAL MATERIAL**

There is no confidential material contained within this thesis.

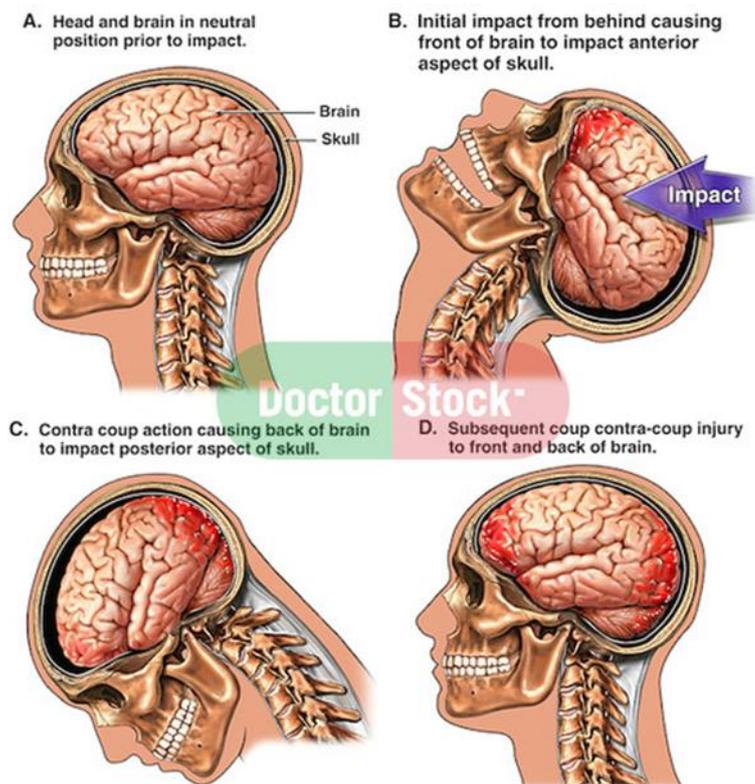
## CHAPTER 1: INTRODUCTION.

This chapter will set out an overview of the context and existing literature informing this PhD. TBI will be defined and diagnostic issues discussed. This will be followed by an overview of the literature on the prevalence and impact of TBI in the general population, and explore evidence of the potential links between TBI and offending.

### What is TBI?

TBI is defined as an injury to the brain resulting from an external physical force (New Zealand Guidelines Group, 2007). The external force can vary considerably in terms of force, energy dispersion, the mechanism of injury and the area of the brain affected. This can result in bruising, swelling or bleeding in the brain. Additionally, neural networks can be damaged or destroyed and brain cells can die. There are up to four physical events of a TBI. These include: shock wave injuries (impact and vibration of the skull after the impact); acceleration and deceleration injuries, which may be antero-posterior deceleration (coup and contracoup) and rotational acceleration, which impacts on the connections between the brain's hemispheres (Martin, 2016). Figure 1 provides a pictorial demonstration of the coup/contracoup injury pattern.

**Figure 1: Mechanism of injury with TBI**



(Nucleus Medical Media, 2015, with permission).

Defining TBI severity accurately is challenging, as all severity classification ratings depend on self-report either by the person themselves or by an observer at the time of the accident or shortly afterwards (Pitman, Haddlescey, Ramos, Oddy & Fortescue, 2015). TBI severity is broadly categorised into mild, moderate and severe, with the period of time with loss of consciousness (LOC) and post-traumatic amnesia (PTA) being the main criteria for categorisation (Table 1). The Glasgow Coma Scale, which assesses level of consciousness, through responsiveness to physical and verbal commands, is often used to determine injury severity. However, consciousness levels can vary considerably over time and are only recorded once a person seeks medical attention (which can range from minutes to

weeks). Loss of consciousness is rarely reliably recorded by lay observers and many accidents are un-witnessed, making accurate recording problematic. Despite a lack of clarity around the definition of PTA, it has been referred to as a period of altered consciousness following an accident. It is characterised by confusion and disorientation. For example, the person may not be able to remember what had just happened or what time or date it is. PTA is usually assessed using tools such as the Westmead PTA scale once the person regains consciousness (Shores, Marosszeky, Sandanam & Batchelor, 1986). A person is considered to be in PTA (if they initially score incorrectly on some items on initial testing) until they have answered all questions correctly for three consecutive days, so it is a term mainly used for diagnostic and prognostic purposes (Marshman, Jakabek, Hennessy, Quirke & Guazzo, 2013).

**Table 1: Criteria for classification of TBI severity**

| <b>Criteria</b>  | <b>Mild</b> | <b>Moderate</b>        | <b>Severe</b> |
|--|-------------|------------------------|---------------|
| <b>Loss of consciousness</b>                           | <30 minutes | 30 minutes to 24 hours | >24 hours     |
| <b>Post-traumatic amnesia</b>                          | 0-1 days    | >1 and <7 days         | >7 days       |
| <b>Glasgow Coma Scale (best available in 24 hours)</b> | 13-15       | 9-12                   | 3-8           |

(Brasure et al., 2012).

## Epidemiology of TBI in the general population

To understand the extent of the problem of TBI within a NZ prison population, it is important to consider how TBI occurs in the general population as a comparator to understand the issues in the community, including dominant mechanisms of injury.

A recent study published by the Global Burden of Disease project, which aims to measure the global burden of a variety of diseases and injuries, revealed that in 2016 more than 55 million people were affected by TBI (James et al., 2019). What is particularly concerning is that between 1990 and 2016 the age-standardised prevalence of TBI increased by 8.4%, and TBI was found to contribute to a considerable proportion of global injury burden. This highlights that TBI is a global public health concern.

Country-specific community TBI prevalence studies are somewhat challenging to interpret given the diverse definitions of TBI, methods of assessment and diagnostic criteria used (Frost, Farrer, Primosch & Hedges, 2013). A meta-analysis was undertaken seeking to understand the prevalence of TBI in an adult community population. Fifteen studies involving 25,134 participants were evaluated and odds ratios were applied to all included studies. The meta-analysis found that the general adult population prevalence of TBI with LOC was 12%: 16.7% for males and 8.5% for females. Men were reported to be 2.2 times more likely to sustain a TBI than women. The analysis discovered heterogeneity of studies with no agreement around TBI

severity. Further, the analysis was somewhat challenging as the authors (Frost et al., 2013) noted that the inclusion criteria for their analysis required LOC, which excluded many mild TBI, which account for approximately 80% of all TBI (Snell, Surgenor, Hay-Smith & Siegert, 2009). It is noted that to sustain a TBI an individual does not require LOC, but rather can experience PTA, neurologic deficits or any alteration to their mental state at the time of the injury (Menon, Schwab, Wright & Maas, 2010). The meta-analysis would have provided additional information had the definition for inclusion been extended to include other indicators of TBI.

Exploring the lifetime prevalence of TBI adds value as it presents information longitudinally and accounts for multiple lifetime injuries. A NZ study, which was based on the Christchurch Health and Development study cohort, followed up a cohort of 1265 children born in Christchurch in 1977. The study explored the prevalence of medically-attended TBI in children, adolescents and young adults across the first 25 years of life (McKinlay, Grace, Horwood, Fergusson, Ridder & MacFarlane, 2009). The study utilised the birth cohort data on medical attendances as well as self-reporting, between 16-25 years of age. The prevalence of TBI in this cohort was reported to be 31%, of which 67% were managed in an outpatient setting (such as a GP or emergency department) and the remaining 33% required an inpatient hospital stay. The lowest prevalence was reported in the 5-10-year age group, with the highest in 15-20-year-olds. The most common mechanisms of injury were motor vehicle accidents (38%) and falls (34%). This

study has a unique NZ relevance, as it captures a large NZ cohort, across a long period of time and has a robust assessment framework. However, only medically-attended TBI were included in the early childhood years (4-16 years), which makes generalisations challenging as there is evidence that many people with acute TBI do not seek the assistance of medical professionals (Feigin et al., 2013), so an unknown proportion of injuries were excluded from this study.

Whilst prevalence studies provide useful information on lifetime burden of TBI, incidence studies contribute to the knowledge and understanding of new TBI cases during a defined time period. Given recent advances in identifying TBI (particularly mild TBI cases) and increased public awareness, incidence studies looking at a more recent period of time may offer more accurate estimates of the TBI burden.

## Incidence of TBI

Based on the Global Burden of Disease data recently published, the global age-standardised incidence of TBI was found to be 369 per 100,000 population for TBI (James et al., 2019). The incidence was found to be highest in central Europe, Eastern Europe and central Asia. These prevalence estimates based on routinely collected medical data are in accordance with the prevalence estimated for NZ, calculated through a review of hospital records, based on hospital discharges for TBI across two time periods: 1998/9 and 2002/3. This NZ study reported the crude TBI

community-based incidence rate as between 226.9 per 100,000 in 1998/9 and 349.2 per 100,000 in 2002/3 (Barker-Collo, Wilde & Feigin, 2008). It was noted that young males aged between 15-30 years were more likely to sustain a TBI from a road traffic accident or acts of violence. Whilst this study provides useful data on the age and gender demographic for TBI, only crude prevalence was presented (which limits comparability to other countries with different population characteristics). Both these studies also do not account for those injuries for which people may not seek medical attention at hospital, e.g. due to injuries being sustained in a domestic or gang violence situation, where there may be a fear of repercussions, or due to lack of awareness of the need to seek medical attention (in the case of mild TBI). Additionally, in some cases of poly-trauma, a TBI may be overlooked whilst other injuries are the focus of acute treatment.

Following this NZ study, a further incidence study in NZ attempted to capture non-medically-attended TBI in addition to medically verified injuries. This study used proactive screening approaches to assess everyone experiencing an accident to the upper half of their body to establish if a TBI was sustained but had not been medically recorded or reported (Feigin et al., 2013). By identifying these previously missed cases, this study revealed that the incidence of TBI is higher than other estimates, with 790 New Zealanders per 100,000 experiencing a TBI within a one-year period. Of these, 95% were classified as being mild in severity (749 per 100,000). Falls were most common in the very young (0-4 years) and the elderly (>65

years); and mechanical forces were greater for adolescents and young adults. The authors (Feigin et al., 2013) did acknowledge the difficulty in capturing the mild TBI category, given the likelihood of not seeking medical assistance and noted that some cases of TBI may still have been missed. Notwithstanding that, a significant proportion of cases (36%) did not attend hospital, so this study highlights the importance of accounting for non-medically verified injuries when exploring incidence and prevalence of TBI. The studies capturing non-medically-attended TBI provide a foundation of knowledge from which to build on for a prisoner cohort. Prisoners are noted not to have attended medical facilities for assistance following a TBI so it is important to reflect the findings of non-medically-attended TBI as part of the preparation for this study.

NZ's population has a diverse cultural background and it is important to explore the populations who may be most at risk of experiencing a TBI in order to inform prevention strategies. It has been noted that Māori and Pasifika have been over-represented in the TBI statistics (Feigin et al., 2013 & Lagolago et al., 2015). In these statistics Māori show an incidence of 1200 per 100,000, with Pasifika even higher at 1242 per 100,000, compared to 842 per 100,000 for participants of European ethnicity. The highest risk age groups were between the ages of 0-4 years and 15-24 years, with falls and sports being the biggest mechanisms of injury. This study highlights that ethnic minority groups appear to be at increased risk of sustaining TBI.

It remains unclear from the available literature as to the reasons for this. A literature review was conducted into TBI and indigenous people (Lakhani, Townsend & Bishara, 2017). The review included 14 studies and confirmed that indigenous people had a higher incidence and prevalence of TBI, compared to non-indigenous people, with increased levels of alcohol and other drugs, violence and a heightened likelihood of requiring hospitalisation and surgery. Consequently, it is important to consider ethnicity as there is evidence to suggest certain ethnicities are at increased risk of TBI. Understanding the epidemiology of TBI may inform TBI prevention strategies that may assist Māori and Pasifika, both in the community and for those in prison.

### Outcomes following TBI

Even following a mild TBI, people can experience persistent symptoms and difficulty maintaining social relationships and employment (McAllister, 2008; Scholten et al., 2015; Ferguson & Coccaro, 2009; Hamilton & Keller, 2010; Snell, Surgenor, Hay-Smith & Siegert, 2009; McKinlay, 2014; Pitman et al., 2015; Theadom et al., 2016; Valente & Fisher, 2011, and Corrigan, Selassie & Orman, 2010). Additionally, there is a relationship between history of TBI and a higher incidence of axis one disorders such as depression and anxiety (Pitman et al., 2015; Arnould, Dromer, Rochat, Van der Linden & Azouvi, 2016; McAllister, 2008, Kocka & Gagnon, 2014 and Slaughter, Fann & Ehde, 2003) and axis two disorders, specifically personality disorders (Shukla & Devi, 2010). One study revealed that those post-TBI had a two-fold risk of mental health issues, when compared to

non-injured siblings (Schofield et al., 2015). These findings have been supported by a study looking at mental health over the first year post-TBI where 61% of survivors were found to suffer from one or more mental health disorders, with anxiety being the most common (Gould, Ponsford, Johnson & Schonberger, 2011). The odds of having a post-injury mental health disorder increased four-fold for those with pre-injury disorders (Gould et al., 2011), suggesting they are at particularly high risk post-injury.

There can also be a cognitive impact post-TBI. Childhood is a time of significant growth and development. Children who have TBIs reportedly struggle academically, particularly in the first 12 months post-injury (Mason, 2013; Max, 2012, and Hamilton et al., 2010). Children with TBI are reported to have poorer episodic memory, slower cognitive processing, poorer performance at calculations and reading (compared to unaffected peers) and concentration (Mason, 2013; Hamilton et al., 2010; Arroyos-Jurado, et al., 2010, and Wszalek & Turkstra, 2015). Similar findings have been identified in adults' post-TBI, with impairments in attention, memory and multi-tasking observed (Barker-Collo, et al., 2015; Schultz & Tate, 2013 & McInnes, Friesen, MacKenzie, Westwood & Boe, 2017).

It is noted that there is considerable heterogeneity in how people recover following TBI. There is the hypothesis that the heterogeneity in outcome may be influenced by what is loosely termed 'reserves' (Scholten et al., 2015; Rassovsky et al., 2015; Mathias & Wheaton, 2015, and Arroyos-Jurado,

et al., 2010). This was illustrated by an exploratory study which sought to understand the impact of childhood TBI on academic functioning. The study involved 43 school-aged children who were followed up and tested up to two years following their TBI. The study found having a satisfactory or high level of academic functioning prior to the TBI positively contributed to the level of functioning following the TBI (Arroyos-Jurado et al., 2010). Other factors may also contribute to the 'reserve', including maternal birth age, socio-economic status, educational levels, maternal punitiveness and parental relationship status (Wand et al., 2018). A recent meta-analysis that explored the relationship between the brain, biological reserves and cognition in the context of TBI (Mathias & Wheaton, 2015) highlighted that higher levels of education and a higher pre-injury Intelligence Quotient (IQ) were indeed associated with better outcomes. However, all measures had an unremarkable to small effect size. This meta-analysis held promise, but, due to the heterogeneity of the included studies, it was unable to establish any conclusive findings. Therefore, the exact nature of the impact of 'reserves' on outcome remains unclear.

It is reported that there are challenges in relation to school relationships and academic achievement following a childhood TBI (Heverly-Fitt et al., 2014). This may have on-going effects during the person's lifespan, into adulthood. As part of the Christchurch epidemiological study of 1265 children born in 1977 were followed up for sixteen years (McKinlay et al., 2009), self- and maternal-reported symptoms for Attention Deficit Hyperactivity Disorder

(ADHD), mood disorders, Compulsive Disorder (CD) and Oppositional Defiance Disorder (ODD), including anti-social behaviour such as fighting, intoxication and stealing were assessed. Family characteristics were also obtained and included: maternal age, punitiveness, family income, maternal birth age and socio-economic information. The study found that hospital-attended mild TBI were associated with an increased likelihood of ADHD, OCD (Obsessive Compulsive Disorder), alcohol misuse and mood disorders; however, community-attended mild TBI were not. Children who experienced a mild TBI before the age of five were more likely to have attention and conduct disorders, compared to their non-injured peers (McKinlay, 2014). Participants with a childhood TBI history were also three times less likely to complete high school, 2.3 times less likely to complete a university qualification and 1.7 times more likely to undertake an unskilled career or be unemployed, compared to their uninjured peers (Taylor, Barrett, McLellan & McKinlay, 2015). This study provides an interesting perspective on the consequences of mild childhood TBI. The studies reveal that childhood TBI impacts on an individual's journey through life, including their mental health, educational achievement and their ability to gain and retain employment. There can be impacted on by their family of origins socio-economic status.

### [Links between TBI, aggression, anti-social and criminal behaviour](#)

There may also be long-term sequelae of TBI. The experience of persistent difficulties after injury, including the impact of cognitive difficulties and symptoms on

performance at school and social relationships, has been hypothesised to increase risk of engaging in crime, substance abuse and aggressive behaviours towards others. There is a growing body of evidence suggesting a relationship between TBI and dysregulated behaviours such as impulsivity and aggression (Pitman et al., 2015; Ferguson & Coccaro, 2009; Arnould, Dromer, Rochat, Van der Linden & Azouvi, 2016; McAllister, 2008; Kocka & Gagnon, 2014 & Slaughter et al., 2003). Kreutzer, Marwitz & Witol (1995) revealed that threats of violence increased over time from 15% at one-year post-injury to 54% five years post-TBI. Furthermore, the overall arrest rates were higher for men with TBI, with a link to pre-injury arrests, with alcohol consumption and pre-injury arrests being amplified post-injury. The findings highlight that the effects of TBI may continue in the longer term, with adults who experienced a TBI in their childhood found to have a 1.7-fold increased risk of incarceration many years later, when compared to non-injured siblings (Schofield et al., 2015).

The relationship between TBI and anti-social behaviour is likely to be highly complex (Williams et al., 2018). For example, a large birth cohort study (n=10, 934) in Finland explored the relationships between childhood TBI, heavy substance use, mental health disorder and criminal activity (Timonen et al., 2002). The study commenced in 1966 and continued for 31 years, with hospital and justice records being retrospectively evaluated. The study found that a childhood or adolescent TBI, in addition to mental health issues, markedly increased the risk of criminal activity. 3.9% of the cohort had been incarcerated at follow-up, with many

experiencing a TBI prior to the age of 15. The TBI group were noted to demonstrate an earlier age of criminogenic activity when compared to their non-injured peers, with criminal activity being reported as young as 12. This study provides valuable information from a homogenous group, across a long period of time. There is caution in establishing a causal link between TBI and crime, as evidenced by a small rate (3.9%) of TBI from the birth cohort who were in prison. However, it highlights the importance of factoring-in risk-taking and anti-social behaviour as having a contribution to the findings.

A further study explored the relationship between childhood TBI and criminality, in addition to substance misuse and psychiatric symptoms (Kennedy, Cohen & Munafo, 2017). The study involved a longitudinal birth cohort of 14,541 women (and their children) between 1991-1992. Individuals who self-identified having a TBI history (from birth to 11 years) completed questionnaires on substance abuse, criminal behaviour and psychiatric symptoms. Their parents also completed the assessment of psychiatric symptoms. The study found those with TBI were more likely to be male, suffer from an adverse life event, be 1.47 times more likely to have problematic smoking and alcohol use, 1.5 times more problematic marijuana use and 1.72 times more likely to have committed at least one offence when compared to their uninjured peers (Kennedy et al., 2017). Further, having a TBI prior to the age of 16 was reported to place the individual at increased risk of conduct disorder, with an increased risk of committing their first offence prior to the age of 17. The study demonstrated

that there was a difference between childhood and adolescent TBI, with a TBI prior to 11 being associated with conduct problems, and adolescence being associated with alcohol and tobacco use as well as criminality. These findings highlight that a childhood TBI may well have a longer-term impact on behaviour and contribute to a person's life course.

Further exploring anti-social behaviours, violence is seen as a complex interplay between environmental factors (including TBI) and genetic factors (Leon-Carrion & Ramos, 2003). A study of 49 prisoners was conducted in Spain, exploring the relationship between childhood TBI and violent behaviours. The subjects were divided into two groups. The first group (n=36) were serving sentences for violent offences, with an average age of 35 years. The second group (n=18) were serving sentences for white collar crime, with an average age of 44 years. An epidemiological questionnaire was administered which covered several questions about growing up, injuries, schooling and behaviour. There were statistically significant differences in TBI between the violent (55.6%) and white collar (7.7%) criminals. Further, school-related challenges were identified as another difference between the groups, which the authors attributed to delinquent behaviour. The findings of the study concluded that there needed to be better preventative measures and rehabilitation for children with TBI. It does provide an insight into a line of assessment not seen in other areas, providing for a comprehensive self-reported personal childhood history.

## TBI and risk of offending

A NZ study explored the relationship between childhood TBI and the risk of offending (McKinlay, 2014). The study examined 156 participants aged 18-30 years with a confirmed medically-attended childhood TBI, from various sources including the community. The TBI group was compared to participants with childhood orthopaedic injuries. Assessments were undertaken in reading, emotional behavioural scales and offending history. The study found that the participants with childhood TBI were more likely to engage in criminal activity, especially those with repeated or severe TBI, suggesting links with increasing severity of injury. The authors proposed that as childhood TBI disrupted the brain's development, especially emotional regulation, this may have contributed to offending activity, when compared to the orthopaedic group. This study provides valuable NZ-derived information around childhood TBI and reinforces the value of exploring all lifetime TBIs with the prison study group to gain a better understanding of prevalence across the lifespan in prisons. Notwithstanding that, the study focussed on medically-attended TBI, even with 10 community recruits amongst the participants sourced from hospital records. Inclusion in the study mandated that those with mild TBI required radiographical diagnostics to provide evidence that there was no skull fracture. This limits generalisability, given the number of mild TBI survivors who do not seek medical attention (Barker-Collo et al., 2015).

In another NZ childhood TBI study by one of the same authors it was noted that following a childhood TBI, young adults (21-25 years) were more likely to be arrested or become involved in property and violent offences (McKinlay, 2014). The findings of these two studies are further supported by a recent review of literature around TBI and violent offences which commented on the disruption to the brain's development from a cognitive and social perspective, and the impact on emotional regulation, executive functioning and contact with law enforcement services (Williams et al., 2018).

Exploring externalised behaviours and the link to crime is important in better understanding the potential journey to jail. A longitudinal prospective study sought to explore the relationship between childhood TBI, externalised behaviours and the link to offence-related behaviours over a period of sixteen years (Ryan et al., 2015). Whilst there is lack of clarity around the timing of the TBI in relation to offending (e.g. whether the TBI was only a few years ago or several decades previous), the authors examined the link between deficits relating to the childhood TBI, the 'reserves' of the TBI survivor, their academic achievement and anti-social or oppositional behaviours. 55 consenting participants were followed up from the time of their TBI (for a period of 16 years), having been recruited following admission to an emergency department with a confirmed TBI. 27% of the TBIs were mild, 45% moderate and 28% were severe. Parental reports were completed on pre-injury behaviour and immediate post-injury assessments of intelligence and the family's socio-economic status. There were follow-up

assessments ten and sixteen years later, which sought to assess executive functioning, communication and behaviour. The study found 25% of the participants met the criteria for clinically significant externalised behaviour, and this was associated with conduct disorder, aggression and oppositional defiance. The patients' pre-injury functioning was seen as a protective factor, which was a buffer for behavioural dysfunction (Ryan et al., 2015). This is a challenge for many prisoners who may come from impoverished and socially disadvantaged backgrounds (Zoellick, 2018).

A longitudinal study was undertaken in Western Australia exploring the relationship between medically-attended childhood TBI and crime, while utilising retrospective data from hospitals, the justice system and in comparison to non-TBI peers and siblings (Schofield et al., 2015). The study found that the mean age for the first TBI was 10.6 for males and 6.9 for females, with an average follow-up time of 12.5 and 16.6 years. The study found an increase in violent offences, albeit modest following a childhood TBI, when compared to uninjured peers and siblings. The authors commented that the genetic blueprint of an individual contributed to their risk of TBI and criminogenic activity, with no causal link established. This study assists the researcher to understand the contribution of TBI to prison and vice versa; and highlights the very early age that TBIs can be experienced and the potential long-term negative impacts.

As childhood TBI is associated with dysregulated behaviours and conduct disorders, it is important to explore the relationship between childhood TBI and offending behaviour (Jackson, Braun, Mello, Triche & Buka, 2017). A recent prospective longitudinal study utilised a birth cohort from the US, where 2983 participants were followed up to the age of seven for a series of assessments, including understanding the incidence of TBI. The study recruited 120 participants with a childhood TBI and matched them with 605 controls at a ratio of 1:5. On analysis, they found that 27.3% had a least one arrest in their lifetime and 1.5 times more arrests than their non-injured peers; however, these results were not statistically significant. Those with severe TBI were twice as likely to commit crimes compared to their non-injured peers. This study provides interesting data into the importance of care and follow-up of children after a TBI. The study only explored TBI up to the age of seven, and there are greater hazardous periods in adolescence and early adulthood that may present more risk. Caution is therefore required in determining a causal effect between childhood TBI and criminality.

The complexities of the potential links between childhood TBI and the risk of offending may also be influenced by environmental factors (Ma et al., 2018). One scoping review explored six studies where adverse childhood events and TBI were discussed. It was noted that 61% of children had been exposed to violence, crime or abuse, and there was evidence that the abuse changed the structure of a child's brain and contributed to developmental issues (Finkelhor et al., 2015). As part of the scoping review, two

articles reviewed childhood TBI in a prisoner cohort, one of which was in a female prison and the other incorporated both male and female prisoners. The review found that a child who had experienced an adverse childhood event was 2.3 times more likely to experience a TBI compared to their unaffected peers (Ma et al., 2018). Further, children who had experienced physical abuse were 2.1 times more likely to experience a TBI. Psychological abuse meant the child was 2 times more likely to experience a TBI. Prisoners with TBI were found to have a significantly higher risk of criminality if they had family members with alcohol issues or mothers with drug-related issues compared to their uninjured peers. Whilst there is not a direct association between adverse childhood events and TBI, it was noted by the authors the early events appeared to increase risk-taking behaviours and were likely to contribute to the victim-perpetrator cycle. Children are vulnerable and prisoners who have been exposed to adverse childhood events have more challenges than their non-affected peers, which needs to be considered when exploring the links between TBI and risk of offending.

Given the personal and societal burden of TBI and additional economic costs to society which is estimated to be between \$1,423 - \$36,648 US per person based on severity of TBI (Te Ao et al., 2014), it is important to better understand the prevalence of TBI both in the community and in prison to illustrate the extent of the problem and to provide justification of the need to explore hypothesised links between TBI and criminal behaviour. Further, it is important to understand what causal factors (if any)

contribute to prisoners' journey to prison. This will assist future studies in the development of strategies which may mitigate some of the long-term effects of untreated TBI across the lifespan.

## Summary

The scoping literature review highlighted that there is evidence of a link between TBI, persistent symptoms, mental health and criminal activity; however these relationships are likely to be highly complex. Depending on the socio-demographic context of the child, environmental influences and their personal 'reserves', a TBI may (or may not) influence their personal journey through life, and for some that includes committing offences and being sent to prison.

## Aims and objectives of the thesis

This thesis aims to improve our understanding of the extent of the problem and management of TBI within male prisoners. The rationale for completing this study is to inform prevention strategies to reduce the impact of high rates of TBI, accompanying persistent symptoms, and to possibly reduce reoffending or recidivism, which in turn, may reduce the costs associated with incarceration and the impact on the victims of crime.

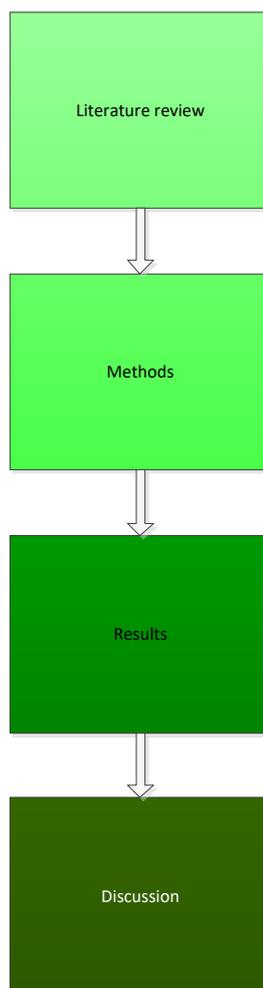
## Specific objectives of this thesis are:

1. To determine the lifetime prevalence of TBI in a male NZ prison service.
2. To determine the feasibility of an intervention to support prisoners with a lifetime history of TBI to improve their coping skills.
3. To explore participant experiences of engaging in an intervention to facilitate positive coping in a NZ prison service.

### Overview of thesis structure

The thesis consists of two distinct studies to address different elements of the overarching thesis research questions. A mixed methods approach was adopted to enable both depth and breadth of data to be considered. The two studies are presented within this thesis as Part One and Part Two (see Figures 2 and 3).

**Figure 2: Study, Part one configuration**

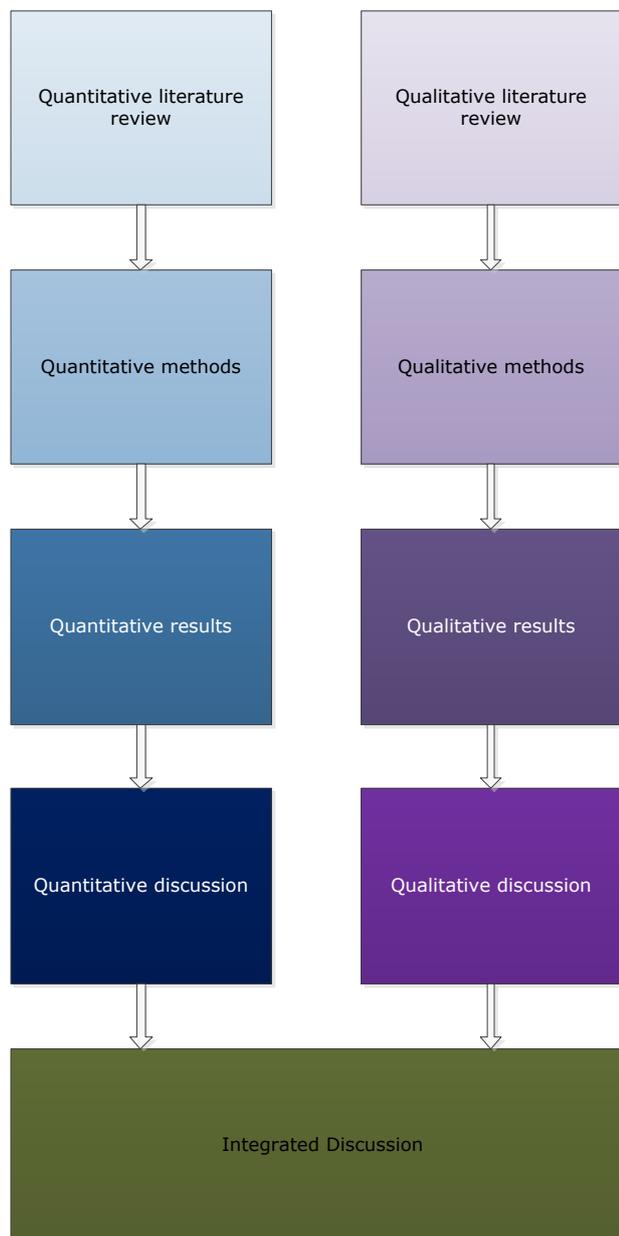


Part one of the study seeks to understand the extent of the problem through reviewing international literature on the prevalence and impact of TBI within prison populations, followed by retrospective prevalence study conducted in a male prison in South Auckland, New Zealand (NZ).

Chapter 2 provides an overview of the literature relating to TBI in the general population, children, prisons and with specific offence types. Chapter 3 provides the methodology for the prevalence study, while Chapter 4 provides the results of the prevalence study. Chapter 5 provides a

detailed discussion around the results of the prevalence study.

**Figure 3: Study, Part two configuration**



Part two of the study seeks to understand the feasibility and potential impact of a randomised control trial (RCT) pilot study to determine whether a CBT/MBSR intervention could assist prisoners to manage persistent symptoms and to develop positive coping strategies with possible reduction on the occurrence of violent episodes. A qualitative

component was included in this study to explore participant experiences of the intervention to inform future modification of the treatment.

Part two of the study commences at Chapter 6, which explores the literature relating to interventions in the general population and prisons, including a range of therapy modalities. Chapter 7 provides the methodology for the intervention study, and Chapter 8 provides the results. The discussion around the results is reflected in Chapter 9.

The study concludes with an integrated discussion in Chapter 10, and the final conclusion is discussed in Chapter 11.

## CHAPTER 2: LITERATURE REVIEW (PART ONE)

This chapter aims to review the literature specifically exploring the impact of TBI within young offender and prison populations before critiquing the literature exploring the prevalence of TBI specifically within the prison population.

### Impact of TBI in young offenders and the prison population

Consistent with findings in the general population that TBI is associated with long-term consequences such as mood dysregulation, cognitive issues, epilepsy and mental health concerns (Morrell et al., 1998), young offenders with a TBI have been found to be more likely to disclose depression (odds ratio [OR]: 2.31), psychological distress (OR: 2.05), being bullied (OR: 2.22), using cannabis (OR: 1.92) and illicit drugs (OR: 2.10) prior to imprisonment (Moore, Indig & Haysom, 2014). Further, in the mild and moderate/severe youth TBI cohorts, one third are reported to have an on-going substance issue or behaviour issues. However, 56% of youth in one study had a TBI prior to their first offence, 30% after their first offence and 14% at the same time (Gordon, Spielman, Hahn-Ketter, & Sy, 2017). Prisoners with TBI are reportedly younger on entry to prison (with a mean age 16.4 years), spend on average seven months longer in prison, and present more frequently in custody (Williams et al., 2010).

The links between childhood TBI and drug/alcohol abuse in the general population (Durand et al., 2016; Fishbein et al., 2016; Colantonio et al., 2014, and Williams et al., 2018) have also been supported in research within the prison population. One study conducted with prisoners in the US found that 92% of the prisoners

with TBI had used illicit drugs, with a starting age of 15.1 years; and 56% reported their first TBI preceding their use of illicit drugs (Fishbein et al., 2016). The study found there was a statistical link between having a TBI, violence and drug use within the prison population. The authors proposed that the prisoners were vulnerable, which made them more susceptible to drugs, violence and TBI as a result of low IQ, mental health issues and socio-demographic factors.

A large TBI and epilepsy prevalence study was conducted in France, involving 1221 female, male and youth prisoners, with a mean age of 30 years and 16 years respectively for adults and youth (Durand et al., 2016). The authors found that prisoners with TBI perceived their health to be worse than those with epilepsy; they spent more time in prison over the preceding five years and consumed more alcohol and drugs than those with epilepsy. This study revealed that a TBI can have a significant impact on a person's life within prison.

A study was conducted in a Scottish prison examining the health-related quality of life for prisoners with ADHD and TBI (Young et al., 2018). 390 male prisoners were screened for ADHD and self-reported TBI, along with a large battery of other neuropsychological measures to determine cognition, emotion, ambulation, vision and pain, in addition to quality of life. Further, their utilisation of health services in the prison was captured. It found that those prisoners with a diagnosis of ADHD were three times more likely than their non-ADHD peers to have a lifetime TBI. Further, the ADHD with TBI cohort were more likely to access prison health services, especially for mental health support, and had a lower IQ, with a lower quality of life. 39% were also diagnosed with conduct disorder. The authors noted there was no robust evidence to demonstrate a causal link in either direction. This study is the first of this size to explore TBI

prevalence in an ADHD cohort. Prison is a challenging location for any prisoner with either condition, and the burden of these two disabling conditions has not previously been explored in the literature. This will better inform healthcare for prisoners with these conditions, but does sit outside the scope of the prevalence study. It may, however, contribute to future research. Other studies have utilised medical conditions as comparisons, such as BPAD (discussed in a later section) (Del Bello et al., 1999). There is a complex interplay between ADHD and TBI, with both demonstrating deficits in executive functioning. Both ADHD and TBI are over-represented in prison populations, with rates reported to be 26% and 60% respectively (Young et al., 2018).

Given the complex sequelae following a TBI, it is important to consider the management of prisoners with TBI while incarcerated, including their access to services and their ability to successfully rehabilitate. There have been studies exploring TBI prisoners' access to in-prison health services. The literature supports the notion that prisoners with TBI access more healthcare services, compared to their non-injured peers; and, aside from mental health issues and low pre-morbid IQ, no other clear reasons for this have been identified (Piccolino & Solberg, 2014 and Young et al., 2018).

One study undertaken in Australia involved 200 prisoners and 200 members of the community (Perkes et al., 2011). Tests were administered to consenting participants, who were postcode matched, using a self-reporting TBI questionnaire, Kessler psychological distress assessment, alcohol and drug consumption assessment and a personality examination. Whilst the medical care was reported to be comparable, the prisoners were noted to have more distressing symptoms following their TBI. Perkes et al. (2011) found that

imprisonment was not associated with TBI but lower education, drug and alcohol use, impulsivity and dissocial personalities were. This study adopts a different perspective on TBI in prisons by providing a matched community sample. The findings also challenge what is represented by other prevalence studies, where a connection is made between TBI and prison. This study more reflects the complex relationship between personality and socio-demographic issues which have a dynamic interplay in any individual's journey to prison. It is also noted that the community prevalence in this study is high compared to other studies, and, as such, may further support the contribution of socio-demographics to TBI.

In the Piccolino & Solberg (2014) study, 1029 newly admitted male prisoners were consecutively screened utilising a self-reporting format, categorising the TBI, rates of recidivism, offender related treatment and the prisoners' utilisation of the health services (Piccolino & Solberg, 2014). The study categorised prisoners into three groups relating to the probability of TBI sequelae (low, medium and high), based on incidence and severity of TBI. The utilisation of health services somewhat matched the probability ratings, in that the high probability group were the largest consumer of health services (mostly psychological support) and the low probability group utilised the health services the least. Prisoners with TBI utilised health services more than those without TBI. Fewer high probability group prisoners were able to complete offence-based rehabilitation (63%) compared to the low probability group (81%). There was no statistical difference between the groups in relation to in-prison infractions. However, there was evidence that the high probability group had an increased rate of recidivism (51%) compared to the low probability group (33%), and the differences were statistically significant. Given those prisoners with repeated or moderate to

severe TBI have increased health needs, this could be considered in factoring the development of healthcare services in prisons. There are limitations in relation to recall bias and inaccuracies; however, the information assists providers in the holistic care of prisoners with TBI.

From an offending in prison perspective, prisoners with medically-attended TBIs have been reported to be less able to follow rules and have experienced 50-86% more in-prison infractions relating to violence than those prisoners without a TBI (Shiroma et al., 2012 and Merbitz et al., 1995). It is reported that this relates to executive dysfunction and cognitive challenges. Further, prisoners with TBI have been reported to be 1.5 times more likely to bully others, 1.5 times more likely to have been incarcerated within the previous 12 months and had three or more periods of incarceration in their lifetime (Moore et al., 2014). Contributing to in-prison infractions are some of the most common long-term sequelae of TBI. These are reported to be passivity of behaviour (or apathy), followed by a decrease in memory and ability to learn (Merbitz et al., 1995). Apathy is seen as a major barrier to successful reintegration (Arnould, et al., 2016). A sense of connection is seen as a protective factor (Freeman, Adams & Ashworth, 2015). This can be challenging for prisoners who have anti-social personality traits and complex family dynamics, with pre-arrest behaviour seen as having a significant link to post-TBI behaviours (Elbogen et al., 2015).

An interesting, but unusual, study was conducted into men detained in protective segregation and custody in a US prison (Merbitz et al., 1995). The men were interviewed by a psychologist to elicit their TBI history, including behaviours and disciplinary infractions while in prison. The study found 32% had a TBI history, and men with TBI

were twice as likely to behave in a manner that attracted disciplinary action compared to their uninjured peers. From the learnings of this study, Shiroma et al (2012) further extended the study methodology to explore the relationship between medically-attended TBI and in-prison infractions. A large longitudinal study was conducted in the US, involving custodial and health file reviews for 16,299 male and female prisoners across an eleven-year period. The study found there was a statistically significant relationship between males with and without medically-attended TBI. Males with TBI were older, African-American, with higher levels of violence-related offences, having spent more time in prison compared to their uninjured peers. Further, males with medically-attended TBI were more likely to have substance abuse issues on admission compared to males with no TBI. It is acknowledged that both studies provide valuable information but, as previously discussed, a large number of prisoners do not seek medical attention for their TBI due to perceived knowledge deficits around the importance of this (Horn & Lutz, 2016). Further, there are concerns about the mechanism of injury (which is reported to be violence-related) and the potential for custodial involvement.

A small study (n=50) was conducted in the US involving both male and female prisoners. Prisoners were recruited into the study by their TBI status, until 25 participants were recruited with and without TBI (Slaughter et al., 2003). 87% of the participants described a lifetime TBI, 36% of the participants had sustained a TBI within the previous 12 months, and 29% described experiencing a mild TBI. Following neurocognitive testing, it was established that there were increased mean scores for anger, aggression and mental health issues, especially for those with a TBI in the previous year. It is difficult to extrapolate the learnings from this study given the small sample size; however, the measures of mental health issues, anger and

aggression are helpful in establishing the care needs for prisoners in prison and confirm the need to consider TBI history in prisoner management.

### Screening for TBI history in prison populations

Given the impact of TBI within young offenders and prisoners, it is important to determine the extent of this issue within these populations. Establishing the absolute prevalence of TBI in prison populations, though, is not without its challenges. Given the low feasibility of using imaging within the prison environment, the lack of accuracy of imaging in detecting mild TBI and the risk of underestimating the burden by using only medically-verified injuries due to poor reporting, the use of self-reported TBI screening tools requires consideration (Merbitz et al., 1995).

Whilst the use of such tools has been criticised by some researchers (McKinlay & Albicini, 2016) for being unreliable, with only 10% of participants from a birth cohort being able to accurately describe TBI events from 0-5 years and 31% from 6-10 years, this is contradictory to other reports that denote self-reporting as a valid and reliable measure of TBI (Schofield et al., 2011 and Pitman et al., 2015). Consequently, self-reporting is seen as one of the most efficient ways of assessing TBI prevalence. Indeed, some refer to self-reporting as the gold standard, given the lack of medical care for many at the time of their injury (Corrigan & Bogner, 2007). Common screening tools include the Traumatic Brain Injury Questionnaire (TBIQ), Ohio State University Traumatic Brain Injury Identification method (OSU-TBI-ID), Brain Injury Screening Questionnaire (BISQ) and the Brain Injury Screening Index (BISI).

One study tried to explore whether cognitive ability affected reporting of TBI with TBI screening tools by exploring the concordance between self-reporting TBI history formats and neuropsychological assessment. Conducted in the US, 225 male and female prisoners completed the TBIQ and then a series of neuropsychological tests (Diamond, Harzke, Magaletta, Cummins, & Frankowski, 2007). The average age of the cohort was 35 years and the age of their first arrest was 20 years old, with an average prison sentence of 90 months, for predominantly drug-related offences. 88% of these prisoners were found to have a TBI utilising the TBIQ. The tool was found to have satisfactory test-retest reliability, internal consistency and there was evidence of criterion validity. There were also no significant discrepancies identified between the TBIQ and the neuropsychological measures, which indicated that the use of self-reporting (whilst there were some concerns) had potential for use in prisons.

A further study reporting concordance between self-reporting and neuropsychological testing was undertaken in the UK exploring the use of a simplified TBI screening tool (the BISI) with a group of 139 prisoners and with 50 non-TBI controls (Pitman et al., 2015). The study indicated that prisoners were reliable disclosers of TBI history. However, there were some limitations in this study. Only prisoners who spoke English were included, which limited the number of vulnerable individuals screened and potentially missed a large cohort requiring additional care. Further, the screening took place within the first day in the prison in the admissions area, which could reflect the stress around being received into a prison. There are no studies evaluating the impact of when TBI screening occurs on self-reporting, however, there is strong anecdotal evidence that this is not the best time to screen prisoners, except to conduct immediate risk

assessments. Consequently, screening may be more appropriately conducted within the first weeks or month following admission in preference to the first day.

Whilst there are several tools available, an attempt was made to validate the OSU-TBI-ID and BISI for use in prisons (McGinlay, 2017). It was found that both tools performed effectively, however the OSU-TBI-ID had better construct validity than the BISI. Currently there is no consensus around the most appropriate tools for screening in prisons, yet there is growing consensus of the need to use self-reported formats to prevent underestimation of the burden of TBI in this population.

### Prevalence of TBI in prison populations

There have been a number of studies exploring the prevalence of TBI history with prison populations. One widely cited meta-analysis explored studies between 1983-2009, including 20 studies involving 4865 prisoners, predominantly in the US, with a mixture of random and convenience sampling (Shiroma, Ferguson & Pickelsimer, 2010). The overall prevalence of TBI in prisons was 60%, increasing to 64% in male offender populations. When including a psychologist interview/assessment (which was reported to be the gold standard) the prevalence increased to 70%. Whilst highlighting the high prevalence of TBI in prison populations, caution should be taken as sampling was predominantly from the US, which has the world's highest incarceration rate (Tsai & Scommenga, 2012).

In two meta-analyses there was evidence of inclusion of one study based on the NZ prison population, which revealed that the

prevalence of TBI was even higher, with 86% of respondents reporting that they had experienced at least one TBI in their lifetime (Barnfield & Leathem, 1998). Allowing for some visibility into the NZ prison context, this unique NZ study reported the risk of sustaining a subsequent TBI following the first event increased by a factor of two, and following a second TBI increased by a factor of eight (Barnfield & Leathem, 1998). However, this study was very small and was based in a provincial prison with a small population of 360 prisoners, with no mention of how the participants reflected the wider NZ prison population. The study also used terminology not in keeping with other literature, such as 'light' TBI. The term 'light' was not defined in the study, which makes it difficult to interpret and translate the findings. The most recent NZ data indicates that 64% of prisoners have a lifetime prevalence of a TBI, with a much higher rate (74%) for Māori (National Health Committee [NHC], 2010). It should be noted that this was based on a 2005 prisoner health survey which covered a number of health components for prisoners and their families. This was not a prevalence study and was not guided by an interview, so does not support prisoners with language or literacy issues (who may have struggled to answer the questions appropriately). The document does note the requirement for a structured approach to screening prisoners for TBI.

At the time of writing there have been five prison-based TBI prevalence studies conducted in Australasia. 80% of those studies utilised a self-reporting format (Barnfield & Leathem, 1998; Perkes et al., 2011; Moore, et al., 2014, and Woolhouse, McKinlay & Grace, 2017). One of the studies conducted in Australia randomly studied 200 new prison entrants in New South Wales (Schofield et al., 2011). Prisoners were screened using a questionnaire either on arrival at a police cell or on admission to prison. The study reported that 82% of

prisoners experienced a TBI with or without LOC, with 59% recorded as mild. This study also attempted to validate the TBI self-reporting tool through verification with medical records. It was successful in validating 70% of the reported TBIs. The analysis conducted included only medically verified TBIs and therefore may underestimate prevalence. This study was also very small (200 participants), so, whilst it contributes to the TBI prison knowledge, caution should be taken in extrapolating any learnings. The remaining four studies have been discussed in other parts of this literature review.

A prevalence study conducted in the US involved 1000 consecutively admitted prisoners. The prisoners were admitted with charges ranging from burglary to murder (Morrell et al., 1998). TBI screening occurred utilising a self-reporting format. 25% of prisoners disclosed a lifetime prevalence of TBI, with 3% reporting two or more. The most frequent mechanism of injury related to fighting. 20% reported on-going symptoms which included problems with memory (11%), changes in mood and behaviour (10%) and post-injury seizures (10%). As this was a very early study there was no particular tool used and there was no classification of severity, which would have positively contributed to additional analysis and discussion. The authors commented on the concerns around self-reporting and the requirement for caution when interpreting results. Further, a valid discussion was presented on the need for rehabilitation with TBI, given the challenges either with coming to prison or remaining compliant in prison.

A further study utilising the OSU-TBI-ID sought to understand the prevalence of TBI in a US prison receiving area (Ray, Sapp & Kincaid, 2014). Across a period of one month 831 male prisoners were screened. The study found that 36% of the prisoners had a TBI, with

20% being classified as mild and 24% experiencing a loss of consciousness. The prevalence in this study is low, which could reflect the timing of the assessments, with them being completed immediately on arrival at prison. Further, the study had an unusual and unexplained category called 'possible TBI' (accounting for 6% of the positive TBI result) which is difficult to analyse, as the questions in the screen are binary (yes or no). The study does assist in understanding the utilisation of a self-reporting tool in prisons and undertaking a brief assessment.

All of the above-mentioned studies make positive contributions to the knowledge around screening prisoners for TBI. The tools (validated or not) are reasonably similar in their configuration. There are limited studies conducted in NZ, and there is some benefit in attempting to align with them wherever possible to provide comparisons with the NZ context. That being said, at the time of the commencement of the study, the only NZ prison prevalence study had been conducted twenty years prior.

To try and address the methodological issues around the heterogeneity of studies, Farrer & Hedges (2011) pooled prevalence data to calculate the un-weighted mean lifetime prevalence of TBI. This was found to be 51%, which is lower than that previously mentioned in an earlier meta-analysis (Shiroma et al., 2010). However, it remains higher than levels found in the general population, which have been reported to be 38% (Durand et al., 2016). Most of the studies used in this meta-analysis were based in the US and United Kingdom, with one NZ study included. They noted that there may be a link between TBI and behaviours which contributed to crime and incarceration; and that these behaviours were likely to increase over time, which has been discussed

previously. There was considerable variation in the methodological quality of the studies included in this meta-analysis, with some studies limited by poor respondent rates and small self-selecting sample sizes which may limit generalisability of the findings.

## Gender

The studies available at the time of writing largely focussed on male adult prisoners (Barnfield & Leathem, 1998; Del Bello et al, 1999; Williams et al., 2010; Perkes et al., 2011; Davies, Williams, Hinder, Burgess, & Mounce, 2012; Piccolino & Solberg, 2014; Ray et al., 2014; Pitman et al., 2015 & Young et al., 2018) and mixed prison populations (Slaughter et al., 2003; Shiroma et al., 2012; Ferguson et al., 2012; Colantonio et al., 2014; Moore et al., 2014; Elbogen et al., 2015; Durand et al., 2016; Fishbein et al., 2016, and Gordon et al., 2017). Two studies did not report the subjects' gender (Merbitz et al., 1995 and Morrell et al., 1998).

The mixed gender studies reported variance between male and female prisoners. The prevalence of TBI for males (in the mixed studies) ranged from 6-80%; while female prevalence was reported to be 6-73%, which are both wide ranges. The lower aspect of the range for both sexes relates to a study exploring medically-attended TBI. In the male-only studies, rates were reported to be much higher than in the mixed gender studies for males, with the prevalence being 32-94%, and a mean prevalence of 69%. It is unclear from the methodology or discussion in these studies as to the factors that may have influenced these differences. The dominant mechanism of injury reported in the male studies was violence. As previously discussed, males with TBI who were noted to be older and African-American had, with higher levels of violence-related offences, spent

more time in prison compared to their uninjured peers (Shiroma et al., 2010). Further, males with medically-attended TBI were more likely to have substance abuse issues on admission compared to males with no TBI (Shiroma et al., 2010).

At the time of writing there were two female-only studies, with prevalence ranging between 21-95% (Durand et al., 2017 and Woolhouse et al., 2017). The prevalence in these studies is much higher than the mixed gender studies. There were very small sample sizes, ranging from 38-100 participants. Compared to community samples, imprisoned women experienced much higher rates of TBI, with the most common mechanism of injury being violence, such as intimate partner violence (23% in the community compared to 75% in prisons) (Wall, Gorgens, Dettmer, Davis & Gafford, 2018) or being the victim of childhood sexual abuse (Brewer-Smyth, 2008). Further, women convicted of violent crimes were more likely to have experienced a TBI prior to their crime (Brewer-Smyth, 2008).

There is some agreement that those prisoners with TBI, regardless of gender, have had greater exposure to adverse events during their childhood. A considerable number of prisoners (64% of male and 78% of female prisoners) are reported to have been exposed to family alcohol abuse, and 48% of male and 55% of females witnessing family violence (Colantonio et al., 2014). It is noted that women experienced more physical and sexual abuse than their male counterparts. Whilst the mechanism and rates of TBI prevalence differ between the sexes, the rates of TBI still far exceed that of their non-prison peers.

## Offender sub-types

There is heterogeneity in the studies reviewed from an offender-type perspective. Populations included: those in protective custody, male and female mainstream and segregated prisoners, offenders in the community, and young offenders. From the studies it was noted that those with a TBI were more likely to commit crimes, be in trouble in prison and to reoffend following release from prison (Williams et al., 2018). The focus of this section will be youth offending and the various adult offence types. Gender differences in offence types will not be explicitly explored. However, only a few studies looked at the offence type.

As an early TBI disrupts the brain's development and contributes to poor impulse control and emotional regulation, violence both as an offence and a consequence of TBI is an important aspect of prison care that warrants further exploration (Williams et al., 2018). People with TBI are three times more likely to commit a violent crime than those without TBI, and two times more likely than their unaffected peers (Fazel et al., 2011). Further, violence may be manifested as Intimate Partner Violence (IPV), with a complex interplay between pre-injury personality characteristics, such as the individual's world view of relationships and the executive dysfunction and impulse control issues associated with TBI (Farrer, Frost & Hedges, 2012). However, it is noted that violence plays out as a result of complex dynamics, family of origin and adverse life events contributing the overall picture for the individual (Williams et al., 2018 and Elbogen et al., 2015).

Given the complex interplay between pre-injury behaviours and TBI, it is relevant to explore offences which may have had a significant

impact on their victims. It has been suggested that TBI may be a mediating factor in sexual offending (Del Bello et al., 1999). This is thought to be dependent on the area of the brain damaged. A study was undertaken in the US to assess the relationship between TBI, bipolar affective disorder (BPAD) and sexual offending. Male parolees (n=25) in a sexual offender half-way house were assessed for TBI and BPAD. Non-sexual offenders with a diagnosis of BPAD (n=15) were also included. The study found that 36% of sexual offenders had a history of at least one TBI, and that having a diagnosis of BPAD increased the risk of a TBI compared to those without BPAD or sexual offending. Of interest, those with TBI reported experiencing their first TBI prior to their first sexual offending. However, a causal link cannot be established as the sample size was very small and the study relied on recall which is subject to bias. Nevertheless, this provides information around a specific category of crime that is reflected quite significantly in the NZ prison system (19%) (Department of Corrections [New Zealand], March 2018). Further, sexual offenders will form part of the intervention, so it provides valuable information around TBI and possible mania, but caution will be adopted in relation to the direction of the relationship, if at all.

Further, it has been reported that between 5-35% of sexual offenders have been found to have some neurological damage (Simpson, Blaszcinski, & Hodgkinson, 1999). A study was undertaken to explore the relationship between TBI and sex offending. The retrospective case review was conducted with TBI survivors in an Australian brain rehabilitation inpatient and outpatient facility to elicit the incidence of sexual offending. Sexual offending was classified as exhibitionism (exposing genitals), frotteurism (gaining pleasure from rubbing genitals against another person without their consent), toucherism (gaining pleasure from rubbing hands against a person

without their consent), voyeurism (gaining sexual pleasure from watching other people naked or engaging in sexual activity), aggression and rape. All files were evaluated for evidence of these activities, and 6% (n=445) of male patients were found to have participated in activities that related to sexual inappropriateness, with the most common offence relating to inappropriate touching. The sexual offending cohort had more severe TBIs, were younger in age and this was found to be statistically significant. Further, it was noted that more than half of those that did offend did so largely on one occasion, four of which had a previous criminal record and two of which had a premorbid sexual offending history. The victims of their offences were staff, strangers, other TBI survivors and family, with 12% of the offences being against children, and charges being brought against 10 subjects, who at times offended on more than one occasion. The results were somewhat skewed as the rehabilitation centre cared for predominantly severe TBI-injured clients, and the sexual offending was restricted to the time in the rehabilitation centre, not following discharge. The study also relied on disclosure of offending, which was felt to be under-reported. However, these studies have identified a possible link between TBI and sexual offending. This does provide some interesting context as the prevalence of TBI in sexual offenders in NZ prisons is not widely understood. It would be interesting to explore the causal relationship (if any), in either direction. This study did also provide valuable context in relation to the region of the brain affected and the behaviours, but did also state that sex offending following a TBI may be attributed to pre-injury behaviours and personality.

At the time of writing there was one study which explored TBI in the context of sentence length. A study was conducted in the US with 'about to be released' and life sentence prisoners (Ferguson et al.,

2012). In total, 636 male and female prisoners were screened using a validated self-reporting TBI screening tool. Of interest, the female prisoners reported a higher prevalence of TBI (72%) compared to their male counterparts (65%), which is not reflective of other studies (Shiroma et al., 2010). On average, all sub-groups of prisoners reported 2.1-2.7 TBIs in their lifetime, with 1.5-2.2 TBIs with LOC. 'About to be released' women reported greater symptomatology compared to men, with the most common issue being on-going headaches. There were challenges in comparing the findings with other studies because of the heterogeneity of studies and methodological issues with defining TBI; however the authors did find concordance with similar studies. The authors adopted an interesting sub-grouping of their sample population (almost released and life sentence or death row prisoners) with no clear reason for this. However, it may be useful to explore different prison sub-groups in the future to better understand the specific care requirements and TBI-associated needs.

### Methodological quality

One of the biggest issues facing TBI research, both in the community and in prisons, is the heterogeneity of studies, including the definition and severity of TBI (McKinlay & Albicini, 2016). The gold standard is reported to be the Glasgow Coma Scale (GCS), and the Abbreviated Injury Scale (AIS) (Rogers & Trickey, 2017). The AIS requires radiographical diagnostics, so this in turn eliminates many of the people experiencing mild TBI who fail to seek medical assistance.

The definition and severity classifications for TBI in a large number of prison TBI prevalence studies is not clearly articulated (Morrell et al., 1998; Del Bello et al., 1999; Shiroma et al., 2010; Perkes et al.,

2011; Ferguson et al., 2012; Ray et al., 2014; Durand et al., 2016; Fishbein et al., 2016, and Young et al., 2018). There appears to be some agreement that the definition of mild TBI is considered to be a LOC of less than 30 minutes, with aggregation of moderate and severe TBI into one category, defined as a LOC reported of more than 30 minutes (Slaughter et al., 2003; Colantonio et al., 2014; Moore et al., 2014; Piccolino & Solberg, 2014; Gordon et al., 2017 and Woolhouse et al., 2017). However, how this definition is implemented varies considerably within the literature.

There were also definitions of TBI which were unique, with the inclusion of terms such as 'light' TBI and mild complicated TBI (Barnfield & Leathem, 1998; Pitman et al., 2015; Williams et al., 2010, and Davies et al., 2012). The heterogeneity of definitions makes comparison and synthesizing the prevalence information challenging, but it does provide insight into the importance of gaining consensus internationally to better understand the prevalence of TBI in prisons.

There are a variety of self-reported formats and screening tools that may be contributing to a high degree of heterogeneity. Indeed, a large number of studies utilised similar questions but did not utilise an established or prison-specific validated tool (Merbitz et al., 1995; Barnfield & Leathem, 1998; Morrell et al., 1998; Del Bello et al., 1999; Slaughter et al., 2003; Williams et al., 2010; Perkes et al., 2011; Davies et al., 2012; Colantonio et al., 2014; Moore et al., 2014; Durand et al., 2016, and Young et al., 2018). Whilst these available tools all aim to elicit lifetime TBI, the differences in the wording of the questions is likely to yield considerable differences in reporting by participants. Given the lack of a gold-standard TBI history screening tool, it is important to have some well-justified questions to help

people to remember events from a long time ago to facilitate recall and to clearly define what is meant by a TBI to ensure accurate reporting. It is also important to include TBIs sustained within prison, given evidence that 10% of the prisoner cohort sustained at least one TBI in prison (Perkes et al., 2011).

In conducting observational studies there are many challenges, not least of which is the provision of controls, despite an acknowledgement that this increases scientific integrity (Durand et al., 2017). At the time of writing ten studies did not utilise any controls or comparison groups (Barnfield & Leathem, 1998; Morrell et al, 1998; Williams et al., 2010; Davies et al., 2012; Ferguson et al., 2012; Colantano et al., 2014; Moore et al., 2014; Piccolino & Solberg, 2014; Gordon et al., 2017; Woolhouse et al., 2017, and Young et al., 2018). TBI prevalence in these studies was reported to be 25 – 95%. Further, the studies predominantly utilised opportunistic sampling (prisoners screened on immediate arrival to prison), however there was heterogeneity in the studies and sample sizes were at times very small. Notwithstanding that, the studies provided valuable information that assists with informing the prevalence study, both from a methodological and data collection perspective. Additionally, at the time of writing there were no studies which reported on TBI that were not medically-attended, which is acknowledged to be approximately 90% of mild TBI (Forrest, Henry, McGarry & Marshall, 2018).

## Summary

In prison the prevalence of TBI is much higher than in the community, and prisoners are reported to experience significant challenges whilst in prison, including in-prison infractions. Whilst medical information

is reported to be the gold-standard for ascertaining prevalence, it is not always possible and there are considerable resource implications associated with this method. Further, many prisoners do not seek medical assistance as they either do not understand the importance of this or their injury is associated with violence so they are cautious in disclosing the genesis of their injury. A self-report method of screening prisoners for TBI is important to assist prison services with developing care plans and support for prisoners with TBI.

Further, prevalence data is important to identify those most at risk so interventions can be designed and targeted accordingly. It is proposed that through evidence-based, structured interventions and focussed care, the incidence of violence and behavioural issues subsequent to TBI may decrease. Decreases in violent behaviour within the prison would reduce injuries to the prisoner, prisoner colleagues and staff within the prison (Ferguson et al., 2012). Knowledge of TBI history could also be used by the reintegration team to help prepare for the prisoner's release, ensuring all of the necessary supports are in place to successfully reintegrate into the community and therefore potentially contribute to reducing recidivism. Crucially by reducing recidivism, there may be a decrease in the impact on victims of crime. In addition, the financial cost of imprisonment (approximately \$91,000NZ per annum) may also be reduced. Reducing recidivism is one of the Department of Correction's key strategic goals for 2014-17 (Department of Corrections, 2014) so this study links strongly to the strategic direction of the Department.

## CHAPTER 3: METHODS (PART ONE).

### Ethics approval

This study received ethical approval from the Auckland University of Technology Ethics Committee (15/41) and Kohuora Ethics committee (15/001) (Appendix A).

### Defining and screening for TBI

In preparation for the opening of the Auckland South Corrections Facility (ASCF) in May 2015, questions to determine a person's TBI history were integrated into the routine initial digital health screen. The TBI screen sought to determine if there had been a lifetime history of brain injury for the prisoner.

As many TBIs go unreported or unrecorded in medical notes, a self-reported TBI history was undertaken to prevent under-reporting of TBI. Previous evidence has revealed that prisoners provide more accurate information on TBI when compared to evaluation of medical records (Pitman et al., 2015; Schofield et al., 2011, and Schofield et al., 2006).

The TBI screening questions were taken from a NZ general population incidence study of TBI to enable comparison of the findings to the general population. These questions were developed to operationalise the World Health Organisation definition of TBI (Feigin et al., 2013). Participants were asked if they had experienced an accident where they hit their head and felt dazed, confused or lost consciousness afterwards. Participants were then

asked to provide details of the accident for each incident experienced (see appendix B). The questionnaire included the following: 1) The number of incidents where the prisoner had hit his head in his lifetime; 2) Descriptions of the last five incidents with ("What were you doing when you hit your head?") along with the age of the individual at the time of the incident; 3) If there was a loss of consciousness and the duration of this; and 4) Confirmation of symptoms at the time and following the incident, which included post-traumatic amnesia, seizures, vomiting, headaches, loss of balance, memory issues and visual disturbances. As part of the detailed questioning, the prisoners were asked to report whether they were rendered unconscious. The prisoners were then asked if they could recall or had been told how long they were unconscious for, which provided valuable information around the severity of the injuries. The severity of the injuries were categorised as: unsure or not noted in the assessment; mild (dazed or unconscious for less than 30 minutes); moderate (unconscious for more than 30 minutes but less than 24 hours); or severe (unconscious for more than 24 hours). The prisoners were also asked to report yes or no to whether they had experienced any of the symptoms (including amnesia, seizures, vomiting, headaches, loss of balance, visual disturbances and memory issues) for each injury they had sustained, reporting up to five TBIs. These questions have previously been effective in identifying brain injuries for which people have not sought medical attention (Feigin et al., 2013).

### Participant recruitment

The TBI history screen was offered to all newly arriving prisoners. Participants for this study were consenting male prisoners who were admitted to the ASCF over a 6-month period between 18 May 2015

and 18 November 2015. Participants included a wide variety of prisoners, many of whom resided in the local area prior to incarceration or had family in the local area. All participants were sentencing, meaning they had all been convicted of a crime and had a defined period of stay, ranging from one month to life imprisonment. Prison experience in this cohort was also varied, ranging from newly sentenced prisoners to experienced or recidivist offenders (with repeated periods of incarceration).

## Procedure

On admission to ASCF all prisoners undertake a brief standardised health and custodial risk assessment which assesses for risk of harm to self or others and identifies any urgent medical issues. A recall (reminder) is then placed in the electronic health record for a more detailed health assessment which is called an Initial Health Assessment (IHA), and at ASCF this included a TBI screen. Prison-regulated healthcare staff (intern psychologist and registered nurses) were responsible for the administration of this health screen. All staff received training and supervision prior to administering the TBI screening tool and had experience in working with male prisoners to improve consistency of delivery of the tool.

Prisoners were electronically messaged via the internal Custodial Management System (CMS) with their appointment time for their health screening. The nurse invited them into a private interview space within the accommodation areas. If the prisoner had a low propensity for violence, custodial staff (officers) waited outside the door to allow for privacy. As is the case for all assessments and interventions following initial consent, verbal consent was obtained

for each episode of care. Verbal consent was re-checked at the time of the IHA and TBI screening. At the commencement of the study all newly arriving prisoners had been sentenced for some time and they were not familiar with the TBI screening procedure, so it was seen as beneficial for the interview to start with something familiar to develop trust and confidence in the process, and then to proceed with the TBI screen. Following an explanation of the purpose of the TBI screen, the healthcare staff member administered the TBI screening tool. If English was not the prisoner's primary language, a member of staff who was able to converse in the participant's primary language administered the health screen, or, alternatively, the telephone interpreting service was utilised. Where the prisoner noted that they had received four or more TBIs but were unable to recall the details of other injuries, only the number of TBIs with details recalled were recorded. Some prisoners indicated they had received 'lots' of TBIs, but on further questioning only recounted 1-3 TBIs. Asking for explicit details of the injury enabled the researcher to determine whether a TBI was likely to have been sustained or not. The TBI screening tool was administered between one and 21 days post-admission. Flexibility in timing of administration of the tool was needed in order to account for triage priorities following admission. For example, if significant or unstable health issues were identified in the reception health screening, the prisoner was booked to see the nurse the following day and the TBI screen was also completed at this time. However, because the prison was new, most of the men (>99%) were stable and were seen between 7-10 days after arrival on average. The TBI screen took between 5 and 15 minutes to complete, which was dependent on the number of TBI events.

Following the completion of the TBI screens, the paper documents were placed in a central secure location where they were entered into an encrypted spread sheet and then scanned into the electronic health record. Only the researcher and an intern psychologist were able to access the encrypted spread sheet. The database was updated at least every second day during the working week as the prison received between 48-60 prisoners per week during the build-up phase (May – October 2015). The TBI screens were cross-checked against a new arrivals report to ensure all prisoners had been offered a screen. Those that did not consent to the TBI screen were noted on the encrypted spread sheet. Spot checks were conducted throughout the data capture, which included accessing 35 TBI screens and cross-checking this information with the data on the encrypted spread sheet. Each time the encrypted spread sheet was accessed an updated version was saved to limit the impact of file corruption.

Demographic information, including age and ethnicity were accessed using the appropriate secure prison systems. Ethnicity was self-identified and categorised in line with 2013 Census information (Statistics New Zealand, 2013) and were listed as Māori, European (New Zealand European and other European), Pasifika (Samoan, Tongan, Niuean and Fijian) and 'Other' (Asian, Indian, South American, African and other) to enable comparison. Offence-related information was accessed from the Integrated Offender Management System (IOMS) which is a NZ nationwide Department of Corrections application. This provided details of the prisoner's unique identifier, the offence, sentence length and the most up-to-date security classification (which is reviewed every six months). In cases where there were multiple offences, only the most serious offence was recorded for the purpose of this study. The categories included

violence, drug-related, sexual, burglary and other (which included dishonesty). The categories align with the Department of Corrections offence categories utilised for reporting (Department of Corrections, 2015). Any identifying information was removed to protect prisoner anonymity. The detailed contents of the offence categories are contained within Table 2.

**Table 2: Offence category description**

| <b>Offence category</b> | <b>Example Descriptions</b>   |
|-------------------------|---|
| <b>Violence</b>         | Grievous bodily harm (GBH)<br>Murder<br>Male assaults female<br>Firearms or weapon-related charges<br>Wounds or injuries with intent to injure or wound<br>Manslaughter<br>Assault (with or without a weapon)<br>Wound or injures with intent to GBH<br>Threatens to kill<br>Attempted murder |
| <b>Drugs</b>            | Manufacturing/supplying drugs<br>Alcohol-related charges<br>Import/export drugs<br>Possession of drugs  |
| <b>Sexual</b>           | Male rapes female/male (under 12, 12-16 years and over 16 years)<br>Unlawful sexual connection (under 12, 12-16 years   |

|                 |  |
|-----------------|--|
|                 | <p>and over 16 years)</p> <p>Indecent assault (under 12, 12-16 years and over 16 years)</p> <p>Knowingly copying objectionable material</p> <p>Husband rapes wife</p> <p>Sexual offences not otherwise noted</p>   |
| <b>Burglary</b> | <p>Aggravated robbery</p> <p>Burglary (by day or night)</p> <p>Theft of a motor vehicle</p> <p>General theft</p>   |
| <b>Other</b>    | <p>Takes or uses document for pecuniary advantage</p> <p>Loss by deception</p> <p>Theft by a person in a special relationship</p> <p>Offences under the tax administration act or passport act</p> <p>Obtains by deception</p> <p>Organised crime</p> <p>Receives stolen goods</p> <p>Other offences against the Judicial Act</p> <p>Extortion</p> <p>Ill treatment or neglect of a child under 18 years</p> <p>Driving offences</p> <p>Arson</p> <p>Kidnapping</p> <p>Contravening a protection order</p> |

|  |   |
|--|---|
|  | Breaching bail conditions<br>Criminal harassment<br>Remaining with intent<br>Disabling/stupefying |
|--|---|

Alongside offence information was the security classification. Security classifications are established using a dynamic online assessment contained within IOMs. It explores the nature of the crime and reviews attitudes and behaviours (and the presence or absence of misconduct charges) whilst in prison. The security classification is reviewed every six months (or following significant adverse events) and the prisoner may be classified as minimum, low, low-medium, medium or high at ASCF. A further category called maximum security exists, but these prisoners are not housed at ASCF. For the purposes of this study, low-medium and medium were combined (to become medium) as there were only six prisoners who were categorised as medium. Prison sentence was classified as less than 12 months, 1-5 years, 5-10 years, 10-15 years, 15-20 years and more than 20 years. This information is based on the statutory release date, which is the day the prisoner legally must be released from prison. For some prisoners there is an additional date called statutory end date, which relates to possible conditions (such as curfews) and controls in place for a further period of time following their release from the prison. It is also noted that prisoners are eligible for parole so can be released prior to their statutory release date. This information has not been recorded as part of the study as it is very detailed and adds no value to the scope of the study.

All demographic information detailed above was entered into the encrypted spread sheet prior to any TBI data in order to ensure the correct data was attributed to the correct prisoner. The TBI screening information was then transferred. This included the accident information, age at accident and symptoms relating to the accident. The details of the accident were then categorised (fall, transport accident, exposure to mechanical force, assault and other) to link to a previous NZ study which examined incidence of TBI in the Waikato region (Feigin et al., 2013) which will allow for future NZ-based comparisons. The detailed accident information is contained within Table 3.

**Table 3: Accident categories**

| <b>Accident Category</b>  | <b>Example Descriptions</b>   |
|---------------------------|---|
| <b>Fall</b>               | From roof, bench, wall, fence, playground equipment, building, over bridge, tree, ladder.<br><br>From bicycle.<br><br>Gymnastics.<br><br>Skateboarding.<br><br>Horse riding.<br><br>From bus or farm bike.<br><br>Dirt bike riding. |
| <b>Transport Accident</b> | Head versus (v) windscreen or steering wheel (not otherwise specified).<br><br>Motorcycle with or without alcohol and with or without helmet (not otherwise specified).<br><br>Car with or without alcohol (not otherwise           |

|   |  |
|---|--|
|   | <p>specified).</p> <p>Car rollover with or without ejection.</p> <p>Pedestrian v car or bus.</p> <p>Torso v windscreen (not otherwise specified).</p> <p>Car v car, tree, pole or kerb.</p> <p>Train v train.</p> <p>Motorcycle v car, kerb or truck.</p>  |
| <p><b>Exposure to mechanical force (accidental)</b></p> | <p>Rugby – tackled, hit pole, knee, head or ground following tackle.</p> <p>Rugby league - tackled, hit pole, knee, head or ground following tackle.</p> <p>Soccer - hit pole, knee, head or ground.</p> <p>Boxing, marital arts or kick boxing.</p> <p>Cricket bat v head (non-assault).</p> <p>Other unintentional assaults.</p> <p>Yachting – boom v head.</p> <p>Gymnastics – bar v head.</p> <p>Basketball – ball v head.</p> <p>Kayaking – head v rocks.</p> <p>Diving – cliff diving (head v ground) or flipper v head.</p> <p>Horse riding – head v stable door.</p> <p>Intoxicated and hit stationary object (such as fence, pole or wall) without falling.</p> <p>Police dog v head.</p> <p>Gunshot wound to head.</p> |

|   |   |
|---|---|
| <p><b>Assault (with intent to inflict harm)</b></p> | <p>Object v head (which includes bin, hammer, mallet, pool balls, baton, pen, table, baseball bat, wine bottle, golf club, axe, wrench, rock, wood, glass and guitar).</p> <p>Prison (not otherwise specified).</p> <p>From behind (not otherwise specified).</p> <p>Fist or foot v head.</p> <p>King hit (“a sudden knockout blow” – Oxford Dictionary).</p> <p>Blind shot (a punch the individual does not see coming – usually from the side).</p> <p>By father (not otherwise specified).</p> |
| <p><b>Other</b></p>                                 | <p>Rugby where no mechanism is described.</p> <p>American football or grid iron.</p> <p>No specific details provided but noted to be hospitalised.</p>  |

All information that may identify the prisoner (such as their name) was kept separate from the data extracted as part of this study. Only anonymised data was analysed and shared. The prisoners were only connected to their details by a unique study registration number. Given the large number of people included in this study and the small number of variables, it was unlikely a person would be identifiable from the data provided.

## Statistical analysis

Data was entered into IBM SPSS Version 24.0 and translated from string values from the prison extract into numeric values to enable statistical analysis to occur. Range, logic and missing data checks were completed to ensure all information was accurate, complete and correctly entered. Skewedness and kurtosis were explored to determine distribution of the data and inform whether parametric or non-parametric tests should be applied (Pallant, 2013). For example, for the variable of age, the skewness (0.689) and kurtosis (-0.108) determined that non-parametric tests should be applied. This was supported by the Kolmogorov-Smirnov (KS) statistic which assessed for normality of distribution. The KS demonstrated a  $p$  value of  $<0.0001$ , which indicated a violation of normal distribution. Comparisons to the NZ prison demographic (Department of Corrections, December 2015) data for age, ethnicity, offence type, security classification and sentence length were made to determine representativeness of this sample. The number of prisoners who experienced at least one TBI in their lifetime were analysed as a frequency and a percentage of the total prison population. Further, rates of TBI were categorised by age, gender, offence category and prison sentence to identify those at highest risk. The contexts within which injuries were sustained were described using frequencies and percentages. Differences in the number of lifetime injuries experienced across the demographic and sentence categories were calculated using binary logistic regression.

## Power calculation

The sample size was calculated using G power 3.1.0 to identify the number of TBI screens required to provide for meaningful analysis. The required sample size was calculated as 568 participants which would allow for understanding the relationship between TBI (dependent variable) and the independent variables (age, ethnicity, offence category, security classification and sentence length), with a medium effect size of 0.3 ( $\alpha=0.05$ ,  $1-\beta=0.8$ , critical  $z=1.64$ , power = 80%). The sample was increased to 1100 to allow for non-completion/refusal and easier data collection over exactly six months, and to facilitate representativeness of the sample (as transfer of high-security prisoners to ASCF did not occur for several months after opening). Following a review of projected admissions across the build-up period a decision was made to screen all newly arriving prisoners for a period of six months, from the day the prison opened.

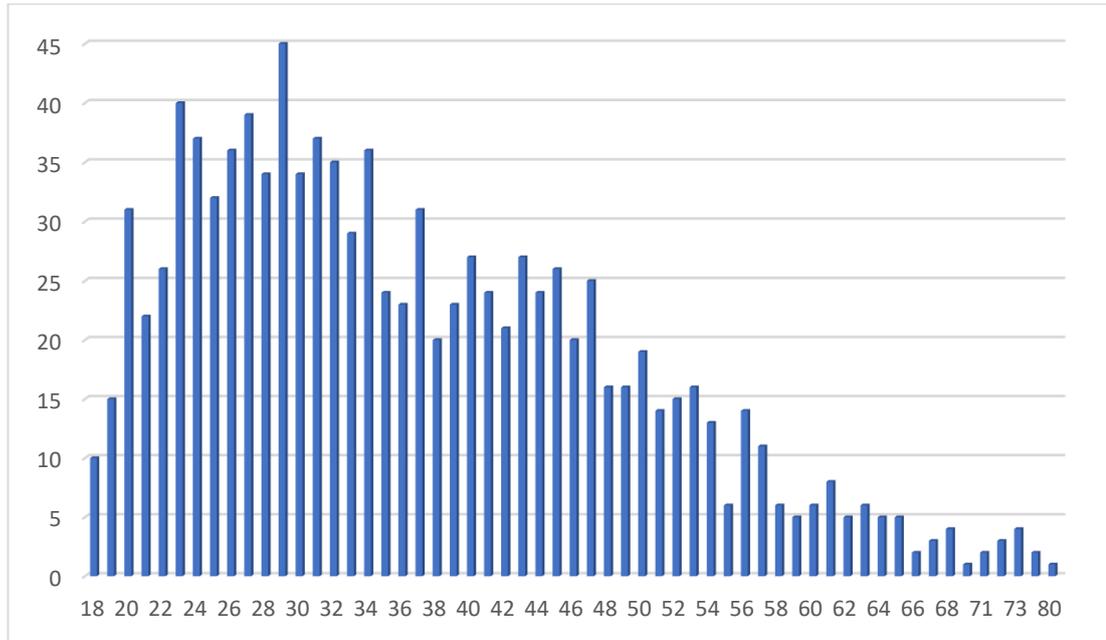
## CHAPTER 4: RESULTS (PART ONE)

### Participant characteristics

Of the 1061 men admitted to ASCF during the study timeframe, 1054 (99.4%) consented to the health assessment. Those who did not consent to the TBI screen were noted on the encrypted spreadsheet. This related to seven prisoners.

It is important to understand the demographics of ASCF and how it compares to the New Zealand total prison population to understand whether the results reflected the NZ Corrections context. In general, the men admitted to ASCF between May and November of 2015 were somewhat reflective of the national prison population (also called prison muster). In this sample, participants ranged in age from 18-80 years, with a mean age of 36.76 (standard deviation [SD] of 12.321) and a median age of 34 years. There was an asymmetrical (skewed) spread of prisoners in terms of age with 34% of the men between the ages of 25-34 years (refer to Figure 4).

**Figure 4: ASCF age frequency, May - November 2015**



This was comparable to the national prison statistics (Department of Corrections, December 2015), and was not statistically significantly different ( $\chi^2= 4.35$  and  $p= 0.367$ ) (Table 4).

There was a significant difference in the ethnicity of the study sample in comparison to the NZ prison population, with a significantly higher proportion of Pasifika men (24% compared to 11% nationally) and men of other ethnicity (13% compared to 4% nationally), but fewer Māori men (41% compared to 51% nationally) and European (22% compared to 32% nationally) (Department of Corrections, 2015) (Table 4).

**Table 4: Representativeness of ASCF in comparison to the Department of Corrections data for the NZ prison population (2015).**

|                                | <b>ASCF</b><br><b>n=1061</b> | <b>Department of Corrections</b><br><b>n=9121</b> | <b>Test of difference</b>      |
|--------------------------------|------------------------------|---|--------------------------------|
| <b>Age</b>                     | <b>n= (%)</b>                | <b>n= (%)</b>                                     |                                |
| Less than 19 years             | 25 (2%)                      | 328 (4%)  | $\chi^2=6.40$<br>$p=0.171$     |
| 20-29 years                    | 342 (32%)                    | 3192 (35%)  |                                |
| 30-39 years                    | 292 (28%)                    | 2462 (27%)  |                                |
| 40-49 years                    | 226 (21%)                    | 1751 (19%)  |                                |
| 50-59 years                    | 119 (11%)                    | 912 (10%)   |                                |
| 60-69 years                    | 44 (4%)                      | 364 (4%)  |                                |
| More than 70 years             | 13 (1%)                      | 109 (1%)  |                                |
| <b>Ethnicity</b>               | <b>n= (%)</b>                | <b>n= (%)</b>                                     |                                |
| Māori                          | 434 (41%)                    | 4615 (51%)  | $\chi^2=299.64$<br>$p<0.00001$ |
| European                       | 234 (22%)                    | 2964 (33%)  |                                |
| Pasifika                       | 259 (24%)                    | 1040 (11%)  |                                |
| Other (including Asian)        | 134 (13%)                    | 501 (6%)  |                                |
| <b>Offence category</b>        | <b>n= (%)</b>                | <b>n= (%)</b>                                     |                                |
| Violence                       | 290 (27%)                    | 3420 (38%)  | $\chi^2=85.83$<br>$p<0.00001$  |
| Burglary/Dishonesty            | 239(23%)                     | 1551 (17%)  |                                |
| Sexual                         | 242 (23%)                    | 2344 (26%)  |                                |
| Drug-related                   | 223 (21%)                    | 1204 (31%)  |                                |
| Other                          | 66 (3 %)                     | 602 (7%)  |                                |
| <b>Security Classification</b> | <b>n= (%)</b>                | <b>n= (%)</b>                                     |                                |
| Minimum                        | 195(18%)                     | 2544 (28%)  |                                |
| Low                            | 182(17%)                     | 2043 (22%)  |                                |
| Medium                         | 295 (28%)                    | 2764 (30%)  |                                |

|                          |                |            |                                      |
|--------------------------|----------------|------------|--------------------------------------|
| High                     | 389(37%)       | 1596 (18%) | X <sup>2</sup> =213.68<br>p=<0.00001 |
| Maximum and unclassified | 0              | 173 (2%)   |                                      |
| <b>Sentence Length</b>   | <b>n= (%)</b>  |            |                                      |
| < 5 years                | 526<br>(49.4%) |            |                                      |
| 5-10 years               | 300 (28%)      |            |                                      |
| 10-15 years              | 105 (10%)      |            |                                      |
| > 15 years               | 133 (16%)      |            |                                      |

As a new prison, ASCF was subject to a very structured 20-week build-up. As a consequence, within the first eight weeks of operation only prisoners from certain groups of offences and security classifications were admitted to the prison. This allowed an opportunity to imbed processes. Consequently violent, high-security, gang-connected prisoners were not admitted to ASCF at this time. Over the following 12 weeks, high-security prisoners were introduced in a staged manner and by October 2015 the ASCF offence categories were similar to that expected of the national prison population.

At the time of the prevalence study there was a statistically significant difference in the prisoners admitted to ASCF when compared with the Department of Corrections in ethnicity ( $p<0.05$ ), offence category ( $p<0.05$ ), and security classification ( $p<0.05$ ). Specific ethnicities were further explored to ascertain whether certain groups were significantly different, however all groups were noted to be significantly different ( $p<0.05$ ). All offence types with the exception of 'other' were also significantly different ( $p<0.05$ ). Likewise, all security classifications, with the

exception of 'medium' were also significantly different ( $p < 0.05$ ). A comparison was unable to be made with the prison sentence length as the Department of Corrections does not display this information publicly.

To some extent, the offence category and the security classification go hand-in-hand, especially in the early stages of a prisoner's sentence. The security classification of the ASCF prisoners is largely reflective of the national prison muster. This also reflects the physical design of the prison, which accommodates 240 minimum-security, 320 low/medium-security and 400 high-security prisoners (refer to Table 4), with a total prison muster of 960 men. It should be noted that the Department of Corrections also has 1.6% of the prison muster classified as maximum security, with 1.6% noted to be unclassified at the time the December 2015 report was published (Department of Corrections, 2015). Neither of those categories of prisoner can legally be housed at ASCF.

### Descriptive statistics for TBI

Of the 1054 men consenting to the health screen, 672 men reported they had experienced a TBI (64%, as shown in Table 5). Most commonly the TBIs were classified as being mild in severity (68%), with 13% being moderate and 5% severe. There were no differences between those who had experienced a TBI and those who had not, based on age, security classification and sentence length, as shown in Table 5. However, differences were observed between the 'TBI' and 'No TBI' groups, based on ethnicity and offence type.

A history of TBI was reported most commonly by participants identifying as Māori, accounting for 29% of all TBIs. A Mann-Whitney (U) test demonstrated that there was a statistical relationship between ethnicity and TBI, with a small effect size ( $U=117810$ ,  $z=-4.065$ ,  $p=<0.00001$ ,  $r=0.12$ ). The chi-square calculation also supported the significance of the relationship between ethnicity and TBI (Table 5).

**Table 5: Age, Ethnicity, offence category, security classification and sentence length by TBI Status, May - November 2015.**

|                                | <b>Total<br/>n=1054<br/>(%)</b> | <b>No TBI<br/>n=382<br/>(%)</b> | <b>TBI<br/>n=672<br/>(%)</b> | <b>Test of<br/>Difference</b>  |
|--------------------------------|---------------------------------|---------------------------------|------------------------------|--------------------------------|
| <b>Age</b>                     |                                 |                                 |                              |                                |
| Mean age (SD)                  | 36.76(12.32)                    | 37.44(12.84)                    | 36.34<br>(12.01)             | U=122148,<br>$p=0.177$         |
| <b>Ethnicity</b>               |                                 |                                 |                              |                                |
| Māori                          | 431 (41%)                       | 125 (33%)                       | 306 (45%)                    | $\chi^2=48.44$<br>$p=<0.00001$ |
| European                       | 233 (22%)                       | 80 (21%)                        | 153 (23%)                    |                                |
| Pasifika                       | 258 (24%)                       | 95 (25%)                        | 163 (24%)                    |                                |
| Other                          | 132 (12 %)                      | 82 (21%)                        | 50 (7%)                      |                                |
| <b>Offence category</b>        |                                 |                                 |                              |                                |
| Violence                       | 289 (27%)                       | 102 (26%)                       | 187 (28%)                    | $\chi^2=25.27$<br>$p=<0.00001$ |
| Drug related                   | 220 (21%)                       | 110 (29%)                       | 110 (16%)                    |                                |
| Sexual                         | 242 (23%)                       | 75 (20%)                        | 167 (25%)                    |                                |
| Burglary                       | 238 (22%)                       | 71 (18%)                        | 167 (25%)                    |                                |
| Other                          | 65 (6%)                         | 24 (6%)                         | 41 (6%)                      |                                |
| <b>Security classification</b> |                                 |                                 |                              |                                |
| Minimum                        | 194 (18%)                       | 77 (20%)                        | 117 (17%)                    | $\chi^2=2.64$                  |
| Low                            | 180 (17%)                       | 66 (17%)                        | 114 (17%)                    |                                |

|                        |           |           |           |                           |
|------------------------|-----------|-----------|-----------|---------------------------|
| Medium                 | 293 (28%) | 110 (29%) | 183 (27%) | $p=0.45$                  |
| High                   | 387 (37%) | 129 (34%) | 258 (38%) |                           |
| <b>Prison sentence</b> |           |           |           |                           |
| Less than 12 months    | 48 (4 %)  | 14 (4%)   | 34 (5%)   | $\chi^2=7.67$<br>$p=0.10$ |
| 1-5 years              | 473 (45%) | 154 (40%) | 319 (47%) |                           |
| 5-10 years             | 299 (28%) | 119 (31%) | 180 (27%) |                           |
| 10-15 years            | 101 (9 %) | 43 (11%)  | 58 (9%)   |                           |
| 15-20 years            | 60 (6%)   | 26 (7%)   | 34 (5%)   |                           |
| More than 20 years     | 73 (7%)   | 26 (7%)   | 47 (7%)   |                           |

### TBI mechanisms of injury

As shown in Table 6, nearly half of all TBIs sustained were caused by an assault (41%), followed by transport accident (23%), exposure to mechanical force - accidental (e.g. being kicked in the head during a game of rugby) (17%), and fall (13%). 'Other' injuries were the least frequent of injury categories (6%) and were described as events where the mechanism of injury was not provided, but the prisoner noted to have been taken to hospital or confirmed they had experienced a TBI.

**Table 6: TBI mechanisms of injury from most recent (TBI 1) to most historical (TBI 5).**

|  | <b>TBI 1</b> | <b>TBI 2</b> | <b>TBI 3</b> | <b>TBI 4</b> | <b>TBI 5</b> | <b>Total</b> |
|--|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Fall</b>                                      | 89<br>(13%)  | 43<br>(13%)  | 21<br>(12%)  | 5<br>(7%)    | 4<br>(9%)    | 162<br>(13%) |
| <b>Transport accident</b>                        | 179<br>(27%) | 68<br>(20%)  | 26<br>(15%)  | 12<br>(17%)  | 6<br>(14%)   | 291<br>(23%) |
| <b>Exposure to mechanical force (accidental)</b> | 101<br>(15%) | 56<br>(17%)  | 39<br>(23%)  | 17<br>(25%)  | 12<br>(28%)  | 225<br>(17%) |
| <b>Assault</b>                                   | 269<br>(40%) | 140<br>(42%) | 73<br>(43%)  | 31<br>(45%)  | 17<br>(40%)  | 530<br>(41%) |
| <b>Other</b>                                     | 32<br>(5%)   | 28<br>(8%)   | 9<br>(5%)    | 4<br>(6%)    | 3<br>(7%)    | 76<br>(6%)   |
| <b>Total</b>                                     | 670          | 335          | 168          | 69           | 42           | 1284         |

The injury profile did not change across the number of injuries, with assault, transport accident and exposure to mechanical force being the three most common mechanisms of injury for both single and multiple TBIs (refer to Table 6).

### Context of injuries

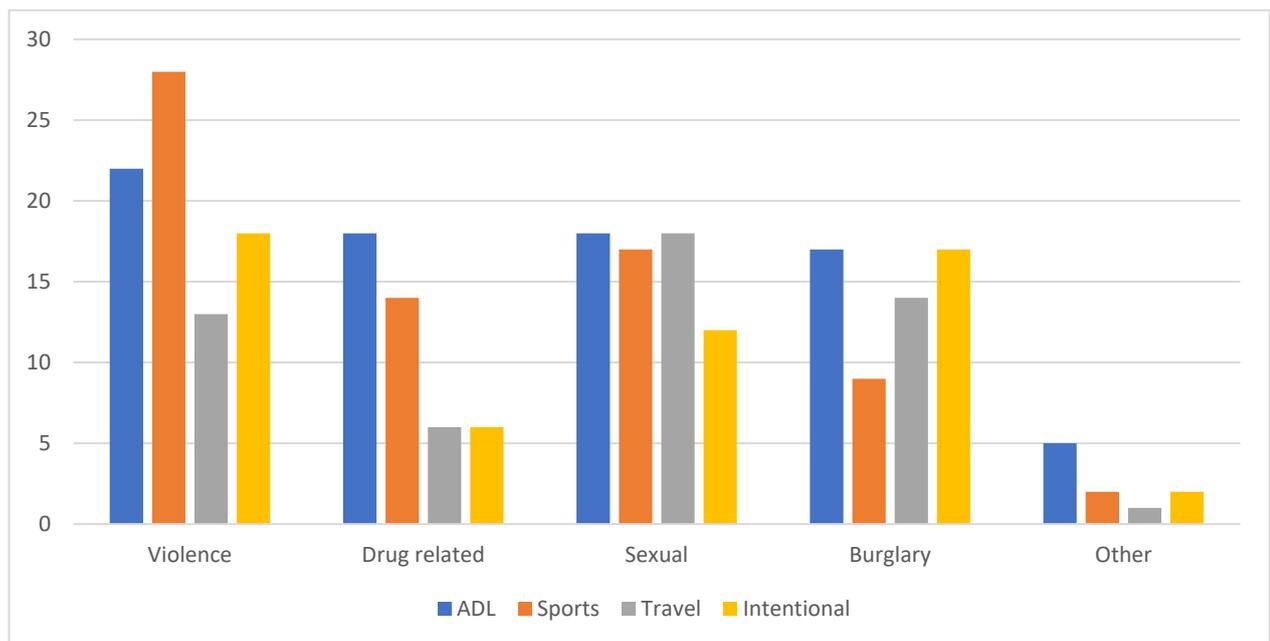
As discussed previously, assaults were the most frequently reported cause of injuries. Of these 8% (n=106) were sustained in prison. It is noted that this information relied on spontaneous disclosure as the prisoners were asked about the details of the injuries, but were not specifically asked about the detail, in terms of location. For unintentional injuries (also known as exposure to mechanical forces), many were sustained whilst participating in sports, and accounted for 25% (n=326) of all injuries. Of those, rugby and rugby league accounted for 51% (n=116) of all sports-related injuries or 13% of the total injuries.

Of the 289 transport incidents noted, 31% (n=91) related to a driver or passenger being unrestrained (denoted by direct disclosure, noting head versus windscreen or roof of vehicle and ejection), or, in the case of motorcycling, disclosing no helmet was worn. 6% (n=18) disclosed the involvement of alcohol or drugs as a contributing factor.

### Paediatric injuries

In total 38% (n=257) of all TBIs were incurred before the age of 15 years. The injuries were broadly categorised as being sustained during activities of daily living (ADL), sports, travel and intentional injuries (see Figure 5). 32% (n=81) of all prisoners who experienced a TBI prior to the age of 15 years committed violent offences, with sports being a significant contributor to this statistic. Intentional injuries (n=55) accounted for 21.4% of all paediatric injuries across all offence types, with the highest prevalence in participants who had committed a violent related offence (n=18).

**Figure 5: Paediatric TBI (<15 years) with offence categories, May - November 2015.**



## Symptoms

The most prevalent symptoms post-TBI were headaches (29%), with loss of balance (24%) and visual disturbances (17%) also frequently occurring (refer to Table 7).

**Table 7: TBI symptoms with repeated TBI, May - November 2015.**

|                               | <b>TBI 1<br/>N=<br/>(%)<br/>Most<br/>recent</b> | <b>TBI 2<br/>N=<br/>(%)</b> | <b>TBI 3<br/>N=<br/>(%)</b> | <b>TBI<br/>4+<br/>N=<br/>(%)<br/>Least<br/>Recent</b> | <b>Total<br/>N=<br/>(%)</b> |
|-------------------------------|---|-----------------------------|-----------------------------|---|-----------------------------|
| <b>Amnesia</b>                | 178<br>(13%)                                    | 72<br>(11%)                 | 40<br>(12%)                 | 28<br>(19%)   | 318<br>(12%)                |
| <b>Seizure</b>                | 22<br>(2%)                                      | 7<br>(1%)                   | 4<br>(1%)                   | 8<br>(6%)   | 41<br>(1.5%)                |
| <b>Vomiting</b>               | 67<br>(5%)                                      | 22<br>(3%)                  | 15<br>(4%)                  | 18<br>(12%)   | 122<br>(4.5%)               |
| <b>Headache</b>               | 395<br>(29%)                                    | 199<br>(30%)                | 95<br>(28%)                 | 81<br>(51%)   | 770<br>(29%)                |
| <b>Loss of<br/>balance</b>    | 313<br>(23%)                                    | 173<br>(26%)                | 79<br>(24%)                 | 68<br>(45%)   | 635<br>(24%)                |
| <b>Visual<br/>disturbance</b> | 228<br>(17%)                                    | 111<br>(17%)                | 64<br>(19%)                 | 55<br>(37%)   | 459<br>(17%)                |
| <b>Memory<br/>issues</b>      | 150<br>(11%)                                    | 80<br>(12%)                 | 37<br>(11%)                 | 41<br>(27%)   | 308<br>(12%)                |
| <b>Total</b>                  | 1353  | 664                         | 334                         | 298   | 2654                        |

### Repeated TBI

Of those reporting a lifetime TBI, just under half (49%) reported one TBI, with 24% reporting two, 14% reporting three and 12.5% reporting four or more TBIs (refer to Table 8). Most of these recurrent injuries were classified as mild in severity, with 52% reporting being dazed or confused or reporting no loss of

consciousness. When specifically evaluating age within the context of repeated TBI it was noted that this was evenly spread across all age groups, with all age groups predominantly reporting one lifetime TBI (refer to Table 8). However, between the ages of 20-29 years and 30-39 years the TBI injuries were reported to be more frequent, with 27% and 29% respectively experiencing two TBI and 14% and 15% respectively experiencing three TBI. Those aged between 50-59 years reported higher levels of TBI compared to other age groups, with 16% reporting four or more TBI.

**Table 8: Age and repeated TBI frequency and percentages, May - November 2015.**

|                       | <b>N= (%)<br/>Most recent</b> | <b>N= (%)</b> | <b>N= (%)</b> | <b>N= (%)<br/>Least recent</b> | <b>Total</b> |
|-----------------------|-------------------------------|---------------|---------------|--------------------------------|--------------|
| <b>Under 19 years</b> | 12<br>(70%)                   | 1<br>(6%)     | 2<br>(12%)    | 2<br>(12%)                     | 17           |
| <b>20-29 years</b>    | 107<br>(49%)                  | 58<br>(27%)   | 30<br>(14%)   | 24<br>(10%)                    | 219          |
| <b>30-39 years</b>    | 82<br>(42%)                   | 56<br>(29%)   | 29<br>(15%)   | 26<br>(13%)                    | 193          |
| <b>40-49 years</b>    | 70<br>(49%)                   | 31<br>(22%)   | 22<br>(15%)   | 19<br>(13%)                    | 142          |
| <b>50-59 years</b>    | 36<br>(52%)                   | 14<br>(20%)   | 8<br>(11%)    | 11<br>(16%)                    | 69           |
| <b>Over 60 years</b>  | 21<br>(66%)                   | 4<br>(12%)    | 4<br>(12%)    | 3<br>(9%)                      | 32           |
| <b>Total</b>          | 328<br>(49%)                  | 164<br>(24%)  | 95<br>(14%)   | 84<br>(12%)                    | 672          |

A Kruskal-Wallis test revealed no statistically significant difference in the number of TBIs across age groups ( $\chi^2[3, n=672] = 2.591, p=.459$ ). The chi-square calculation also demonstrated the absence of statistical significance ( $\chi^2=9.5, df=12, p=0.6265$ ).

Māori men reported the highest number of repeated TBI (42-51% across the number of TBI). A chi-square calculation revealed no statistical significance between ethnicity and the number of TBIs ( $\chi^2=12.5, df=9, p=0.1866$ ). The relationship between the category of offence and the number of TBIs was not statistically significant ( $\chi^2=10.57, df=9, p=0.3063$ ). Security classifications were also noted not to be statistically significant ( $\chi^2=13.91, df=9, p= 0.1256$ ). High-security prisoners reported the highest frequency across the number of injuries, ranging from 27-46%. The 1-5-year sentence length expressed the highest percentage of repeated injuries (43-54%). There was no statistical significance between sentence length and the number of TBI ( $\chi^2=8.5, df=12, p=0.7449$ ).

Whilst not statistically significant, the most prevalent TBI experience in relation to repeated TBI were recorded for young (20-29 years) Māori men, with violent crimes serving 1-5 years and categorised as high security (refer to Table 9).

**Table 9: Age, ethnicity, offence category, security classification and sentence length, with the number of TBI, May - November 2015.**

|                   | <b>1 TBI</b><br>n=<br>(%) | <b>2 TBIs</b><br>n=<br>(%) | <b>3 TBIs</b><br>n=<br>(%) | <b>4 or more TBIs</b><br>n=<br>(%) | <b>Total</b><br>n= | <b>Test of difference</b>         |
|-------------------|---------------------------|----------------------------|----------------------------|------------------------------------|--------------------|-----------------------------------|
|                   | <b>n= 329</b>             | <b>n= 164</b>              | <b>n=95</b>                | <b>n=84</b>                        | <b>n=672</b>       |                                   |
|                   | <b>Most recent</b>        |                            |                            | <b>Least recent</b>                |                    |                                   |
| <b>Age</b>        |                           |                            |                            |                                    |                    |                                   |
| 19 years or under | 12<br>(4%)                | 1<br>(0.6%)                | 2<br>(2%)                  | 2<br>(2%)                          | 17                 | $\chi^2=9.8$<br>df=12<br>$p=0.63$ |
| 20-29             | 108<br>(33%)              | 58<br>(35%)                | 30<br>(32%)                | 23<br>(27%)                        | 219                |                                   |
| 30-39             | 82<br>(25%)               | 56<br>(34%)                | 29<br>(30%)                | 26<br>(31%)                        | 193                |                                   |
| 40-49             | 70<br>(21%)               | 31<br>(19%)                | 22<br>(23%)                | 19<br>(23%)                        | 142                |                                   |
| 50-59             | 36<br>(11%)               | 14<br>(8%)                 | 8<br>(8%)                  | 11<br>(13%)                        | 69                 |                                   |
| > 60 years        | 21<br>(6%)                | 4<br>(2%)                  | 4<br>(4%)                  | 3<br>(4%)                          | 32                 |                                   |
| <b>Ethnicity</b>  |                           |                            |                            |                                    |                    |                                   |
| Māori             | 139<br>(42%)              | 75<br>(46%)                | 49<br>(52%)                | 43<br>(51%)                        | 306                | $\chi^2=12.5$<br>df=9<br>$p=0.19$ |
| European          | 72<br>(22%)               | 37<br>(23%)                | 24<br>(25%)                | 21<br>(25%)                        | 154                |                                   |
| Pasifika          | 89<br>(27%)               | 36<br>(22%)                | 20<br>(21%)                | 17<br>(20%)                        | 162                |                                   |

|                                |              |             |             |             |     |                                    |
|--------------------------------|--------------|-------------|-------------|-------------|-----|------------------------------------|
| Other                          | 29<br>(9%)   | 16<br>(10%) | 2 (2%)      | 3 (4%)      | 50  |                                    |
| <b>Offence category</b>        |              |             |             |             |     |                                    |
| Violence                       | 86<br>(26%)  | 40<br>(24%) | 30<br>(32%) | 31<br>(37%) | 187 | $\chi^2=10.6$<br>df=9<br>$p=0.306$ |
| Drug-related                   | 64<br>(19%)  | 24<br>(15%) | 11<br>(12%) | 11<br>(13%) | 110 |                                    |
| Sexual                         | 83<br>(25%)  | 45<br>(27%) | 23<br>(24%) | 16<br>(19%) | 167 |                                    |
| Burglary                       | 73<br>(22%)  | 48<br>(29%) | 25<br>(26%) | 21<br>(25%) | 167 |                                    |
| Other                          | 23<br>(7%)   | 7<br>(4%)   | 6<br>(6%)   | 5<br>(6%)   | 41  |                                    |
| <b>Security classification</b> |              |             |             |             |     |                                    |
| Minimum                        | 50<br>(15%)  | 27<br>(16%) | 23<br>(24%) | 17<br>(20%) | 117 | $\chi^2=13.9$<br>df=9<br>$p=0.126$ |
| Low                            | 60<br>(18%)  | 26<br>(16%) | 14<br>(15%) | 14<br>(17%) | 114 |                                    |
| Medium                         | 92<br>(28%)  | 36<br>(22%) | 25<br>(26%) | 30<br>(36%) | 183 |                                    |
| High                           | 127<br>(39%) | 75<br>(46%) | 33<br>(35%) | 23<br>(27%) | 258 |                                    |
| <b>Sentence length</b>         |              |             |             |             |     |                                    |
| Less than 12 months            | 16<br>(5%)   | 11<br>(7%)  | 6<br>(6%)   | 1<br>(1%)   | 34  | $\chi^2=8.5$<br>df=12              |
| 1-5 years                      | 153<br>(46%) | 76<br>(46%) | 51<br>(54%) | 39<br>(46%) | 319 |                                    |
| 5-10 years                     | 87<br>(26%)  | 43<br>(26%) | 25<br>(26%) | 25<br>(30%) | 180 |                                    |

|                    |            |             |           |           |    |          |
|--------------------|------------|-------------|-----------|-----------|----|----------|
| 10-15 years        | 29<br>(9%) | 16<br>(10%) | 6<br>(6%) | 7<br>(8%) | 58 | $p=0.74$ |
| 15-20 years        | 17<br>(5%) | 9<br>(5%)   | 3<br>(3%) | 5<br>(6%) | 34 |          |
| More than 20 years | 27<br>(8%) | 9<br>(5%)   | 4<br>(4%) | 7<br>(8%) | 47 |          |

### TBI and loss of consciousness

Data that explored the frequency and percentage of prisoners with loss of consciousness (LOC) presented some interesting information (refer to Table 10). A Mann-Whitney test revealed no significant difference in unconscious/conscious status across the categories of age ( $U=38775$ ,  $z=-1.722$   $p=0.263$ ). A chi-square calculation demonstrated statistical significance between age and ethnicity ( $\chi^2=15.65$ ,  $p=0.0013$ ). There was no statistical significance between offence category and LOC ( $\chi^2=5.67$ ,  $p=0.225$ ) or between security classification and LOC ( $\chi^2=0.43$ ,  $p=0.933$ ). A Mann-Whitney test revealed no significant difference in unconscious/conscious status across the length of prison sentence ( $U=39098$ ,  $z=-1.602$   $p=0.352$ ).

**Table 10: Age, ethnicity, offence category, security classification and sentence length with LOC or no LOC, May - November 2015.**

|                                | <b>No LOC<br/>n= (%)</b> | <b>LOC<br/>n= (%)</b> | <b>Total<br/>n=</b> | <b>Test of<br/>difference</b>                          |
|--------------------------------|--------------------------|-----------------------|---------------------|--|
| <b>Age</b>                     |                          |                       |                     |  |
| 19 years or under              | 9 (4%)                   | 8 (2%)                | 17                  | U=38775<br>Z=-1.722<br>X <sup>2</sup> =5.24<br>p=0.263 |
| 20-29                          | 78 (35%)                 | 141 (31%)             | 119                 |  |
| 30-39                          | 56 (25%)                 | 137 (30%)             | 88                  |  |
| 40-49                          | 45 (20 %)                | 97 (21%)              | 142                 |  |
| 50-59                          | 21 (9%)                  | 48 (11%)              | 69                  |  |
| 60 + years                     | 12 (5%)                  | 20 (4%)               | 32                  |  |
| <b>Ethnicity</b>               |                          |                       |                     |  |
| Māori                          | 89 (40%)                 | 217 (48%)             | 306                 | <b>X<sup>2</sup>=15.65</b><br><b>p=0.0013</b>          |
| European                       | 43 (19%)                 | 110 (24%)             | 153                 |  |
| Pasifika                       | 62 (28%)                 | 101 (22%)             | 163                 |  |
| Other                          | 27 (12%)                 | 23 (5%)               | 50                  |  |
| <b>Offence category</b>        |                          |                       |                     |  |
| Violence                       | 66 (30%)                 | 121 (27%)             | 187                 | X <sup>2</sup> =5.67<br>p=0.225                        |
| Drug-related                   | 43 (19%)                 | 67 (15%)              | 110                 |  |
| Sexual                         | 55 (25%)                 | 112 (25%)             | 167                 |  |
| Burglary                       | 44 (20%)                 | 123 (27%)             | 167                 |  |
| Other                          | 13 (6%)                  | 28 (6%)               | 41                  |  |
| <b>Security classification</b> |                          |                       |                     |  |
| Minimum                        | 38 (17%)                 | 79 (17%)              | 117                 | X <sup>2</sup> =0.43<br>p=0.933                        |
| Low                            | 39 (18%)                 | 75 (17%)              | 114                 |  |
| Medium                         | 57 (26%)                 | 126 (28%)             | 183                 |  |
| High                           | 87 (39%)                 | 171 (38%)             | 258                 |  |
| <b>Sentence length</b>         |                          |                       |                     |  |
| Less than 12 months            | 6 (3%)                   | 28 (6%)               | 34                  |  |

|                    |           |           |     |  |
|--------------------|-----------|-----------|-----|--|
| 1-5 years          | 108 (49%) | 211 (47%) | 319 | U=39098<br>Z=-1.602<br>X <sup>2</sup> =4.42<br>p=0.352 |
| 5-10 years         | 63 (28%)  | 117 (26%) | 180 |  |
| 10-15 years        | 17 (8%)   | 41 (9%)   | 58  |  |
| 15-20 years        | 12 (5%)   | 22 (5%)   | 34  |  |
| More than 20 years | 15 (7%)   | 32 (7%)   | 47  |  |

### Severity of TBI

Overall 743 injuries were categorised as mild, moderate or severe (refer to Table 11). Of those, 62% (n=461) were categorised as mild across the frequency of TBI.

**Table 11: TBI Severity and frequency May - November 2015.**

| <b>Severity of TBI</b>     | <b>TBI 1<br/>n = (%)</b> | <b>TBI 2<br/>n = (%)</b> | <b>TBI 3<br/>n = (%)</b> | <b>TBI 4 +<br/>n = (%)</b> |
|----------------------------|--------------------------|--------------------------|--------------------------|----------------------------|
|                            | <b>Most recent</b>       |                          |                          | <b>Least recent</b>        |
| <b>Unsure or not noted</b> | 76<br>(19%)              | 28<br>(15%)              | 10<br>(11%)              | 9<br>(14%)                 |
| <b>Mild</b>                | 223<br>(55%)             | 129<br>(70%)             | 63<br>(70%)              | 46<br>(71%)                |
| <b>Moderate</b>            | 74<br>(18%)              | 19<br>(10%)              | 15<br>(17%)              | 7<br>(11%)                 |
| <b>Severe</b>              | 32<br>(8%)               | 7<br>(4%)                | 2<br>(2%)                | 3<br>(5%)                  |
| <b>Total</b>               | 405                      | 183                      | 90                       | 65                         |

Prisoners' offence category was explored against the frequency and severity of TBI, to explore whether there were any connections. Violent offences accounted for 30% (n=225) of all TBIs reported, with mild TBI being the most commonly reported TBI severity across all TBI frequencies. However, the relationship between offence type and severity of TBI was not statistically significant ( $\chi^2=17.16$ ,  $p=0.143$ ).

### Correlation analysis

Spearman's rank order correlation was performed to assess the strength and direction of the relationship between the five independent variables (age, ethnicity, offence category, security classification and sentence length) and the number of TBI, or a positive or negative TBI history (refer to Table 12). This non-parametric test was undertaken because of the skewed distribution of the sample. The correlation analysis was undertaken in order to select variables for the regression model.

There was a small negative correlation between TBI and ethnicity ( $r=-0.176$ ,  $p=<0.05$ ), with a small effect size. There was also a small positive correlation between offence type and TBI ( $r=0.061$ ,  $p=0.048$ ), meaning all offence types other than violence were slightly more likely to report a TBI. The same occurred for prison sentence length, where there was a small positive correlation ( $r=-0.077$ ,  $p=0.012$ ), meaning those prisoners with sentences longer than five years were slightly more likely to report a TBI. No other independent variables demonstrated a correlation (refer to Table 12).

**Table 12: Spearman's correlation of multiple factors.**

|                                |                         | <b>Age</b> | <b>Ethnicity</b> | <b>Offence category</b> | <b>Security classification</b> | <b>Prison sentence</b> | <b>TBI?</b> |
|--------------------------------|-------------------------|------------|------------------|-------------------------|--------------------------------|------------------------|-------------|
| <b>Age</b>                     | Correlation coefficient | 1.000      | .065*            | -.068*                  | -.235**                        | .312**                 | -0.042      |
|                                | Sig. (2-tailed)         |            | 0.033            | 0.026                   | 0.000                          | 0.000                  | 0.177       |
|                                | N                       | 1061       | 1061             | 1061                    | 1061                           | 1061                   | 1054        |
| <b>Ethnicity</b>               | Correlation coefficient | .065*      | 1.000            | -.128**                 | -.096**                        | .173**                 | -.176**     |
|                                | Sig. (2-tailed)         | 0.033      |                  | 0.000                   | 0.002                          | 0.000                  | 0.000       |
|                                | N                       | 1061       | 1061             | 1061                    | 1061                           | 1061                   | 1054        |
| <b>Offence category</b>        | Correlation coefficient | -.068*     | -.128**          | 1.000                   | .064*                          | -.220**                | .061*       |
|                                | Sig. (2-tailed)         | 0.026      | 0.000            |                         | 0.037                          | 0.000                  | 0.048       |
|                                | N                       | 1061       | 1061             | 1061                    | 1061                           | 1061                   | 1054        |
| <b>Security classification</b> | Correlation coefficient | -.235**    | -.096**          | .064*                   | 1.000                          | -.004                  | 0.046       |
|                                | Sig. (2-tailed)         | 0.000      | 0.002            | 0.037                   |                                | 0.889                  | 0.133       |
|                                | N                       | 1061       | 1061             | 1061                    | 1061                           | 1061                   | 1054        |
| <b>Prison sentence</b>         | Correlation coefficient | .312**     | .173**           | -.220**                 | -0.004                         | 1.000                  | -.077*      |
|                                | Sig. (2-tailed)         | 0.000      | 0.000            | 0.000                   | 0.889                          |                        | 0.012       |
|                                | N                       | 1061       | 1061             | 1061                    | 1061                           | 1061                   | 1054        |
| <b>TBI?</b>                    | Correlation coefficient | -0.042     | -.176**          | .061*                   | 0.046                          | -.077*                 | 1.000       |
|                                | Sig. (2-tailed)         | 0.177      | 0.000            | 0.048                   | 0.133                          | 0.012                  |             |
|                                | N                       | 1054       | 1054             | 1054                    | 1054                           | 1054                   | 1054        |

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

### Logistic regression

A binary logistic regression was performed to determine the relative importance of the variables significantly correlated with TBI history, namely: ethnicity, offence type and sentence length. The full model containing all predictors was statistically significant,  $\chi^2 (12, N=1054) = 59.64, p < 0.001$ , indicating the model was able to distinguish between those who reported a TBI and those who did not.

The model explained between 5.5% (Cox and Snell R Square) and 7.5% (Nagelkerke R Squared) of the variance in TBI and correctly classified 67.3% of cases overall compared to the predicted performance by SPSS of 63.8%. This means that the model functioned more positively than was predicted. As shown in Table 13, ethnicity (specifically Māori, Pasifika and other) and offence category (specifically violence) made statistically significant independent contributions to the model. Participants categorised in the burglary and sexual offence categories were respectively between 1.2-1.4 times more likely to report a TBI than other groups (demonstrated by odds ratios of 1.16 and 1.44 respectively). While important, all other categories did not provide a statistically significant independent contribution to the model.

**Table 13: Binary logistic regression of TBI history.**

|                         | <b>B</b> | <b>S.E.</b> | <b>Wald</b> | <b>df</b> | <b>Sig.</b>  | <b>Exp (B)</b> | <b>95% C.I. for EXP(B)</b> |       |
|-------------------------|----------|-------------|-------------|-----------|--------------|----------------|----------------------------|-------|
|                         |          |             |             |           |              |                | Lower                      | Upper |
| <b>Ethnicity</b>        |          |             |             |           |              |                |                            |       |
| Māori                   |          |             | 27.617      | 3         | <b>0.000</b> |                |                            |       |
| European                | -0.201   | 0.182       | 1.224       | 1         | 0.269        | 0.818          | 0.572                      | 1.168 |
| Pasifika                | -0.379   | 0.171       | 4.924       | 1         | <b>0.026</b> | 0.685          | 0.490                      | 0.957 |
| Other                   | -1.184   | 0.233       | 25.841      | 1         | <b>0.000</b> | 0.306          | 0.194                      | 0.483 |
| <b>Offence category</b> |          |             |             |           |              |                |                            |       |
| Violence                |          |             | 9.611       | 4         | <b>0.048</b> |                |                            |       |
| Drug related            | -0.232   | 0.212       | 1.201       | 1         | 0.273        | 0.793          | 0.523                      | 1.201 |
| Sexual                  | 0.368    | 0.202       | 3.312       | 1         | 0.069        | 1.445          | 0.972                      | 2.149 |
| Burglary                | 0.148    | 0.200       | 0.546       | 1         | 0.460        | 1.160          | 0.783                      | 1.717 |
| Other                   | -0.193   | 0.299       | 0.416       | 1         | 0.519        | 0.825          | 0.459                      | 1.481 |
| <b>Sentence length</b>  |          |             |             |           |              |                |                            |       |
| Less than 12 months     |          |             | 4.270       | 5         | 0.511        |                |                            |       |
| 1-5 years               | -0.118   | 0.340       | 0.120       | 1         | 0.729        | 0.889          | 0.457                      | 1.731 |
| 5-10 years              | -0.391   | 0.353       | 1.227       | 1         | 0.268        | 0.676          | 0.339                      | 1.351 |
| 10-15 years             | -0.490   | 0.402       | 1.488       | 1         | 0.223        | 0.612          | 0.278                      | 1.347 |
| 15-20 years             | -0.246   | 0.435       | 0.321       | 1         | 0.571        | 0.782          | 0.333                      | 1.833 |

|                    |            |           |       |   |       |       |       |       |
|--------------------|------------|-----------|-------|---|-------|-------|-------|-------|
| More than 20 years | -<br>0.216 | 0.42<br>0 | 0.266 | 1 | 0.606 | 0.805 | 0.354 | 1.833 |
| Constant           | 1.054      | 0.34<br>7 | 9.206 | 1 | 0.002 | 2.868 |       |       |

## Summary

This study sought to understand the prevalence of TBI in a newly opened sentenced male prison between May and November 2015. The prison in which the study was conducted was statistically different to the national prison muster for ethnicity and security classification, but not for age.

Over this time period 1054 of the 1061 prisoners admitted to the prison consented to healthcare and the TBI screen. A further seven prisoners consented to the screen but did not complete the TBI screen. Two-thirds (63.8%) reported they had experienced a TBI. Most commonly, the TBIs were mild in severity (67.8%). The prevalent ethnicity was Māori, accounting for 41% of the prison population at the time of the study and 29% of all TBIs. There was a statistical relationship between ethnicity and TBI.

Nearly half of all TBIs sustained were caused by assaults (41%). Of the assaults, 8% (n=106) were sustained in prison. Drivers being unrestrained and also the use of alcohol were contributors to TBI (31% of all transports accidents). Sports was a major contributor to unintentional injuries, accounting for a total of 25% of all injuries.

38% of all TBIs were incurred before the age of 15 years. Of concern is the absolute number of intentional injuries which accounted for 21.4% of all paediatric injuries across all offence types.

Of those reporting experiencing a TBI in their lifetime, the most prevalent TBI experience in relation to repeated TBI were young (20-29 years) Māori men, with violent crimes serving 1-5 years and categorised as high security. The most prevalent symptom post-TBI were headaches. Violent offences accounted for 30% of all TBIs reported. However, the relationship between offence and TBI was not statistically significant.

## CHAPTER 5: DISCUSSION (PART ONE)

This study aimed to determine the prevalence of TBI in a NZ male prison and to identify whether age, ethnicity, offence type, security classification and sentence length were linked to prevalence of TBI. It was revealed that two-thirds of male prisoners on this site reported experiencing at least one lifetime TBI in their lifetime, with the majority reporting mild TBI. Prisoners identifying as Māori, those having committed a violent, sexual or burglary offence and those sentenced within the last 1-5 years were independent predictors of TBI history. The study has highlighted that given the high rates of TBI in this population, there is a need to screen for history of TBI and identify any persistent impairments that could be impacting on the person's behaviour, to assist these men transitioning back into their communities, by the provision of specialised reintegration support, and to assist with the prevention of reoffending.

### TBI prevalence

TBI prevalence in this study was found to be more than four times higher than males of an equivalent age in the NZ general population (Feigin et al., 2013). However, the prevalence of TBI in this study was in the mid-range compared to other international prison studies (Merbitz et al., 1995; Shiroma et al., 2010; Allely, 2016, and Farrer & Hedges, 2011), suggesting that TBI is higher within prison populations. One of the challenges in comparing this study to others is the considerable variation in the methodological quality of the studies included in these reviews, with some studies limited by poor respondent rates and different TBI screening methods.

Notwithstanding that, the prevalence of TBI in the newly-opened South Auckland prison is comparable to international prison studies of this nature. Of interest, the only other NZ prison-based prevalence study reported a much higher prevalence and appears to be an outlier of other prison studies (Barnfield & Leatham, 1998). This is likely to be due to the small selective sample used within this study which may have skewed the findings.

## Screening for TBI

Whilst prevalence of TBI was found to be equivalent to other studies using TBI screening tools, the rates of recurrent injury in the current sample were, however, much lower than previously reported (Pitman et al., 2015). A systematic review (Allely, 2016) on screening for TBI in prison populations reported that there were many challenges in accurately screening for TBI. One of the challenges in determining prevalence of TBI is that prisoners can find it difficult to accurately recall injuries, particularly those that were relatively mild or sustained early on in life. Public awareness of mild injuries has previously been found to be low (Cusinamo et al., 2017). Further, prisoners initially reported that they did not wish to disclose injuries as they believed they were being assessed for their propensity for behavioural challenges. This study utilised questions to identify TBI in order to enable direct comparison to a NZ general population study. Other screening tools such as the Brain Injury Screening Index (BISI) (Pitman et al., 2015) or Traumatic Brain Injury Questionnaire (TBIQ) (Diamond et al., 2007), were developed specifically for use with offenders, but are subject to similar recall biases. Given the limited awareness and potential under-reporting of prior TBIs, prevalence of TBI is likely to be an underestimate of the true burden of the

condition. Establishing a consensus on a TBI screening tool and definition of TBI would facilitate comparisons across international literature and between different populations.

## Offence type

Men who were imprisoned for a burglary, violent or sexual offence were more likely to have sustained a TBI in their lifetime. Whilst prison sentence length and security classification contributed to the overall explanation of variance in the regression model, they were not independent predictors of TBI history, highlighting that type of crime rather than severity of offence was associated with history of TBI. There is a paucity of studies comparing TBI and offence type, but one study reports that TBI is associated with more violent offences (Davies et al., 2012). One further study denotes an association between TBI and sexual offending, although pre-injury behaviour is believed to have an impact on post-injury behaviour (Simpson et al., 1999). The increased prevalence of TBI in men detained for burglary, sexual or violent offences, may suggest a link between the emotional and behaviour regulation as well as decision making that can occur following a brain injury (O'Rourke, Linden, Lohan, & Bates-Gaston, 2016). Indeed, the findings support a previous study identifying that up to one third of sexual offenders were found to have some neurological damage (Simpson et al., 1999). As suggested earlier in the current research literature, the relationships are likely to be more complex and could be influenced by other factors, such as mental health and substance abuse (Farrer, Frost & Hedges, 2013 and Corrigan et al., 2010). The links between TBI history and offence type identified in this study highlight the need for further exploration.

## Influence of ethnicity

The higher prevalence of TBI in Māori reflects an increased risk of TBI in Māori in comparison to New Zealand Europeans (Feigin et al, 2013 and Barker-Collo et al., 2008). As ethnic minority groups have been found to be at increased risk of TBI internationally (Diamond et al, 2007), those identifying as being of an ethnic minority group may also be at increased risk within the international prison population. The mechanism of injury for TBI differs greatly between the prevalence group and international data, especially general population samples. Male prisoners identifying as being of 'other' ethnicity (including Asian, Indian, South American, African and not specified) had the lowest prevalence of TBI.

## Mechanism of injury

The most prevalent mechanisms of injury for TBI in international literature for the general population were falls and transport accidents (Corrigan et al., 2010). In NZ, TBI peaks in the 15-30 years age group, with the largest percentage experiencing a transport accident and interpersonal violence (Barker-Collo et al., 2008). When analysing international prison-specific prevalence data, the study group is somewhat different from the international data. The most common mechanism of injury for the study was assault, followed by transport accidents. Falls as a mechanism of injury was a third as likely in this cohort when compared with assaults. This result was somewhat mirrored in one other study conducted within prisons (Morrell et al., 1998). The percentages of occurrences were not provided, but the authors did state that assaults were most prevalent in their study group, followed by gunshot wounds, transport accidents, falls and job-related injuries. This also relates to modes of violence

in different cultures. For example, the US has a higher rate of death from penetrating head injuries as a result of gunshot wounds when compared to their European colleagues (Maas et al., 2017). Further, it is noted that in high-income countries the predominant mechanism of injury is shifting from traffic-related to falls-related injuries, with a move to higher prevalence in the elderly (Maas et al., 2017). However, different methods of classifying mechanism of injury limit direct comparisons between studies.

### Severity of TBI

Two-thirds of the study group were categorised as experiencing a mild TBI across the frequency of TBI, and this also reflected the most recent injury in cases where multiple injuries were noted. This is in keeping with international general population and prison literature for mild TBI but is much lower than the NZ general population study (Snell et al., 2009; Valente & Fisher, 2011; Shukla & Devi, 2010, and Feigin et al., 2013). One-sixth of the study group stated they had experienced either a moderate or severe TBI across the frequency of injuries. Almost one-third of the study group expressed that the most common symptoms post-TBI were headaches with one quarter reporting loss of balance. Headaches were the most commonly reported symptom following a TBI, so this result is comparable to the international literature (Hoffman et al., 2011 and Sawyer et al., 2015).

The classification of TBI severity is challenging. The severity of TBI for this study was based on self-reported loss of consciousness. This was required as many of the study group had not sought medical assistance or their injuries were very historical. The study did not

attempt to verify the self-reported severity of TBI against medical records. It is acknowledged that the study group were at times vague around the severity of their TBI as they were relying on reports from others around them or had an awareness that the loss of consciousness was for a short period of time. There is no consensus on the self-reporting of severity of TBI, with some researchers denoting medical records as the gold standard, citing issues with inaccuracies and recall bias (McKinlay & Albicini, 2016), whilst others strongly support the use and reliability of self-reporting TBI assessment tools (Schofield et al., 2011 and Pitman et al., 2015). Pragmatically, a decision was made to proceed with the self-reported format.

### Age at time of first injury

Two in five of those experiencing a TBI reported that their first TBI occurred before the age of 15 years and this is comparable to a study which explored childhood TBI and its impact on offending (McKinlay et al., 2014). Of concern in this study sample was the number of intentional injuries sustained in participants' childhoods. Intentional injuries accounted for one-fifth of all paediatric injuries. The high prevalence of childhood TBI within the prison population supports emerging evidence of a link between early childhood trauma and risk of engagement in criminal activity in later life (Shiroma et al., 2012; Schofield et al., 2015; Leon-Carrion & Ramos, 2003; Horn & Lutz, 2016, and McKinlay et al., 2014). A TBI also impacts on the child's ability to productively engage in education, with challenges to memory, cognition, language and performance in calculations and readings (Hamilton & Keller, 2010 and Wszalek & Turksta, 2015). It may be the case that symptoms and changes in behaviour resulting from childhood TBI may contribute to the beginning of a journey to

jail, due to being ostracised by their peer group because of their impulsivity, aggression and irritability, which impact on peer relationships (Heverly-Fitt et al., 2014). However, longitudinal studies are needed to determine if there are causal links between early injury and engagement in anti-social behaviour later on in life. If a link is established, this may inform youth crime prevention initiatives and promote agency involvement in providing families with support and education around the management of childhood TBI.

## Strengths

This research provides valuable information that can assist prisons with the care and management of their prisoners. The last prison study undertaken in NZ is very historical, with a small sample size (Barnfield & Leathem, 1998). This study provides up-to-date information, which offers useful information for the assessment and management of prisoners with TBI. The self-reporting format has allowed the assessment to be seamlessly integrated into the standard prison health assessments and allows every prisoner to consent (or not) to this assessment at the time of that scheduled appointment, without additional appointments or staff required. Further, the information provided around childhood TBI allows for an opportunity to enhance community-based education around the importance of seeking assistance following a TBI as this may (or may not) change the trajectory for children following TBI.

## Limitations

The study utilised the unique opportunity of a new prison opening to systematically screen all new prisoners for a history of TBI. One of

the challenges in undertaking a study of this nature is that the prison muster is dynamic, with prisoners being admitted, transferred and released every day. An ideal study would screen for TBI on a given prevalence date (point prevalence); however, due to the numbers of prisoners within ASCF at any given time, this approach would not have been feasible. Consequently, it is likely prevalence of TBI is likely to vary considerably over time and the prevalence presented in this study may over or underestimate prevalence on any given day due to the mobility of the prison population.

This approach consequently enabled systematic screening of prisoners to occur to prevent biasing the sample. The advantage of this approach was that there was no influence over who undertook the screen as it was a requirement of every consenting prisoner. This allowed for a wide cross-section of prisoners. The disadvantage of doing the study from a sample representativeness perspective presented some issues. There were some differences observed between this sample and the NZ national prison population. For example, there were fewer prisoners in this study who had committed violent crimes or sex offences, but more prisoners with burglary or drug-related crimes, and prisoners classified as high-security. This is likely to be the result of the structured, scheduled build-up of prisoners, where high-risk prisoners (violent prisoners) were admitted much later in the 20-week build-up, to ensure prisoner safety. Further, the prisoners were adjusting to different systems and processes and, as such, some of them may not have had enough confidence or trust in the system to disclose TBI information. Despite reassurances, some of the men had verbally stated that they felt they would get in trouble if they had experienced a TBI, especially if there were any prison-related injuries. Trust has been identified as a longstanding issue for prisoners, both from a prisoner-to-staff and

prisoner-to-prisoner perspective (Liebling & Arnold, 2012). However, this was managed through the development of relationships and reassurance of confidentiality, processes and how the information would be used. Further, as the format of the TBI screening had not been systematically utilised in prisons, some prisoners were unable to grasp the concept of most recent to least recent TBI, so it became challenging to perform a meaningful analysis on the impact of the initial injury, without manual manipulation of data (reconfiguring individual prisoners' reporting to reflect most recent to least recent TBI). For example, one prisoner aged 57 years reported the age of his injuries in the following sequence: 22 years, 17 years, 25 years, 29 years and 48 respectively across his five TBI experiences. Further, the tool utilised was not validated but had been used with a prison cohort in the Waikato region as part of a general population study (Feigin et al., 2013). Whilst there are some prison-specific TBI assessment tools available (Pitman et al., 2015), the strength of evaluating TBI in the NZ context was seen as more beneficial than a prison-specific tool. Feasibility of screening an existing prison population remains unclear based on these study findings. However, through integrating the TBI screening tool within the routine health screen, the ability to screen all consenting new arrivals was demonstrated to be feasible.

Whilst this study has highlighted those most at risk of having sustained a TBI in the prison population, the sample may not have been representative of a more stable prison population because of the structured build-up. It should also be noted that the sample population were sentenced male prisoners (over the age of 18 years), predominantly from the Auckland region. Given the identified higher prevalence of TBI within the prison population and potential link to engagement in criminal behaviour and reoffending (Elbogen et al.,

2015), it would be important to extend this work through screening young offenders, female prisoners and the inclusion of the remand prison population to determine if similar trends emerge.

A further limitation of this study is that it was not able to determine the proportion of male prisoners who may still be experiencing persistent difficulties following TBI. Given deficits have been found to persist for many years, even after mild TBI (Horn & Lutz, 2016), assessments to determine prevalence of common deficits post-TBI including post-concussion symptoms, level of cognitive functioning, sleep difficulties and social skills, would be useful to identify the difficulties experienced within the prison population. Understanding potential areas where interventions could be targeted may assist in optimising quality of life and reduce reoffending.

As only restricted health information was available from the prison service for study participants, limited data on pre-imprisonment psychiatric history, substance use, prior incarceration or neuropsychological profiles were also available. These factors have been found to be predictive of persistent problems following TBI, in both the general population and in prison (Lingsma et al., 2015). Further, seeking to understand the prisoner's reserves (such as intellect, family of origin behaviour and configuration and socio-economic status) (Rassovsky et al., 2015) would be important in future studies to explore the role they may play on the effects of TBI on a person's level of functioning and offending.

## Conclusion

Based on the feasibility of the TBI screening process demonstrated in this study, the TBI screen now forms a part of the standard health screening procedure in the study prison, alongside a measure of current post-concussion symptoms, to inform the management and care of prisoners who may be experiencing persistent deficits following TBI. The findings are also being explored to inform a roll-out of TBI screening in young offenders and other prison populations in NZ. Knowledge of TBI history and current symptoms could be used to help identify potential difficulties male prisoners may be experiencing in prison, such as taking longer to process or remember information, and fatigue or noise sensitivity. The management of prisoners within the prison could be developed to include specific staff training around TBI and the establishment of TBI-specific units with the aim of supporting the management of persistent TBI impairments (Allely, 2016).

## CHAPTER 6: LITERATURE REVIEW (PART TWO)

It has been established that the prevalence of TBI is higher in prisons than the community in NZ (Mitchell, Theadom & du Preez, 2017). Further, prisoners with TBI struggle with prison rules and are more likely to be in trouble in prison (Shiroma et al., 2010). Through the process of developing an intervention for those affected by TBI, it was important to explore all available literature to understand which studies had been undertaken, their results and possible application to the prison environment (if not based in a prison). There were several questions in the researcher's mind that informed this literature review.

### Review questions

1. What interventions have been undertaken for TBI in the community, prisons in NZ and globally?
2. Are there community-based interventions that would have application to the prison environment?
3. What methodology was utilised?
4. How was success measured in these interventions?
5. Was there more success with participants following mild, moderate or severe TBI?

### Search strategy

#### Methods

#### Electronic sources and search strategy

A scoping literature review was conducted exploring literature from 1965 to 15 December 2018. The search was conducted using the university library system. Six databases were accessed. These included Clinical Key®, Cochrane library (via OVID), MEDLINE® via EBSCO®, Scopus®, Web of Science® and AUT's 'Tuwhera' open access publishing.

The following search terms were utilised: TBI OR traumatic brain injury OR head injury OR concussion OR brain injury OR acquired brain injury OR ABI, AND prisoner OR inmate OR offender OR prison OR jail OR incarceration OR imprisonment OR corrections facility OR New Zealand OR NZ OR psychological interventions OR therapy OR cognitive behavioural therapy OR CBT OR Mindfulness Based Stress Reduction OR MBSR. Further, all relevant studies and papers were assessed for any additional and relevant papers cited within them, and these were also accessed and assessed for relevance where they had not been identified in the initial searches.

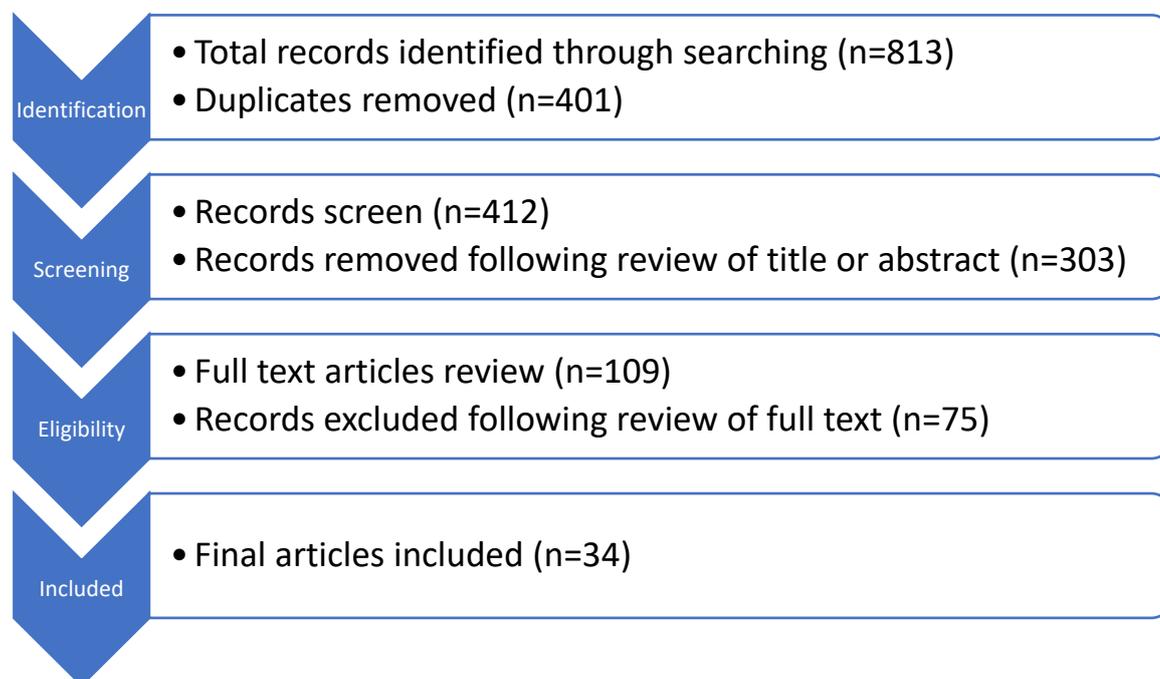
### Inclusion and exclusion criteria

Intervention studies, reviews and meta-analysis written in English, or a thesis at doctoral level were included. Studies including youth and adults, both in the community and prisons were included. Studies utilising quantitative, qualitative or mixed methodology were also included. All study designs were considered, and no particular study participants were excluded.

The initial search yielded 813 articles. After removing duplicates 412 articles were identified. All papers were screened for relevance,

and, as a result of this screening, 303 articles were removed. The author read 109 articles in full. A further 75 articles were excluded because were not relevant to the review questions. 34 articles were included in the final review (refer to Figure 6).

**Figure 6: Search strategy flow diagram**



At the time of writing, the search yielded no research on prison-based interventions, following a lifetime TBI. As a result of this, the literature was divided into community-based interventions and prison-based interventions, where the study was seen to have relevance to the proposed intervention, despite being offence-focussed, rather than mental health-focussed.

Further, there was a paucity of studies discussing anger management, with the remaining studies focussing on the sequelae of TBI, particularly depression and anxiety. The concept of anger is important but has been rarely comprehensively covered in the literature available. Anger is a normal but unpleasant emotion

which is differentiated from other emotions by affective, cognitive, behavioural and physiological components (Novaco (1975), cited in Boman, Mergler, Furlong & Caltabianco, Deffenbacher, 2011 and Schamborg & Browne, 2015). Anger has been used interchangeably with aggression and hostility; however aggression is seen as an antecedent to anger (Hutchinson Willner, Rose, Burke & Bastick (2017). Aggression is seen to be problematic as it involves hostility and harm to individuals and property. Anger has further been discussed as state and trait anger, with state anger being a reaction to an unpleasant situation (within a short time span) and trait anger relating to a person's disposition in relation to anger, with or without provocation. Prisoners are reported to have more challenges with anger expression, control and experience when compared with community samples (Schamborg & Browne, 2015).

### Community reviews

Several systematic reviews have been completed which explore the range and effectiveness of psychological interventions and TBI/ABI outcomes (Beck and Fernandez, 1998, Comper, Bisschop, Carnide & Tricco, 2005, Snell, Surgenor, Hay-Smith & Siegert, 2009, Cattelani, Zettin & Zoccolotti, 2010, Soo & Tate, 2012, Barker-Collo, Starkey & Theadom, 2013, Stalder Luthy et al, 2013, Block & West, 2013, Ownsworth & Haslam, 2016, Bryne & Coetzer, 2016, Chun et al, 2018, Fernandez, Malvaso, Day & Guharajan, 2018 and Iruthayarajah, Alibrahim, Mehta, Janzen, McIntyre, & Teasell, 2018). They provided some consolidation of the knowledge around interventions for symptoms following TBI. CBT was noted to be the most common treatment modality; however, a number of newer therapies have been incorporated, including positive psychology and MBSR. There were some difficulties reflected in the reviews.

Almost all of the reviews commented on the heterogeneity of the studies, which made comparisons challenging. Included in this was the use of different assessment tools and follow-up protocol. Further, the lack of methodological quality was noted, with small samples which contributed to underpowered studies.

## Community-based interventions following a TBI

### Quantitative studies

From the reviews we can see that there are many treatment modalities which have been trialled for TBI/Acquired Brain Injury (ABI), however the majority relate to CBT. CBT is seen to be helpful in the context of TBI because of its structured approach (Stalder-Luthy et al., 2013). As there is a dearth of prison-based literature, it is useful to explore community-based literature in relation to TBI interventions. Studies are discussed in chronological order (see Table 14).

**Table 14: Quantitative community-based studies.**

| <b>Author and year</b>                  | <b>Intervention type</b>                       | <b>Disorder being treated or purpose</b> | <b>Setting</b> | <b>Number of participants</b> | <b>Outcomes</b>   |
|---|--|--|----------------|-------------------------------|---|
| Medd & Tate (2000).                     | RCT: CBT (group).                              | Anger                                    | Community      | 16                            | Decreased in expressed anger, sustained a follow-up.                              |
| Owens-worth, McFarland, & Young (2000). | Mixed model (group).                           | Self-awareness                           | Community      | 21                            | Improved self-awareness sustained at follow-up.                                   |
| Tiersky et al. (2005).                  | RCT: CBT & Cognitive remediation (individual). | Post-concussion syndrome (PCS)           | Outpatient     | 20                            | Less distress, depression and anxiety, with an increase in cognitive functioning. |
| Anson & Ponsford (2006).                | RCT: CBT (group)                               | Depression, anxiety & adjustment         | Community      | 31                            | Increase in coping skills which declined at follow-up.                            |

|                         |  |   |           |    |   |
|-------------------------|--|---|-----------|----|---|
| Kelly (2007).           | Pilot:<br>CBT/MBSR<br>for<br>adolescent<br>(individual). | Anger   | School    | 1  | Reduction in anger, not sustained.                                      |
| Bradbury et al. (2008). | RCT:<br>CBT for TBI:<br>in person &<br>phone<br>(group). | Distress  | Community | 20 | Reduction in distress which was sustained at follow-up.                 |
| Cicerone et al. (2008). | RCT:<br>Holistic<br>rehabilitation<br>(group).           | To improve<br>neuro-<br>psycho-<br>logical<br>functioning | Inpatient | 68 | Improved community integration which was sustained at follow-up.        |
| Walker et al. (2010).   | Repeated<br>measures:<br>CBT                             | Anger   | Community | 52 | Decreased self-reported anger and better control which was sustained at |

|  |  |   |            |    |  |
|--|--|---|------------|----|--|
|  | (group).   |   |            |    | follow-up.   |
| Simpson,<br>Tate, Whiting<br>& Cotter<br>(2011). | RCT: Mixed<br>methods<br>(group).                                  | Hopelessness                                    | Community  | 17 | Reduced feelings of<br>hopelessness which were<br>sustained at follow-up.    |
| Hart,<br>Vaccaro,<br>Hays &<br>Maiuro<br>(2012). | Feasibility<br>study:<br>Psycho-<br>education<br>(group).          | Anger and<br>irritability                       | Inpatient  | 10 | Improvements in self-<br>reported anger with large<br>effect size.           |
| Hsieh et al.<br>(2012).                          | RCT: CBT &<br>motivational<br>interviewing<br>(MI)<br>(individual) | Anxiety   | Outpatient | 27 | Reduction in anxiety and<br>stress.  |
| Azulay,<br>Smart, Mott<br>& Cicerone             | Pilot: MBSR.   | Self-efficacy<br>& quality of<br>life after TBI | Outpatient | 22 | Increased self-efficacy but<br>no significant change in<br>neuro-behavioural |

|   |   |                             |            |     |  |
|---|---|-----------------------------|------------|-----|--|
| (2013).   |   |                             |            |     | symptoms.  |
| Andrewes, Walker, & O'Neill (2014).                   | RCT: MBSR & positive psychology.                        | Improve mood & self-concept | Inpatient  | 10  | Improvement in happiness which was sustained at follow-up.                   |
| Ashman, Cantor, Tsaousides, Spielman & Gordon (2014). | RCT: CBT & supportive psychotherapy (SPT) (individual). | Depression                  | Community  | 77  | CBT was not more effective than SPT but both modalities improved depression. |
| Bedard et al. (2014).                                 | RCT: CBT & MBSR (group).                                | Depression                  | Outpatient | 100 | Decrease in depression, which was sustained at follow-up.                    |
| Bennett, Flett & Babbage (2014).                      | Pilot: CBT with modification for Māori                  | Depression                  | Community  | 16  | Reductions in depression.  |

|   |  |                                  |            |    |  |
|---|--|----------------------------------|------------|----|--|
|   | values (group).                        |                                  |            |    |  |
| Vestri et al. (2014)                        | RCT: ABI & individual & group therapy. | Functional rehabilitation        | Community  | 74 | Group intervention noted a significant improvement in functional independence measures compared to controls. |
| Backhaus, Ibarra, Parrott, & Malec, (2016). | RCT: CBT (group).                      | Self-efficacy                    | Outpatient | 38 | Improved coping skills. Maintained for CBT group compared to skills training                                 |
| Bay, Ribbens-Grimm & Chan (2016).           | RCT: MBSR & psycho-education (group).  | Self-efficacy & quality of life. | Community  | 25 | A high level of satisfaction was experienced.  |
| Ponsford et al. (2016).                     | RCT: CBT & MI                          | Anxiety & depression.            | Community  | 75 | Improvement in anxiety and depression, no  |

|                                     |   |                         |            |    |  |
|-------------------------------------|---|-------------------------|------------|----|--|
|                                     | (group).  |                         |            |    | additional gain from pre-intervention MI.  |
| Potter, Brown, and Fleminger (2016) | RCT: CBT (individual).  | PCS                     | Outpatient | 46 | Improvements in quality of life.   |
| Cullen et al (2018).                | RCT: Positive psychology & treatment as usual (TAU) (individual). | Psychological wellbeing | Outpatient | 27 | Positive feedback from participants. Improvement in measures for depression & anxiety. |

As previously discussed, the management of anger expression is a challenge following TBI (Kim, 2002 and Yang, Huang, Lin, Tsai & Hua, 2012). A study into anger management utilised a matched randomised methodology, using stress inoculation theory (Medd & Tate, 2000). The study involved 16 participants, aged between 16 and 60 years of age, with 13 having experienced a TBI, and the remaining three having had a stroke or aneurysm. The participants were randomised to the 'treatment' (n=8) or 'wait-list' arm (n=8) of the study. The participants underwent an anger management programme, for between five to eight weeks, with some modifications such as hand-outs to account for the impact of their ABI. A number of standardised and validated measures of anger were utilised, including the STAXI (State Trait Anger Expression Inventory). The 'treatment' group demonstrated a decrease in expressed anger, compared to the 'wait-list' group and showed on-going improvements at the two-month follow-up. From a qualitative perspective, the participants felt the relaxation component was helpful, but did feel they had increased self-efficacy as a result of the study. The authors (Medd & Tate, 2000) noted considerable challenges in getting the self-reflective anger logs completed, even with daily phone reminders. They suggested improvements such as booster sessions, additional hand-outs and the involvement of significant others. This study is useful as a RCT that explores an intervention (albeit different to the proposed intervention) to attempt to address anger as a challenging emotion. The sample size was very small, and the large battery of anger-specific neuropsychological measures would be onerous and challenging to achieve in a prison with limited resources and a rapidly changing local prison population, due to rehabilitation needs and general prison muster pressure.

Following TBI, survivors can feel isolated (Morton & Wehman, 1995). In Australia, a support group programme was established with 21 participants aged between 22 and 49 years, who were on average 8.36 years after their ABI (Ownsworth et al., 2000). The group was designed to improve psychosocial functioning and self-awareness, which are noted to be common issues following ABI. Prior to the intervention, self-awareness was assessed using validated tools. The programme utilised a mixed model, which included cognitive rehabilitation, CBT and skills training across a 16-week period. Each session took place over 90 minutes with small breaks, and written material was provided at the end of each session. The assessment measures were repeated immediately following the intervention and again at six months. The study showed positive results, with improvements in self-awareness, which were sustained at six months. Relatives also reported fewer behavioural challenges, compared to pre-intervention. Whilst this study demonstrates CBT is feasible to utilise with people who have experienced TBI, it focussed on clients who were known to a rehabilitation facility following a medically-attended ABI, which is not the case for the majority of the TBI clients (Pitman et al., 2015). The potential effectiveness also remains unclear based on the small sample sizes (n=21); and its applicability to people who have experienced a mild TBI remains unknown.

Post-concussive symptoms are common sequelae of TBI, regardless of the TBI severity (Potter et al., 2016). In the majority of cases, symptoms normally resolve within approximately three months, but for 5-15% of TBI survivors experience symptoms beyond this time and they can continue for years (Tiersky et al., 2005). One RCT study explored the treatment of symptoms for survivors of mild and

moderate TBI. It was based in an outpatient setting and consisted of CBT and cognitive remediation. The study involved 20 participants, who were randomised to either a treatment group (n=11) or wait list control (n=9). The study participants were between 19-62 years of age and were recruited through multiple avenues including advertising in community practices, brain support groups and evaluating discharge documents from a large TBI facility. Several pre-intervention psychometric measures (including a symptom checklist, and measures of anxiety and depression) were undertaken to determine suitability for the intervention. The intervention included an individualised, manualised programme that was administered by an experienced psychologist, across 11 weeks. The control group were contacted three to four times over the 11-week period by the lead researcher, but were otherwise expected to function independently. When the intervention group completed the intervention the wait list controls then completed the intervention protocol. The study found that the intervention group demonstrated less distress, depression and anxiety, when compared to the wait list controls, and experienced an increase in cognitive functioning. It should be noted that the sample were predominantly white females who had university qualifications, so there was an assumption of enhanced reserves (heightened ability to recover from insulting events on the brain) that is provided with higher levels of education, as was seen in this cohort.

A further study in Australia explored the impact of a CBT-based coping skills group (CSG) on depression, anxiety and self-esteem, with a group of TBI survivors who were also receiving outpatient rehabilitation (Anson & Ponsford, 2006). This study utilised a wait list control methodology, however both groups participated in the intervention, with the follow-up timeframes differing (group A were

followed up at five weeks and a further ten weeks, while group B were followed up at five weeks and a further five weeks). Participants were required to attend 40% of the ten, 90-minute sessions, which were run bi-weekly, across five weeks. There were 31 participants involved in total (with 15 in Group A and 16 in Group B). Assessments for depression, anxiety, self-esteem, psycho-social dysfunction and problem-solving were undertaken at designated time points. The study found that participants believed their ability to adapt to their changed lifestyle were enhanced by the intervention. There were no differences in the two groups in terms of the validated measures, and the coping skills measure initially declined at the first follow-up, but then increased again at the second follow-up. The study did not find any statistically significant changes in the other measures following completion of the intervention. The authors felt the intervention needed to be either more intense or longer in order to develop and maintain the skills learnt in the intervention. It should be noted that this study involved participants who had experienced an inpatient episode (with an average hospital stay of 71 days), with on-going outpatient rehabilitation needs for their TBI, and an average post-amnesia period of 33 days. The study did not document the severity of TBI, which would have been helpful to better understand the application of this study to the researcher's study; however, noting the length of hospital stay and the PTA somewhat indicates that the participants had at least moderate to severe TBIs.

From an earlier review, it is noted that CBT is a very common and reportedly effective therapy modality; however these have generally been reported as face-to-face interventions. A study completed in Canada piloted an intervention comparing CBT delivery in person and by telephone with TBI survivors who were connected to a

community rehabilitation facility (Bradbury et al., 2008). The participants were aged between 18 and 65 years, with moderate to severe TBI, who were more than one year post their injury and experiencing distress. All participants received an introductory session and were randomised to a telephone (n=5) or group therapy (n=5), or education control group delivered either telephonically (n=5) or in person (n=5). Eleven sessions of CBT were delivered to the study groups, and the study participants' levels of distress were evaluated using validated tools (measuring symptoms of anxiety and depression; and ability to integrate in the community), immediately following the intervention and again one month post the intervention. The study demonstrated a statistically significant improvement in distress for both the educational and therapy cohorts, which were sustained at one-month post-completion. The study suggested some changes to the delivery of CBT in a TBI cohort, which acknowledged the cognitive and emotional challenges for the participants, which were somewhat mitigated by repetition of material, the provision of written material and frequent breaks. Whilst based on a small sample size (n=20), which may have limited identification of a treatment effect, this study provides important learning around the development of a specific programme of CBT for TBI sufferers.

Self-regulation following a TBI is seen to be one of the more challenging sequelae following TBI (Morton & Wehman, 1995). One RCT study integrated individual and group therapy for the enhancement of cognition, emotional challenges, interpersonal relationships and functional skills (Cicerone et al., 2008). The study sought to explore the effectiveness of holistic neuropsychological rehabilitation, compared to treatment as usual for TBI survivors (n=64) who had been under the care of a rehabilitation facility. The

participants had predominantly experienced moderate to severe TBI, and the intervention involved fifteen hours of therapy each week for four months. The study found that both treatment arms resulted in improvements for the participants. Those participants randomised to the intensive rehabilitation had increased scores in community functioning and life satisfaction, with moderate and small effects sizes respectively. It was understood that this related to specific modules outlining self-appraisal, prediction, self-monitoring and self-evaluation, which were seen as important in improving self-efficacy. This study has some interesting characteristics, in that it was suggested that self-efficacy provides the TBI survivor with confidence to self-manage in the community, through the acquisition of skills and training. However, the study only related to individuals who had experienced moderate to severe TBI and who had attended a rehabilitation facility, which limits the application of learning from this study somewhat.

Severe TBI has a strong link to behavioural challenges, including aggression (Walker et al., 2010). Predominantly this is verbal aggression, but can extend to physical aggression, whether towards self, objects or others. Between 1998-2006 nine CBT groups (with an average of five participants) were run with 69 severe TBI survivors (Walker et al., 2010). The CBT programme was manualised and included psych-education into anger management, with the programme being run for two hours over 12 weeks. The participants completed a self-reported anger scale (STAXI) pre-intervention, post-intervention and at approximately seven months following completion of the intervention. It was noted that 32 participants completed the entire study protocol and were more likely to complete if they had good family support. The completers also showed a reduction in the STAXI scores from pre-intervention

to post-intervention, and these were maintained at the seven-month follow-up, however none were statistically significant. The researchers (Walker et al., 2010) commented that CBT was a cost-effective intervention, with social contact with like peers being helpful; however, it is noted that there was no wait list control, so it is very difficult to draw definitive conclusions from this study. It does provide some valuable insight into CBT and severe TBI in the context of anger, but is challenging to translate the learnings because of methodological issues.

As a result of significant personality changes, suicidality has been linked to TBI, especially in the context of hopelessness (Simpson et al., 2011). The 'Windows to Hope' programme was developed to target hopelessness rather than depression in a cohort of severe TBI sufferers, aged between 18 and 65 years, who were more than one-year post-injury, with documented moderate to severe levels of hopelessness. A RCT was developed, focussing on four therapeutic strategies, which included: behavioural activation, cognitive restructuring, problem-solving and relapse prevention, whilst reflecting Khan-Bourne and Brown's (2003) recommendations for CBT for TBI sufferers. These recommendations included adaptations to mitigate cognitive and emotional deficits, such as taking additional time to form a therapeutic relationship, shortening session length, but increasing frequency, providing memory aids and being more directive (Khan-Bourne & Brown, 2003). The participants were randomised to the intervention (n=8) or wait list control group (n=9). The manualised programme was administered over ten weeks for two hours per week, in groups of two. Tests were administered, (including the Beck Hopelessness Scale and measures of suicidal ideation) to both groups at the same time. The wait listed cohort was provided the intervention following the

completion of the intervention group. Both groups were measured at three months post-intervention, utilising independent assessors and validated tools. The study demonstrated that there was a reduction in hopelessness scores for the intervention group, when compared to the wait list controls, and 75% of participants sustained this reduction at the three-month post-intervention review. The study is very helpful in terms of its configuration and application of a TBI-modified CBT model. It is a very small sample (n=17) and poses some significant operational challenges in providing the 'group' therapy to only two participants.

The issue of anger, frustration and attainment of self-efficacy are important for TBI survivors. Hart et al (2015) proposed to explore self-management of anger and irritability, in the context of chronic TBI (more than six months post-injury), in a community sample utilising a multi-centre RCT of psych-education for eight 90-minute individual sessions. Participants were to be randomised to either anger self-management self-training or the study intervention entitled 'Personal Readjustment and Education' (PRE). The study was proposed to include survivors of complex mild to severe TBI with documented concerns around anger and irritability. The categorisation of TBI was achieved via access to hospital records, so all participants had experienced a medically-attended TBI. The outcome procedures included a measure of anger and aggression, a battery of neuro-psychological tests to establish cognitive function and measures for post-traumatic stress and willingness to change. This study closely aligns to the proposed study in the prison. The authors published the proposed study outline, but there have never been results published. The authors appear to have developed the study protocol based on an earlier feasibility study that explored anger self-management in a group of ten participants. In the 2012

study, ten moderate to severe TBI survivors were involved in a one-to-one eight-week manualised programme for the management of anger and irritability (Hart et al., 2012). They were asked to measure their anger and irritability as were their significant others. The study noted that there were significant improvements in irritability and anger control between weeks one and three, however these were not maintained. It is noted that the study was very small (n=10); that there was no control group; the assessment points were within a short period of time (within three weeks of completion of the programme) and the participant group only included those with medically-attended moderate to severe TBI. This study provided valuable information; however, it excluded a large number of TBI survivors who fall into the mild category, and this is relevant in the prison population, given 68% were categorised as mild from a recent prison prevalence study (Mitchell, Theadom & du Preez, 2017).

Anxiety can be disabling for all sufferers and can be a dominant feature following a TBI (Soo & Tate, 2012 and Schalock, 1998). More recently, Hsieh et al. (2012) explored the management of anxiety in over 17-year-olds who had experienced a mild to severe TBI in more than the last year, with a documented diagnosis of anxiety. In this study, 27 participants were randomised to one of three arms of the study (Hsieh et al., 2012). All participants were tested at week 0, week three, week 12 (following the CBT) and at week 21, using validated tools for the assessment of anxiety, mood, coping, psycho-social functioning and self-awareness. The study demonstrated that there was a reduction in anxiety in the motivational interviewing and CBT group when compared to the other arms of this study.

MBSR has efficacy in the treatment of mood disorders and there is growing evidence to support the use of MBSR and associated therapies (such as positive psychology) with TBI survivors (Kanga & McDonald, 2011). A small feasibility study (n=6) into MBSR was conducted to evaluate the management of cognitive, physical and emotional symptoms post-TBI (Azulay et al., 2013). The study found that MBSR increased the self-efficacy for management of cognitive and emotional symptoms, but there was no significant change in neuro-behavioural symptoms. This study provides challenges in generalising the findings because of the sample size and the participant demographics, which were predominantly European, with higher education, who were receiving concurrent rehabilitation and were on average seven months post-injury.

One study into the concept of positive psychology in the context of TBI was undertaken (Andrewes et al., 2014). The study involved ten Caucasian patients from a residential rehabilitation facility in the US who presented with agitation, aggression and sexually inappropriate behaviour. A large number of the participants (80%) also had substance misuse prior to their TBI. A 12-week pilot study was conducted involving a strengths intervention. It focussed on MBSR, and the importance of gratitude, values and strengths. There were two interventions (three good things in life and signature strengths). The three good things intervention required the participants to write three positive things each day. They were evaluated prior to the intervention, immediately following and 12 weeks post the intervention, using the authentic happiness inventory. The second intervention required that the participants identify five of their key strengths and the values associated with these strengths. They chose one strength each day to focus on. All

the information was captured through diary entries daily. The Head Injury Semantic Differential Scale (HISDS) was administered immediately prior and following the intervention. It was noted that behavioural and cognitive impairments impacted on the signature strengths intervention, and support was required from carers to complete the diaries and assist with motivation. The study was deemed to be a promising start for the concept of positive psychology, despite there being no statistically significant difference between the intervention and control groups. Whilst the sample size was very small (n=5), with participants having recently sustained their TBI, this is one of the first studies exploring positive psychology in TBI, so provides valuable information for consideration in developing the proposed intervention.

A further study explored the effectiveness of CBT and/or supportive psychotherapy in the treatment of depression for TBI survivors (Ashman et al., 2014). The RCT initially involved 77 participants (with a mean age of 47 years), with a diagnosis of TBI and depression. They were randomised to the CBT intervention or supportive psychotherapy; however, the attrition rate was high (44%), so only 43 participants completed the study protocol, 22 in the CBT arm and 21 in the supportive psychotherapy. Sixteen individual sessions were provided over three months for 90 minutes, following a standardised treatment protocol. Standardised and validated assessments were completed pre- and post-intervention, which included the BDI (Beck Depression Inventory) and a range of structured clinical interviews to elicit diagnostic criteria for depression. Whilst the study found improvements in depression symptoms in the CBT group, the results were not statistically significant. Further, there was no statistical difference in the two treatment arms, with the positive changes in the diagnosis of

depression 35% for the CBT group and 17% for the supportive psychotherapy group, which was felt to be a low response rate. It was noted that the sample group was largely white females, with trade/college education, with a moderate income and a moderate or severe TBI. This study provides information around the effectiveness of CBT when comparing to other psychological interventions which assists with the decision-making around the proposed study. It is difficult to extrapolate learnings from this study as the sample size was very small, with a high attrition rate. There is no coherent explanation around the attrition rate, which would have been helpful to understand how to better structure the proposed intervention to reduce this likelihood. Further, whilst CBT has been one of the tested methodologies in this study, individual sessions are not feasible in a prison from a financial and professional availability perspective.

A study combining MBSR and CBT treatment was undertaken to explore the impact on depression following TBI (Bedard et al., 2014). A RCT was conducted, involving 100 participants across three sites, who were recruited from multiple community sources. The participants were either randomised to the intervention or wait list control. The study included meditation, yoga, self-awareness and 'living in the moment' over a period of ten weeks, with a requirement for daily meditation practice. Interestingly, the first year of this study was spent training the clinicians to deliver the programme, which was manualised. The study had a high attrition rate (30%), relating to multiple causes. The authors report that this is the first RCT conducted into mindfulness and CBT to address depression in TBI. It demonstrated a reduction in depression symptoms (using the BDI) following the intervention, which was sustained at three months following the intervention. This study

provides some interesting insight into the combination of two treatment modalities, which appear to complement each other and provide better outcomes for clients with TBI.

When exploring the NZ context, there were no Māori specific studies relating to interventions supporting individuals with symptoms following a TBI. Further, there were very limited studies into CBT within the general Māori population in NZ (Bennett et al., 2014). Whilst Māori account for 15% of the population (based on the 2006 NZ Census), they have increasing rates of depression, but just over half access assistance for this. An individual CBT-based programme for the management of depression was adjusted to incorporate Māori values, including domains of connectedness, spirituality, extended family and metaphors (Bennett et al., 2014). Sixteen people aged between 19-52 years, who were predominantly women, participated. The intervention ran over 12 sessions with participants who self-identified as Māori, who were aged over 18 years and had a diagnosis of depression following screening with a standardised depression screen. The participants were screened at pre-intervention, post-intervention and again six months following completion of the intervention. The study found a statistically significant difference in the standardised measures of mood and thoughts from the baseline to the post-intervention and this was maintained at the six-month follow-up. They felt a culturally appropriate CBT treatment protocol was important for depressed Māori; however it was noted that there was an absence of a control arm of the study, so it would be challenging to establish that conclusion at this time. Notwithstanding that, this is a very valuable study that would have real application in a prison, given half of the prison identify as Māori (Department of Corrections, 2018), specifically when strongly linking to Māori cultural values.

TBI survivors experience a number of challenges in integrating into society, including sensitivity to noise and dysregulation of emotions (Landon et al., 2012). A study sought to understand the benefit of group therapy, compared to individual therapy, in the context of ABI (Vestri et al., 2014). The intervention involved a number of rehabilitation events which included physical, emotional and functional activities. One group (n=42, TBI=17) received both group and individual therapy, while the remainder (n=32, TBI=25) received individual therapy. The participants were assessed for cognitive functioning, levels of disability and functional independence. The study found there was no statistical difference for all measures, with the exception of the Functional Independence Measure (FIM), which was higher in the group therapy arm of the study. This study provides some reassuring information around the use of groups as a treatment configuration. However, there was some blurring in the group arm of the study, as the participants experienced both group and individual therapy, and this makes it challenging to apply the learnings with absolute certainty.

One study explored the concept of perceived self-efficacy for individuals who had experienced an ABI, including TBI, stroke and brain haemorrhages (Backhaus et al., 2016). Caregivers were also invited to participate. This RCT involved 38 participants (and their caregivers), who were inpatients or outpatients from a brain rehabilitation facility in the US. The participants were randomised to a brain injury skills group or a support group. The intervention group utilised a manualised programme for 16, two-hour sessions using multiple teaching modalities but focussing on CBT, using real-life examples which were provided by the participants. The support

group (control) met for the same time and was described as a facilitated supportive forum. The study found positive gains in perceived self-efficacy in the participants, including the caregivers. The CBT group had a sustained change at three months following the intervention, compared to the controls. It is noted that the sample size was small (n=38) and the participants were from a rehabilitation facility, which may denote a more serious nature of brain injury. Further, there was no determination of severity of injury, so it is difficult to appreciate which sub-group this study would best suit.

A further study into the effectiveness of MBSR was undertaken utilising an RCT of two manualised interventions, one involving an enhanced MBSR model (including positive mantra, affirmation and compassionate mediation) (n=14) and the other arm involving a health enhancement programme which included self-help strategies (n=11) (Bay et al., 2016). The intervention was conducted over eight sessions and included four face-to-face group sessions and four telephone group conference sessions. The participants were required to keep a daily log of mood across 84 days and this was evaluated by a psychologist. The RPQ (Rivermead Post concussion Questionnaire) was also completed, as was a depression scale, as a measure of stress and competency. The overall satisfaction was also collected, and was found to be higher for the MBSR group, with a preference for the face-to-face meetings. Whilst the authors broadly classify the issues following TBI as being self-efficacy, quality of life and depression, they did not specifically provide quantitative results for the measures used, but did report on satisfaction with the interventions as their main measure of success. It is difficult to understand any learnings and possible future applications from this study. Further, the study cohort was largely

white females, who were less than one year post their TBI. An inclusion criterion was that they were under the care of a rehabilitation service, denoting a level of severity or complexity, and this also excluded a number of possible participants.

PCS can influence a survivor's reintegration into society by affecting relationships following their TBI (Forrest et al., 2018). Potter et al. (2016) conducted a study involving 46 mild to moderate TBI survivors who had persistent PCS six months following their TBI. They employed a wait list controlled RCT, utilising CBT. Twelve weekly individual sessions were conducted for the intervention group, using a semi-structured protocol. The study found there were improvements in the quality of life with no statistically significant effect on the symptoms of depression or anxiety. Further, the wait list control had no evidence of improvement in their post-concussion symptoms or quality of life while waiting. This study provides valuable information into the details of a CBT programme. The main concern is the requirement for the TBI to be medically-attended, which is not always realistic for certain segments of the community (such as in the context of violence). Medical attendance for TBI is reported to be as low as 5.6% for women and 6.6% for men in the community, compared to 0.46% for women and 0.08% for men in prison (Allely, 2016), so the learnings for this study are somewhat difficult to extrapolate with confidence in a prison context.

Emotional distress is a relevant sequelae following TBI and is sometimes accompanied by anxiety and depression, with CBT being a common treatment modality for these conditions (Cullen et al., 2018). A study was conducted in the United Kingdom (UK) in 2013

to trial the application of Positive Psychotherapy (called PoPsTAR), with a cohort of ABI survivors. This was a two-arm parallel group single-blinded RCT, which compared positive psychotherapy (PP) and treatment as usual (TAU) with TAU alone. Participants were recruited from two centres in the UK, one being a stroke service and the other a TBI outpatient service. Participants were required to be medically stable, with signs of emotional distress. Unfortunately, the study excluded participants with mild TBI. There were 27 participants who entered the study, with 14 in the intervention group and 13 in the controls. Those in the intervention arm had weekly individual sessions for eight weeks. A large number of validated quantitative tests (to measure anxiety, depression and happiness) were conducted at baseline, five, nine and twenty weeks. The researcher noted that recruitment was challenging in this cohort, with a large number of eligible individuals declining to participate; however, a dropout rate of 37% was deemed acceptable. The study revealed a cohort which largely reflected that of stroke (89%), which in turn reflected a more advanced age (median age 57 years). The cohort also had an average level of education of 11 years. The study demonstrated a positive response from the participants, but it was noted that the sample size needed to be larger to understand the efficacy of the study (Cullen et al., 2018).

## Summary of quantitative community-based interventions

This literature review explored the treatment options currently being utilised in the community, both for TBI survivors and generally. Predominantly the studies reviewed were RCTs of well-established treatments including CBT, MBSR, positive psychology, motivational interviewing and psych-education. There were a wide variety of

conditions or target groups that were relevant to the proposed intervention. Valuable knowledge was gained from the studies in terms of format, sample size and randomisation. There was one study which explicitly explored the Māori experience of therapy, with modifications to better reflect their values (Bennett et al., 2014), and this presented unique information around the NZ cultural context, which is very relevant to the development of the proposed intervention.

In general, the samples were small, with an average sample size of 36 (range 1-100), with heterogeneity in the studies and evidence of quasi-wait list controls. All of this information provides the researcher with an awareness of the need for scientific robustness, while also gaining valuable knowledge from the studies undertaken, which assists with the development of the proposed intervention. This includes the use of controls, blinding and manualised interventions.

### Qualitative studies

When exploring the literature, it is important to incorporate qualitative studies into the review. There is richness in the information provided in qualitative studies. However, there is a paucity of this type of enquiry in TBI research. At the time of writing there was one relevant qualitative study and one mixed methods study published (refer to Table 15).

**Table 15: Qualitative community-based studies.**

| <b>Author &amp; year</b>           | <b>Study type</b>   | <b>Purpose</b>                                     | <b>Setting</b> | <b>Number of participants</b> | <b>Outcomes</b>  |
|------------------------------------|---|--|----------------|-------------------------------|--|
| Karagiorou, Evans & Cullen (2018). | Thematic analysis following previous quantitative intervention. | Post-traumatic growth                              | Community      | 7                             | Themes developed about personal strength, appreciation for life, relating to others, optimism, feeling fortunate compared to others and positive emotional and behavioural changes |
| <b>MIXED METHODS</b>               |   |  |                |                               |  |
| von Mensenkampff et al. (2015).    | Exploratory mixed methods<br><br>Six-week semi-                 | Distress, post-traumatic growth & impact of events | Community      | 45                            | Significant correlation between age & injury type (young men TBI) and Attendance & PTG.<br><br>Themes developed about identity confusion, learning                                 |

|  |                                 |  |  |  |  |
|--|---------------------------------|--|--|--|--|
|  | structured intervention (group) |  |  |  | to cope & following intervention, normalising behaviours, knowledge is power, new identity & positive mental health. |
|--|---------------------------------|--|--|--|--|

Karagiorou et al (2018) conducted a thematic analysis on participants' understanding of their post-traumatic growth following the PoPsTAR study (Cullen et al., 2018). None of the participants in this part of the study were TBI survivors. All had experienced an ABI. Seven interviews were conducted in total, with four from the intervention group and three from the TAU group. Six themes evolved which included: personal strength, appreciation for life, relating to others, optimism, feeling fortunate compared to others, and positive emotional and behavioural changes. It was reported that there were both similarities and differences between the intervention and TAU groups, with the intervention group expressing lifestyle improvements and new possibilities in addition to the above-mentioned themes. This study provides valuable qualitative information and there appears to be a paucity of this in relation to TBI and ABI research. However, this sample was very small (n=7), with no TBI survivors and no blinding of the researchers. Whilst not relevant to the study cohort this study provides some insight into the configuration of this aspect of the research, from which to build the proposed study on.

### Mixed method study

At the time of writing there was one study located that presented a mixed methodology approach.

TBI is associated with psycho-social issues, including decreased self-esteem and self-concept, which are compounded by a lack of social support (von Mensenkampff et al., 2015). A study was undertaken

to explore these concepts, utilising a client-driven therapy group, with mixed methodology and included a thematic analysis. The intervention was attended by 45 TBI survivors across six weeks. Post-traumatic growth (PTG) was evaluated using the 'impact of event' scale and the 'post-traumatic growth' questionnaire following the intervention, which demonstrated statistically significant changes in PTG, and were related to the number of sessions attended. Further, the thematic analysis asked two questions pre-intervention and post-intervention. The study found that there were a number of themes. During the pre-intervention phase, the themes included identity confusion and learning to cope. Post-intervention the themes included: normalising and behaviour (through connection and friends), acceptance and knowledge, new identity and positive mental health. The study demonstrated positive growth from both a quantitative and qualitative perspective. It is a very useful study as it somewhat mirrors the proposed intervention, and, while the number of participants is small (n=45), it does make a significant and original contribution to the knowledge of interventions for people following a TBI with complex traumatic experiences of their 'new' self.

While there were very few qualitative or mixed method studies they did provide valuable insights into the experiences of participants, with one of the studies involving TBI survivors. There were similar themes in relation to the 'new self' and evidence of post-traumatic growth. The studies were small (7-45 participants) and addressed important issues for rehabilitation. The information gained from the studies will be incorporated into the proposed study design as having a qualitative measure will assist the researcher in better understanding the detail of each individual's experience.

## Prison-based studies

Whilst the above-mentioned studies provide relevant information into interventions relating to TBI in the community, it is also important to explore the literature in terms of psychological service delivery in general in prison. There were no published studies into TBI-specific interventions in prisons (at the time of writing). However, there were studies which provided valuable information into therapy options in the mental health context (including CBT, MBSR and post-traumatic growth) for the general prison population; however, these were scarce. There were several studies which sought to explore therapeutic options for behavioural, criminogenic and offence-focussed rehabilitation (Himmelstein, 2011 and Auty, Cope & Liebling, 2015).

It was reported that prisons were exploring and trying to resolve problematic behaviours without consideration of emotional health (Xu, Jia, Liu & Hofman, 2016). Where offence-focussed rehabilitation studies have been relevant, they have been included in the literature review as they contribute to the knowledge in relation to the proposed intervention.

## Prison specific quantitative studies

As mentioned previously, there are limited studies into any prison-based therapeutic interventions. In order to develop a robust intervention, it is important to further explore the literature to

ascertain the number and quality of interventions in prison environments. In total, nine studies were reviewed (see Table 16).

**Table 16: Quantitative prison-based intervention studies.**

| <b>Author and year</b>                         | <b>Intervention type</b>                              | <b>Disorder being treated or purpose</b>                   | <b>Setting</b>          | <b>Number of participants</b> | <b>Outcomes</b>  |
|--|---|--|-------------------------|-------------------------------|--|
| Samuelson, Carmody, Kabat-Zinn & Bratt (2007). | Pre-post intervention measures<br>MBSR<br>(group)     | Drug addiction   | Prison<br>(male/female) | 1350                          | Positive changes in hostility, self-esteem             |
| Shuker & Newton (2008).                        | Pre-post measures<br>Therapeutic community<br>(group) | General mental health, personality issues and criminogenic | Male prison             | 172                           | Changes in anxiety, self-esteem and personal distress. |

|                     |   |                         |               |    |  |
|---------------------|---|-------------------------|---------------|----|--|
|                     |   | needs                   |               |    |  |
| Rocha et al (2014). | Pilot study:<br>Cognitive remediation<br>(individual) | Neuro-cognitive decline | Female prison | 28 | Positive changes to several neuro-cognitive domains decrease in negative emotions. |

|  |                      |  |             |    |   |
|--|----------------------|--|-------------|----|---|
| Xu et al. (2016).                                  | RCT: MBSR<br>(group) | Emotional decline for long- serving prisoners. | Male prison | 54 | Significant changes in depression, anxiety, tension, hostility & total mood disturbances.             |
| Hutchinson, Willner, Rose, Burke & Bastick (2017). | RCT: CBT<br>(group)  | Anger management                               | All prisons | 85 | Decrease in anger and anger expression, increase in coping skills which were maintained at follow-up. |

|  |  |                          |                       |                     |   |
|--|--|--------------------------|-----------------------|---------------------|---|
| Ramos, Oddy, Liddement & Fortesque (2017). | Implementation link worker role                      | TBI                      | Male prison           | 134 referrals       | Engagement with link worker & better community integration.                   |
| Kelly, Brown & Simpson (2018).             | Pre-post intervention measures:<br>Education (group) | Improve knowledge of ABI | Service worker forums | 178 service workers | Significant gains in knowledge, which were maintained at follow-up.           |
| Mak & Chan (2018).                         | RCT: CBT & Positive Psychology (group)               | Psychological distress   | Female prison         | 75                  | Reduction in psychological distress & improvement in psychological wellbeing. |

|                                 |   |  |                     |     |  |
|---------------------------------|---|--|---------------------|-----|--|
| Umbach, Raine & Leonard (2018). | RCT:<br>CBT/Mindfulness training<br>(group) | Emotional regulation & cognitive decline | Youth offender unit | 268 | Significant declines in executive functioning but intervention group buffered. |
|---------------------------------|---|--|---------------------|-----|--|

A study was conducted into the use of MBSR in six US prisons (Samuelson et al., 2007). The study involved 1350 inmates (both male and female) treated in 113 MBSR groups in six drug units across Massachusetts, with 1-1.5-hour sessions across a period of 6-8 weeks. The study found that there were positive changes in self-reported hostility and improvement in self-esteem. It was noted that the greatest improvement was seen in female prisons and with those of minimum-security classification. There were limitations associated with this study, which included the absence of meaningful demographic information and measures of recidivism. The authors also noted their concerns around prisoners self-reporting. This study provides insight into a large study over a long period of time, undertaken in a restrictive environment, which is an admirable achievement given the significant constraints inherent in a prison environment. It should be noted that this was not a RCT, but rather an evaluation of an existing programme of work. Nevertheless, being such a large intervention, it provides information around the value of MBSR in prisons.

Whilst there are very few studies that specifically focus on mental health interventions in prison, one such study was found that explored psychological interventions in prison in the context of mental health, personality disorder and criminogenic risk. This study occurred in a UK prison and involved the establishment of six therapeutic communities and 172 prisoners (Shuker & Newton, 2008). The study aimed to integrate cognitive, social and psychological principles, in an effort to address offence and risk factors by improving psychological wellbeing. Whilst this study adds little value to the TBI environment, it does demonstrate that psychological interventions can occur in prisons. This study also

demonstrated that positive changes in mental health were correlated with reductions in offence-specific risk (Andrewes et al., 2014). Whilst there is some evidence of the applicability of MBSR and positive psychological approaches within prison populations, there is no evidence in this study as to whether these approaches could be applied to TBI.

Cognitive decline and emotional distress have been reported to be associated with imprisonment (Rocha et al., 2014 and Umbach et al., 2018). A study was conducted in Portugal with 28 female prisoners exploring cognitive remediation in an attempt to improve three cognitive domains, namely: cognitive flexibility, memory and planning. The researchers discussed the impact of TBI on offending; however the study did not specifically target inmates with a TBI. The researchers conducted a battery of neurocognitive tests before and after 40 sessions of individual cognitive remediation training. The study found statistically significant changes across the neurocognitive domains with medium to large effect sizes. The researchers also found a decrease in conditions such as anxiety, depression and stress. Whilst this study is not specific to TBI, it does provide valuable information about some of the opportunities that exist for prisoner rehabilitation. It is noted to have a small sample size (n=28) and wholly female participants. The study design would also be onerous in a prison with the volume of individual sessions, which would be challenging to manage in a prison where prisoner movement is a barrier.

A further study extended the learnings from Samuelson et al. (2007). A MBSR study was conducted in a Chinese prison working with prisoners with sentences of at least 10 years (Xu et al., 2016).

54 male sentenced prisoners consented to participate in a MBSR RCT, with 25 randomised to the intervention and 19 randomised to the wait list control. The MBSR intervention ran across six weeks, with a 2.5-3-hour session each week and daily homework. The researchers used a five-facet mindfulness questionnaire, which explored anxiety, depression, use of mindfulness and general mood. The study found there were significant changes in depression, anxiety, tension, hostility and total mood disturbances in the intervention group when compared with the wait list controls.

TBI has a strong link to dysregulated behaviours, including violence (Farrer et al., 2012 and Gordon et al., 2017). A RCT was recently completed in a Caribbean prison, trialling CBT for anger management (Hutchinson et al., 2017). This RCT was undertaken at the same time as there were escalating levels of violence in the Caribbean, with murders by youth 1267% greater than in the UK. The study involved males, females, youth and maximum-security prisoners across four Trinidad prisons; and the researchers trained and utilised prison guards as recruiters for the study, in addition to assisting with the interventions. The group intervention utilised a manualised CBT-based anger management approach, undertaken across 12 two-hour sessions. This had been validated for use with people with mild intellectual challenges. The randomisation was based on a 2:1 ratio of intervention to control allocation. In total there were 57 participants, with 72% of the participants allocated to the intervention group. There was no statistically significant difference in the demographics of the intervention and wait list control, except in relation to the age, with the mean age of the intervention group being 11 years older than the control group (mean age was 31 years). Amongst other neuropsychological assessments, the STAXI and 'the profile of anger coping skills'

assessments were undertaken pre-intervention, post-intervention and again four months following completion of the intervention. The study found decreasing levels of anger in the intervention group, compared to the control group; however, the effect sizes were smaller ( $d=0.31-0.56$ ) than previously seen in a community sample who had undertaken a similar intervention. It was noted that the improvements were maintained at the four-month assessment. Understandably, there were no changes in the control group, which the researcher felt confirmed that the anger management intervention had effected the change. It is noted that there was a small sample size ( $n=57$ ); however, it is one of the few published studies in prisons describing interventions for anger, acknowledging that it was offence-focussed, rather than mental health-focussed. Notwithstanding that, the study provides knowledge around possible alternatives, such as the use of the officers and using multiple sites, should the proposed intervention be successful.

One of the few studies into TBI in prison focussed on employing keyworkers to help prepare prisoners with TBI for release (Ramos et al., 2017). This role acted as a facilitator and support person for prisoners with TBI, ensuring that the prisoner received appropriate support during their criminogenic rehabilitation, acknowledging the particular manifestations of their TBI. This included facilitating transitions of care on release. In the two years that the role had been in place, they received 510 referrals, supported 92 people and trained 140 staff. Whilst this role and its proposed benefits were not formally evaluated, it was seen as providing the necessary support to assist with the care of prisoners with TBI in custody and with their reintegration into the community. However, without a formal evaluation there remains limited evidence of its effectiveness to support implementation in New Zealand.

In keeping with the community integration of TBI survivors in the criminal justice system, there was a recent study further building on the study described above. The project was called the 'building bridges' project (Kelly et al., 2018). It involved a series of one-day forums around Australia where education was provided to caregivers and justice sector workers about TBI, the care of survivors and their entitlements. Questionnaires were completed by 178 participants which covered service knowledge, behavioural changes and forum evaluation forms pre-forum, post-forum and at six months following the forum. They found that there was a change in service behaviour, with better inter-agency collaboration. Disappointingly, at no time was a consumer involved in the forums, or was there any evidence of better outcomes for consumers of the services, or measures of reducing recidivism because the necessary supports were in place. The alliance between agencies in releasing prisoners with TBI is vital, but it was challenging to understand the application of the learnings.

An integrated study was undertaken in Hong Kong with female prisoners. The study explored the effectiveness of CBT and positive psychological interventions, with the aims of reducing psychological distress and improving wellbeing (Mak & Chan, 2018). The study was based on an established therapeutic programme (called 'Psychological Gymnasium') for prisoners with moderate to severe levels of distress. This residential programme entailed sixteen sessions across three months, each running for half a day. Forty women attended between 2014 and 2015, with a further 35 women who were on the wait list serving as controls. The study utilised a large number of standardised tests measuring depression, anxiety, thoughts, hope, outlook and gratitude. The assessments were undertaken at baseline, following session 8 and session 16. The

authors noted that the in-group differences between the CBT and positive psychological interventions was small, and that CBT was noted to alleviate stress and build on strengths, while the positive psychological intervention enhanced psychological wellbeing and reduced distress. It is noted that the study had several limitations which included: a small sample size (n=40), the absence of randomisation (as the controls were the women waiting), and they did not seek to understand the on-going treatment effects, so did not conduct assessments beyond the end of the intervention. It is rewarding to see an intervention being undertaken in a prison explicitly for distress, as it is well documented that prisons are very stressful environments with high rates of suicide (Fazel, Ramesh & Hawton, 2017; Favril, Vander Laenen, Vandevivier & Audenaert, 2017; Xu et al., 2016 and Pratt, Gooding, Awenat, Eccles & Tarrier, 2016).

Continuing with an integrated therapeutic model, a recent study explored the use of MBSR and CBT with youth offenders in the US, exploring emotional regulation and cognitive deficits while incarcerated (Umbach et al., 2018). The study involved 268 youth offenders, with a mean age of 17.4 years. The intervention was entitled 'Power Source' with 109 randomised to the intervention and 88 were controls. The intervention ran weekly across 3-5 weeks, with groups of 8-12 youth, running for 750 minutes across this timeframe. The wait list control group underwent an intervention focussed on beliefs around drugs and alcohol for the same period. Both groups underwent a computerised test called the 'emotional go/no-go task', which was completed at baseline and four months. The study found that there were significant declines in executive functioning in all groups, but the intervention group did buffer some of the effects of this. Further, the intervention did not improve

cognitive functioning when compared to a community sample. There were several challenges with this study. The authors noted that the average length of stay was 103 days, which made retention challenging. Further, they offered payment of \$5US for each session attended and \$25US for each test completed, which could be considered an inducement. Of most concern was the disclosure of serious assault by prison guards on prisoners during the time of the intervention, which was being investigated and may have adversely contributed to the results. This study provides an interesting insight into the use of combined therapy in a young prison cohort and the use of an electronic platform for testing. Whilst this is not considered in the proposed study, it provides interesting insight into possibilities for future testing. Further, both cognitive deficits and emotional dysregulation are characteristic of TBI, and it would have been interesting to have assessed the participants for TBI as part of this study.

Having reviewed the prison studies, valuable information has been attained in relation to study structure, assessment tools and timelines. The studies described above had relatively large sample sizes, with an average of 249 participants (range 28-1350). The proposed intervention is based on MBSR and CBT, so the valuable information from the aforementioned studies assists the researcher with understanding their application, albeit for a different focus (offence-focussed rather than mental health-based). Whilst there are two studies that relate to TBI in prison, they do not contribute to the knowledge base for assisting prisoners with distressing symptoms; but they do provide information about how to better assist with integration into the community for released prisoners with TBI.

From the review there is evidence of heterogeneity in the studies which makes generalisations somewhat challenging. Nevertheless, given the number of studies reviewed, the learnings can be incorporated into the proposed intervention.

## Conclusion

Even though there are a significant number of intervention studies for TBI survivors using quantitative measures, the published studies either focussed on moderate to severe TBI (Bradbury et al., 2008; Simpson et al., 2011; Cicerone et al., 2008, and Hart et al., 2015) or required participants to have had a medically-attended TBI (Ownsworth et al., 2000; Anson & Ponsford, 2006; Backhaus et al., 2016; Cullen et al., 2018; Potter et al., 2016; Tiersky et al., 2005; Bay et al., 2016, and Andrewes et al., 2014). This reduced the available participant pool given the documented low numbers of medically-attended TBI in the community (Allely, 2016).

Most of the reviewed interventions were RCT, which is seen as the gold standard (Fernandez et al., 2018). However, the sample sizes were generally very small, and this was seen as a reflection of the challenge in the recruitment of TBI survivors (Cullen et al., 2018). Further, attrition rates were relatively high at between 30-40% (Bedard et al 2014; Cullen et al., 2018, and Ashman et al., 2014). Of interest was the blending of therapeutic interventions, which meant evidence-based interventions such as CBT were paired with third generation interventions such as positive psychology and MBSR. These studies were particularly informative as the proposed research has a blended approach.

At the time of writing only one relevant qualitative study and one mixed methods study were identified. They provided valuable information around the experiences of the participants including the development or enhancement of the individual's core values and their relationships with others as a result of the intervention. Including qualitative measures into the proposed study will provide appreciated information into the prisoner experience of the intervention and how they have integrated any learning into their daily lives. This information will further contribute to the knowledge base on the care of prisoners with TBI.

There were only four studies specifically exploring mental health and associated interventions in prisons. The remaining studies explored CBT, MBSR and positive psychology intervention for offence or criminogenic needs. Whilst the studies focussed on reducing criminal behaviour, they did demonstrate reductions in anxiety, depression and stress (Xu et al., 2016 and Hutchinson et al., 2017), with improvements in self-esteem and identity (Samuelson, 2007 and Mapham & Hefferon, 2012). There was one qualitative study reviewed which explored a violence reduction intervention in prison and this also provided rich detail around the lived experience. Given the prevalence of TBI in prisons in NZ (Mitchell et al., 2017 and Barnfield & Leatham, 1998), there is a need to develop interventions that may assist prisoners with some of the distressing symptoms as a result of their TBI.

In summary, there is a paucity of studies involving prisoners with TBI. Studies based in the community provide valuable insights into intervention configuration and outputs, particularly the blending of

interventions (such as MBSR and CBT) and the mixed methods approach. These provide some foundations for the proposed intervention which will be utilising a mixed methods approach and will utilise MBSR and CBT.

## CHAPTER 7: METHODOLOGY (PART TWO)

In the intervention component of this study a pilot RCT study was undertaken to determine whether, and to what extent, a combined Cognitive Behavioural Therapy (CBT)/Mindfulness Based Stress Reduction (MBSR) intervention would impact on prisoners' skills and ability to manage persistent symptoms and negative affect following a TBI and reduce the occurrence of violent episodes. This was a single centre study conducted at Auckland South Corrections Facility (ASCF).

### Hypotheses:

- Participants receiving the group intervention will have reduced TBI symptoms post-intervention, in comparison to wait list controls as measured by the Rivermead Post-Concussion Symptoms Questionnaire (herein referred to as the Rivermead or RPQ).
- Participants receiving group intervention will have improved scores on the Negative Affect Repair Questionnaire (NARQ) post-intervention, in comparison to wait list controls.
- Participants receiving the group intervention will have reduced in-prison infractions immediately post-intervention and 12 weeks after the intervention, in comparison to wait list controls.

### Power calculation for sample size

The sample size was calculated using G power 3.1.0 to identify the number of group participants required to ensure statistical power. The required sample size was calculated as 62, with a medium effect

size of 0.3 ( $\alpha=0.05$ , power = 80%, number of groups = 2, number of measurements = 3). The effect size was estimated based on other studies which report an appropriate effect size for a positive psychological intervention as being between 0.23-0.34 (Bolier et al., 2013 and Hanks, Rapport, Waldron-Perrine & Millis, 2014). It is acknowledged that prison populations are relatively mobile, both from criminal rehabilitation (certain programmes happen in other parts of NZ) and release (both statutory release dates and paroled releases), which is an unavoidable aspect of prison life. Consequently, the sample was increased to 72 to allow for potential attrition.

Ethics approval was attained from three ethics committees prior to commencement. Ethics approval was granted on 2 April 2017 (Health and Disability Ethics Committee [HDEC], approval number 17/NTB/22); from the ASCF prison ethics committee (Kohuora Ethics Committee) 24 April 2017 (approval number 17/003); and the Auckland University of Technology Ethics Committee (AUTEK) on 26 April 2017 (approval number 17/120) (See Appendix A).

### Participant recruitment

Prisoners were invited to attend information sessions, which were held in the prison house blocks and the healthcare centre, over a period of three weeks. There were advertisements placed which outlined the study in basic terms and then the psychology staff liaised with their custodial colleagues to enter the housing areas at pre-agreed times to provide a face-to-face discussion, when large numbers of men were in the area. This was predominantly in the late afternoon, prior to the evening lock regime. The invitation was also extended by placing an online advertisement on the Custodial

Management System (CMS), which is an intranet-type system that prisoners can access from their cells. Following the information sessions, prisoners were invited to place a health request on CMS which stated, "I would like to speak to someone about the head injury study." There were also paper copies of the health request form available, and prisoners were given an opportunity to discuss the study with the psychology staff members delivering the intervention. As part of the consent process, prisoners were made aware that they may be required to wait up to six months for their intervention. They were also advised that they would have full access to standard healthcare in the prison during this time. In total, 500 participant information sheets were printed, and more than twenty information sessions were provided. The attendance at the sessions varied from 5-62 men.

High-security and segregated prisoners received additional targeted advertising through the CMS advising them of the intervention and its requirements, and were invited to place a health request as described earlier. This additional recruitment round occurred because of the nature of security measures in place for this prison population and low initial numbers of interested prisoners within the segregated prison population.

Once prisoners indicated an interest in participating in the study, the psychology team sought to verify that the prisoner had experienced a TBI. Details of their TBI history given at the time of admission to ASCF and health care records of their time in the prison was accessed from the prison electronic medical record and provided to the intervention team. Further, the psychology team was asked to check for a classification of head injury in the electronic clinical record,

which captured any head injuries sustained while in prison. From the prison records at the time of recruitment, this related to two individuals. If a TBI history was not able to be verified, then the person was excluded from the study.

### Participant selection and randomisation

Following confirmation of eligibility to participate in the study, participants' demographic details, criminal and health history were extracted from the prison health database. Initially an online QMINIM randomisation platform was considered, to assist with stratifying interested participants by particular characteristics (e.g. age, cause and number of TBIs). However, a manual randomisation approach was adopted, as strict internet security protocols within the prison did not allow access to QMINIM.

Written consent was obtained by one of the psychology staff who conducted one-to-one meetings in a private space within the prisoner's residential area. Due to literacy concerns, the staff read through the consent forms with the prisoners and sought to understand any queries or concerns. The prisoners were provided up to three weeks to consider the offer and discuss this with their families. Family information sheets were available for the prisoners to discuss with their families; however, no prisoners utilised this information.

The manual randomisation of the study participants was conducted using 72 sequentially numbered envelopes, which were prepared by an administrator who was blinded to details of the participants. This

was done to ensure allocation concealment (Bench, Day & Metcalfe, 2013). Psychology staff delivering the intervention allocated the participants to the intervention or the wait list using the above-mentioned sequentially numbered envelopes, which were divided to accommodate mainstream and segregation prisoners, who are not legally allowed to associate. This information was entered into the study database.

The randomisation envelopes were retained for the duration of the research and each participant's name was noted on the front of the envelope and placed with their individual study record. During the study, individual randomisation was changed to block randomisation as it was more difficult to recruit segregated prisoners and obtain sufficient numbers for both the intervention and control group simultaneously (n=24). The block randomisation allowed for groups to commence whilst wait list control participants were then recruited. This enabled the project to continue in a timely and efficient manner.

The psychologist delivering the intervention ensured that all prison legislative requirements were met by ensuring that participants allocated to the intervention group were legally allowed to associate with others in the group (referred to as the mainstream group). Some groups were heavily weighted to certain offence types, as some categories of offending aggregated in segregation (such as sex offenders). The placement of these prisoners is approved by the prison director. Within the intervention and wait list groups, participants were initially allocated into groups of 12, based on prisoner categories (mainstream or segregated); however, during the course of the study this required changing as some groups of prisoners stated they were reluctant to participate if the study did not

contribute to their parole board requirements, making recruitment challenging. As a result of this, some groups commenced with between 4-12 participants. The first wait list control group became the second intervention group, the second wait list became the fourth intervention group, and this continued until all 55 prisoners had received the intervention. Only half of the prisoners (4-12 per group) received consent at any one time, due to high frequency of movement of prisoners between corrections facilities in NZ. This meant that the wait list group then immediately became the intervention group to reduce the possibility of a prisoner being on the wait list and not receiving the intervention prior to being relocated to a different prison facility.

## Intervention

The study involved a manualised five-week CBT/Mindfulness Based Stress Reduction (MBSR) group-based intervention. An integrated programme for the management of anger initially developed by Kelly (2007) was modified by the psychologist and supervising psychologist to reflect the requirements of prisoners who had experienced at least one TBI in their lifetime and who resided within the prison environment, based on the team's clinical experience and previous research evidence. The modifications included the provision of prison-specific examples for discussion within the programme, and providing for repetition of the previous session's material in summary (see Appendix C).

The intervention was administered by a psychologist and an intern psychologist. The psychologist was an experienced practitioner with more than three years' experience working with vulnerable adults.

The intern psychologist was in the second half of his internship and had experience in working with prisoners. The groups ran for five weeks with sessions held twice weekly for 1.5 hours. The initial plan allowed for one hour per session, but it was decided to extend the sessions by thirty minutes to allow additional time for regrouping and to allow processing of the previous session's information. Further, there were often delays in the sessions commencing due to internal prison movements. This change was made after the first session of the first group. The group members were encouraged to complete all sessions, but were able to withdraw consent to participate at any time. Successful completion was considered to be attendance at 80% of the sessions. The intervention was repeated until all prisoners had completed the intervention, which was six cycles. The structure of the programme is reflected in Table 17 below.

#### Eligibility criteria:

##### Inclusion criteria:

Participants were required to: 1) have experienced at least one TBI in their lifetime; 2) be imprisoned for violent, burglary or sexual offences (groups found to experience particularly high rates of TBI in screening data); and 3) be imprisoned at ASCF. There were no age exclusions for recruitment given all prisoners were aged >18 years.

##### Exclusion criteria

Prisoners who were unable to speak English and those with active psychosis were excluded as they were likely to prevent engagement in the intervention and completion of the pre- and post-intervention measures. Further, prisoners who, following assessment from a

psychologist, had identified barriers such as intellectual challenges that would make the group content difficult to process, or serious mental illness where the frailty of the prisoner was deemed to be greater than their ability to participate, or where forensic mental health did not support inclusion of the prisoner into the programme or non-associations with other group members were excluded for clinical and safety reasons.

### Structure of group CBT programme

The structure of the sessions (excluding the first session) was based on a CBT format (Beck, 2011), which begins a brief check-in, transition from the last session, homework review, discussion of the agenda for the current session, session topic and setting new homework (refer to Table 17).

**Table 17: TBI intervention structure.**

| <b>Session</b> | <b>Content</b>  |
|----------------|---|
| 1              | Introduction of facilitator and session structure<br>Housekeeping and group rules – confidentiality and respect<br>Rationale for this intervention- discuss CBT and MBSR for TBI<br>Homework is to develop personal goals for the programme |
| 2              | Standard session structure<br>Psych-education on CBT and TBI and the importance of emotional regulation following TBI<br>Homework feedback/discussion   |
| 3              | Standard session structure<br>Psych-education on relationship between thoughts, emotions and behaviour using 5-part CBT model   |

|    |   |
|----|---|
|    | MBSR-thoughts and emotions<br>Homework feedback/discussion  |
| 4  | Standard session structure<br>CBT<br>Mindfulness exercises in group<br>Homework feedback/discussion   |
| 5  | Standard session structure<br>Application of mindfulness to thoughts- psych-education on thought diffusion strategies<br>Mindfulness exercises in group<br>Homework feedback/discussion |
| 6  | Standard session structure<br>Application of mindfulness to emotional regulation –<br>Exercise in acceptance of emotions<br>Homework feedback/discussion                                |
| 7  | Standard session structure<br>Integration of CBT and mindfulness to understand relationship between thoughts and emotions and how this drives behavioural patterns<br>Discussion        |
| 8  | Standard session structure<br>Introduction of the problem-solving process<br>Homework feedback/discussion   |
| 9  | Standard session structure<br>Review, reinforcement and connecting of models discussed throughout programme<br>Homework feedback/discussion   |
| 10 | Standard session structure<br>Overview of programme<br>Feedback and discussion<br>Completion of the NARQ and Rivermead  |

A safety protocol was in place. All group participants were made aware of the supports available to them should the intervention elicit uncomfortable emotions. Supports included access to the prison mental health nursing team, emergency call bells in their cells, nominated custodial officers, and nurses and healthcare assistants located in residential areas. Where there was a disclosure of self-harm or suicide during any part of the study process, including the consent, intervention or assessment procedures, the prison-wide system was activated, which includes a very strict protocol of assessment and management. During the period of the study, one participant became upset because he was removed for attending insufficient sessions and to avoid disrupting the group dynamic of re-joining subsequent sessions. At this time, the researcher was involuntarily un-blinded as the prisoner presented as aggressive to the researcher and required de-escalation. He was removed from the study and provided with support to process this removal, which included an offer of support from the mental health nursing team.

## Assessment

Prior to the intervention commencing, the prisoners completed the NARQ and the Rivermead (refer to Appendix B). The Rivermead (RPQ) was chosen as it is well established in the context of TBI research, psychometrically measuring a large number of post-concussion symptoms (broadly categorised as cognitive, affective and physiological), and has demonstrated reliability and validity for enduring symptoms (Medvedev, Theadom, Barker-Collo, Feigin & BIONIC research group, 2018 and Thomas, Skilbeck, Cannan & Slatyer, 2018). The NARQ explored the concepts of emotion and mood regulation through a measurement of a series of strategies

including cognitive regulation, calming and distraction, social strategies and externalized strategies. Eberle (2009) likens emotions to storms and moods to seasons. There is synergy between the NARQ and the STAXI in that the NARQ's measurement of emotion and mood change strategies are similar to the STAXI's state anger and trait anger. For the purposes of this research we are focusing on strategies that assist with the reduction of emotions (state anger), anger expression and anger control. Trait anger (mood) explores the pre-morbid state (such as personality structure) of the participants and as this study focused on TBI these constructs were not explored. The NARQ is noted to have good reliability and validity. It is acknowledged that the NARQ has not been utilized in the context of TBI previously.

Because of concerns with cognitive or literacy issues, the intervention psychologist and the intern psychologist provided assistance by reading through the questionnaires with the participants to ensure they understood the questions and were able to complete them. On average this assessment took approximately 30 minutes per participant. Rates of misconduct charges and negative file notes within the prison in the past five weeks were also obtained from electronic prison records. A negative file note was described as any comment in the IOMS that has a "bad or unwelcome quality or aspect of a situation or a word expressing negation" (Oxford Dictionary). The results of these were entered into a secure database which was only accessed by the mental health nurse extracting the data, the psychologist or intern psychologist. They were not available to wider staff within the prison facility. As the participants were provided with a unique study reference number, there was no study documentation shared with the researcher which contained identifying details. This ensured that the researcher had no access to identifiable data of those who chose to take part in the study. This helped to avoid any

potential influence on the prisoner's decision to participate and reduced the impact of their perception of prison healthcare during the period of the study.

At the completion of the five-week programme (post-intervention) prisoners were asked to complete the NARQ and Rivermead again. This was repeated again 12 weeks following completion of the intervention to examine the on-going effects and benefits of the intervention. The prison database (IOMS) was searched to elicit whether there had been any misconduct charges (relating to behaviours) or negative file notes during the intervention and at the 12-week follow-up. Data on misconduct offences and responses to the questionnaire items were recorded in the secure database and were only identifiable by the study participant number in order to ensure confidentiality. Participants in the wait list group completed the outcome measures at the equivalent time-points.

An experienced mental health nurse was responsible for entering all data including demographic details and assessment measure responses into the encrypted spreadsheet in preparation for analysis. This was done at the completion of each group session. Demographic information included the prisoner's full name, date of birth, ethnicity, category of crime, prison sentence length and security classification. This was completed prior to any study information being inputted to reduce the potential for any errors. Each time the database was updated a new version was created to reduce the possibility of file corruption. The intervention psychologist selected five cases at the mid-point and end of the study to cross-check data integrity.

Once all data was inputted and cross-checked by the intervention team, the information was anonymised to meet the requirements of the ethics approval. Anonymisation included removal of the prisoner's name, date of birth and prisoner registration number (PRN). Their age, ethnicity, offence category, security classification and sentence length remained. This information was then provided to the researcher for analysis. The anonymised information was saved in a secure drive available only to the researcher. All anonymised information was checked by the researcher and any queries were provided to the intervention team via email using only the unique study identifier. A request was made to the intervention team to respond using only the unique study identifier to mitigate issues with un-blinding the researcher.

### Quantitative analysis

The quantitative data was entered into IBM SPSS Version 24.0 and translated from string values from the prison extract into numeric values to enable statistical analysis to occur. Range, logic and missing data checks were completed to ensure all information was accurate, complete and correctly entered. Skewedness and kurtosis were explored to determine distribution of data and to inform whether parametric or non-parametric tests should be applied (Pallant, 2013).

Descriptive analyses were conducted to describe the participant sample in terms of ethnicity, age, offence category, security classification and sentence length, and to describe the distribution of scores on the assessment measures. An analysis of covariance (ANCOVA) was used to determine if there were any statistically

significant differences between the intervention and wait list control groups at the baseline, intervention completion and 12-week post-intervention mark. Change scores were used to determine the trajectory of assessment measure scores following completion of the intervention to determine whether there was improvement, stabilization or a decline in scores.

### Qualitative data collection and analysis

As this was the first administration of such an intervention within a prison population, a sequential exploratory mixed methods approach was deemed useful to determine acceptability of the intervention, and to identify any necessary modifications or unexpected outcomes following the treatment and to augment the quantitative data. To avoid a qualitative interview influencing the quantitative outcome data, the qualitative interviews were conducted after the last follow-up assessment, 12 weeks post-intervention. Sample size is important in qualitative research, as is information saturation (Mason, 2010 and Trotter, 2012). Whilst there are no specific power calculations for qualitative research, there is value in exploring the heterogeneity of the sample, the number of selection criteria, any groups of special interest, the different types of data collection and the budget or resources available (Sandelowski, 1995 and Mason 2010). Fugard and Potts (2015) posited a quantitative-type power calculation for thematic analysis and on that basis the required sample size was calculated as 12 participants. However, this approach has been heavily criticized, as theme development should be organic and exploratory, thus evolving during the initial stages of the thematic analysis (Braun & Clarke, 2016). Some literature suggests a sample size of between 20-50 participants (Mason, 2010). Given the homogeneity of the study group (sentenced male

prisoners) and the challenges with recruitment into the intervention a respondent driven sampling method was adopting, understanding that the sample needed to be large enough to gather sufficient information to achieve data saturation, noting that this could be a relatively small sample, particularly with an expert interviewer, who was employed onto this study (Mason, 2010). Voluntary segregated prisoners were encouraged to attend, despite the challenges in engagement.

On the basis, following completion of the 12-week follow-up, all participants were invited to participate in a semi-structured interview to explore their experiences of their TBI, the intervention and the impact of that on their experiences in the prison. Separate participant information sheets and consent forms were provided to ensure the prisoners understood what the interview involved (refer to Appendix D). The interviews were conducted by an experienced clinical psychologist, with a qualitative research background and nine years' clinical experience, who had not been involved in any previous aspect of the study process. The interviewer followed a semi-structured interview format (refer to Appendix D); however, flexible administration of this guide enabled the interviewer to be led by the participants and what was most important to them. Informed consent was obtained prior to commencement of the interviews, which were scheduled into the prisoners' CMS schedule and the prisoners were invited to attend the interview in a private space within the healthcare centre, located within the prison. The interviews lasted for approximately one hour. The interviews were audio-taped and transcribed verbatim by a professional transcriptionist who had completed a confidentiality agreement. All interview participants were identified only by their unique study identifier to ensure the blinding requirements of the ethics committee were met; and all identifying characteristics in the audio recordings

(e.g. names or specific places) were removed and replaced with a generic statement of what they were referring to (e.g. their unique study identifier). The lead researcher only saw the anonymised written transcripts in order to protect participant confidentiality.

A semantic, inductive, experiential thematic analysis (Braun & Clarke, 2006) was conducted to understand the participants' experience of TBI and the intervention/study process. This method was selected as it provided an opportunity to learn from this new intervention (at the time of writing there were no published studies about TBI interventions in prisons) and to learn from the data to better understand the participants' experiences, to further enrich the research and to provide a different and detailed discourse to the quantitative data collected (Braun & Clarke, 2006). Further, any additional benefits less amenable to measurements from the intervention could be highlighted. In order to capture a range of experiences whilst ensuring feasibility, it was planned to recruit 18 (50%) of participants from across the different treatment groups.

Each transcript was read at least three times to understand each participant's experience and to explore and establish codes. During this familiarisation phase, notes were taken, and the researcher was aware of any conscious bias (Braun & Clarke, 2006). This was reduced by presenting the data to the supervision team monthly, which contributed to a higher inter-rater reliability. Following the familiarisation, codes were developed using a semantic descriptive approach to quite simply identify and summarise the data without attempting to understand the underlying patterns or stories. Themes were then developed based on these codes and the rich dialogue contained within the transcripts. This was achieved by mapping

codes into broader themes and sub-themes where there was synergy in the coding information. Once all initial themes and sub-themes were developed, a further review was conducted to ensure the themes established truly reflected the essence of the prisoners' experience of TBI, the intervention and their life following the intervention.

### Researcher positioning

In qualitative research it is important to maintain awareness of the impact of the researcher on research participants, the research outcomes and the effect of the research on the researcher (Probst, 2015). Therefore, it is important to document the influences the researcher brings in terms of gathering, analysing and reporting the research findings (Gemignani, 2016). In doing so, it is hoped that through the process of reflexivity that the researcher has heightened awareness of any factors that impact on their involvement in the research, creating an external awareness of this, as well as gaining individual knowledge and awareness (Probst, 2015).

### Dual relationship

The researcher was the head of healthcare at the prison where the research was conducted, with responsibility for the healthcare of 960 male sentenced prisoners, so there was awareness of a perceived or actual privileged position. This was somewhat mitigated by complete blinding of the researcher to the prisoners who undertook the intervention; although this was problematic as some prisoners wanted their needs met and were not amenable to alternative lines of communication. The physical location of the intervention (in the front

of the prison healthcare centre) also required a high level of situational awareness to ensure that the researcher never entered the healthcare centre at the times the intervention was running. This was somewhat mitigated by placing some window coverings across windows, where there was limited visibility into the room and the prisoners were asked to sit with their backs to the windows. Based on literature, it is likely that the researcher knew many of the prisoners associated with the intervention, as there is evidence to suggest people with TBI are more likely to access healthcare (Piccolino & Solberg, 2014).

### Personal experience

The researcher had personal familial experience of TBI, so brought preconceptions and the possibility of countertransference to the study around the management of aggressive behaviours in the context of TBI, which included concerns about possible acts of verbal and physical aggression and distress for the men and facilitators involved in the study, should they witness this.

### Prior knowledge and attitudes

Having an awareness of the vulnerability of the prisoner cohort contributed to the possibility of countertransference (Gemignani, 2011). This was based on knowledge acquired through research and through the analysis of the prevalence study, where it was identified that 38% of the prison cohort assessed had experienced a TBI prior to the age of fifteen years (Mitchell et al., 2017). The descriptions of the actual injuries denoted a significant amount of violence (for example, spoon versus head [participant TBI514, aged 4 years], or

hammer versus head [participant TBI013, aged 14 years]), and this created some empathy and sadness for the researcher. This also created some additional pressure around not wanting the prisoners to experience any more distress or trauma because of the research.

The researcher had several preconceptions which included the thought that many of the prisoners would take time to trust the process and absorb the information provided, as trust is a significant issue for prisoners and this would negatively impact on their outcomes (Liebling & Arnold, 2012). Further, the researcher believed that the more mature prisoners (those older than 35 years) would benefit more from the intervention than younger prisoners and was concerned for the younger men as the risk of recidivism is high in this population (Department of Corrections, 2016). There was also a concern that as prisoners had a requirement to undertake many rehabilitation programmes throughout their sentence (Department of Corrections, 2016), the content of the intervention would be duplicitous and would create some behavioural challenges for the psychologist and intern psychologist due to prisoners' boredom. Finally, there were concerns that with a complex mix of prisoners, the impact of gangs, security classifications and offences would create some tension, which may result in verbal aggression, particularly in the context of frustration. All preconceptions were documented prior to any analysis of data (qualitative or quantitative) to ensure the researcher was able to demonstrate reflexivity (Probst, 2015).

### Reliability and validity in qualitative research

Reliability and validity are critical to the acceptance of qualitative research and they go hand-in-hand (Golafshani, 2003). There is a

different view of the concepts of reliability and validity in qualitative research, when compared to quantitative research. This research adopted a naturalistic approach, meaning that the researcher sought to understand the intervention in a prison environment without attempting to manipulate or control any of the outcomes or measures. From a reliability perspective, it is essential to seek to understand, explain and demonstrate the value of the research findings (Golafshani, 2003). It was also important to reflect the real-world experience of prisoners in relation to their TBI experience, the intervention and their experience of life following the intervention. From a reliability perspective, this is critical as it is hoped that the research would positively contribute to the lives of the prisoners and may have extrapolation and applicability to other prisoners in NZ and globally.

Validity has wide and varied understandings and definitions; however, the concepts of trustworthiness, quality and rigour have been described as critical elements in ensuring validity in qualitative research in order to ensure high quality defensible outcomes are achieved (Golafshani, 2003).

## CHAPTER 8: RESULTS (PART TWO)

### Quantitative results

#### Participant characteristics

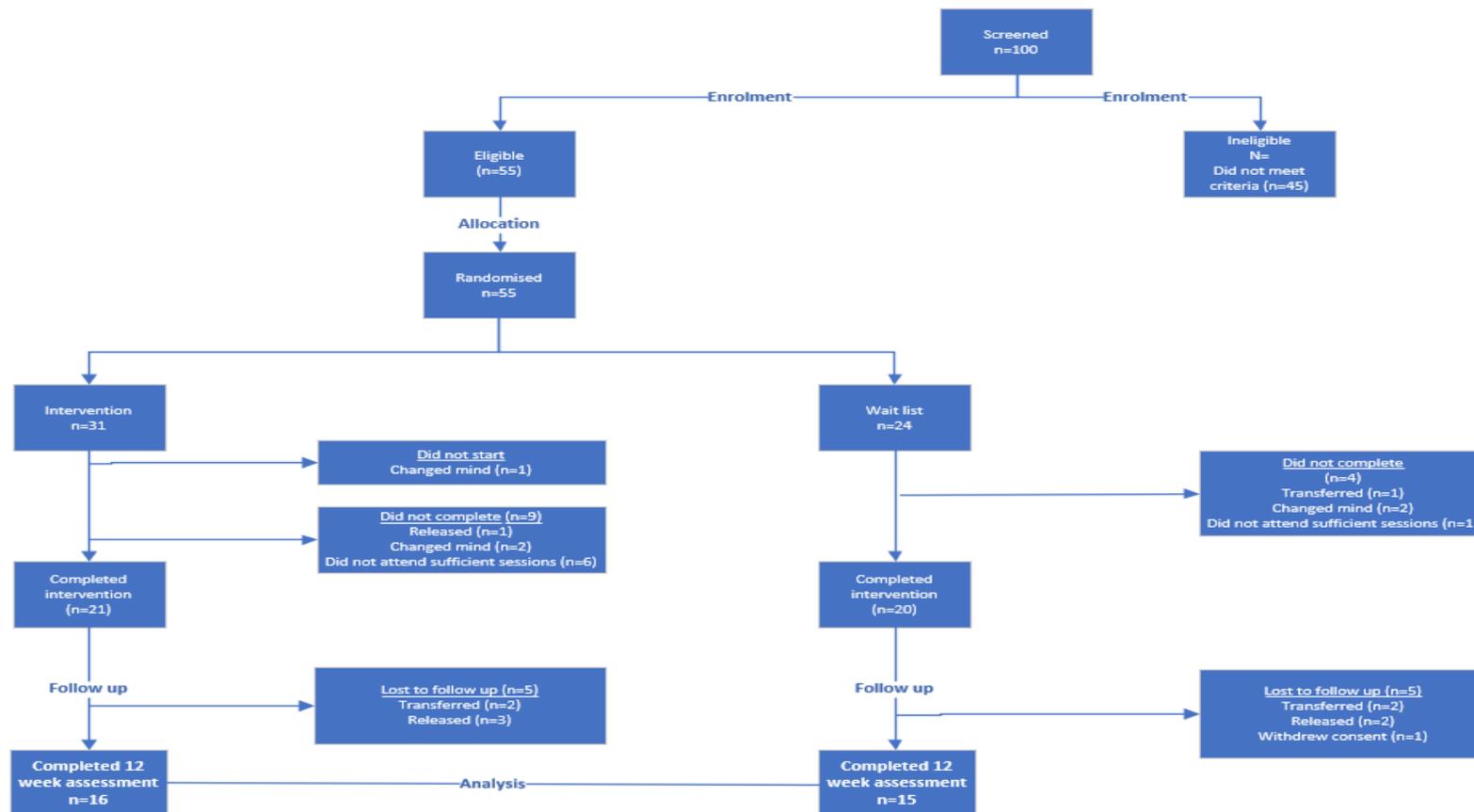
The study intervention took place between 27 June 2017 and 12 February 2018. A total of 100 interested participants were screened for eligibility for inclusion in the intervention. 55 (55%) were found to be eligible and 45 (45%) were found to be ineligible. Reasons for ineligibility included not disclosing a TBI on arrival at the prison or no record of sustaining a TBI in prison (n=41), having active mental health issues where their primary caregiver felt the intervention may worsen their condition (active psychosis) (n=1) or the intervention psychologist assessed them as being unsuitable for a group intervention (n=3).

Just over half of the study group, 56% (n=31) of the study cohort were randomised to the intervention and 44% (n=24) were randomised to the wait list control. One quarter, 25% (n=14) of the participants had the legal status of voluntary segregation and 75% (n=41) were classified as mainstream prisoners. There was no statistical difference in the intervention or wait list control groups for segregation or mainstream status ( $\chi^2=1.733$ ,  $p=.188$ ).

98% (n=54) of the consented participants started the intervention, with 75% (n=41) of those participants completing the five-week programme. One participant did not start the intervention, having withdrawn consent, and 57% (n=31) went on to complete the 12-week assessments. Attrition from initial consenting to completing the intervention related to changing their mind about being involved in

the intervention (n=4), transferring or being released (n=2), and failing to attend the minimum required number of sessions (n=7). Between completion of the intervention and the 12-week assessment, nine participants were released or transferred, and one participant did not wish to complete the assessment (refer to Figure 7: CONSORT diagram). There was no statistical difference in the completion status of the intervention and wait list control groups ( $\chi^2=1.18, p=.75$ ).

Figure 7: CONSORT diagram of flow of participation



**Table 18: TBI intervention participant demographics: June 2017-February 2018.**

|                               | <b>Total group</b> | <b>Intervention</b> | <b>Wait list</b>    | <b>Test of difference</b>  |
|-------------------------------|--------------------|---------------------|---------------------|----------------------------|
|                               | <b>Mean (SD)</b>   | <b>Mean (SD)</b>    | <b>Mean (SD)</b>    |                            |
| <b>Age</b>                    | 37.29<br>(SD 9.81) | 36.32 (SD 8.7)      | 38.54<br>(SD 11.13) | $t=-.83$<br>$p=.410$       |
| <b>Ethnicity</b>              | <b>n (%)</b>       | <b>n (%)</b>        | <b>n (%)</b>        |                            |
| Māori                         | 33 (60)            | 20 (65)             | 13 (54)             | $\chi^2=4.59$<br>$p=.205$  |
| European                      | 8 (15)             | 2 (6)               | 6 (25)              |                            |
| Pasifika                      | 10 (18)            | 5 (16)              | 5 (21)              |                            |
| Other                         | 4 (7)              | 4 (13)              | 0                   |                            |
| <b>Category of crime</b>      | <b>n (%)</b>       | <b>n (%)</b>        | <b>n (%)</b>        |                            |
| Violence                      | 26 (47)            | 19 (61)             | 7 (29)              | $\chi^2=6.73$<br>$p=.080$  |
| Burglary                      | 5 (9)              | 2 (6)               | 3 (13)              |                            |
| Sexual                        | 15 (27)            | 5 (16)              | 10 (42)             |                            |
| Other                         | 9 (16)             | 5 (16)              | 4 (17)              |                            |
| <b>Prison sentence length</b> | <b>n (%)</b>       | <b>n (%)</b>        | <b>n (%)</b>        |                            |
| 1 - 5 years                   | 21 (38)            | 12 (39)             | 9 (38)              | $\chi^2=2.38$<br>$p=.665$  |
| 5.1-10 years                  | 11 (20)            | 5 (16)              | 6 (25)              |                            |
| 10.1 - 15 years               | 7 (13)             | 3 (10)              | 4 (17)              |                            |
| 15.1 - 20 years               | 2 (4)              | 1 (3)               | 1 (4)               |                            |
| More than 20 years            | 14 (25)            | 10 (32)             | 4 (17)              |                            |
| <b>Segregation status</b>     | <b>n (%)</b>       | <b>n (%)</b>        | <b>n (%)</b>        |                            |
| Voluntary                     | 14 (25)            | 10 (32)             | 4 (17)              | $\chi^2=1.733$<br>$p=.188$ |
| Mainstream                    | 41 (75)            | 21 (68)             | 20 (83)             |                            |

## *Age*

The participants' ages ranged from 22-65 years. There was a two-year variation in mean age between the intervention (36.32) and wait list control (38.54) groups. Mainstream prisoners were on average 5 years older (mean age of 38.51 years) than voluntary segregated prisoners (mean age of 33.71 years). However, there were no statistical differences in the mean ages between the intervention and wait list control groups ( $t=-.83$ ,  $p=.410$ ). The sample had a symmetrical, normal distribution (skewness =.722, kurtosis =.418 and Kolmogorov-Smirnov =.112,  $p=.084$ ) (refer to Table 18).

## *Ethnicity*

More than half of all participants were Māori. Māori were the majority of the voluntary segregated prisoners in the intervention (86%,  $n=12$ ); although it is acknowledged that the total number of voluntary segregated prisoners was small ( $n=14$ ). Pasifika were 18% ( $n=10$ ) of all participants, comprising 16% ( $n=5$ ) of the intervention group and 21% ( $n=5$ ) of the wait list control group. The remaining prisoners were classified as 'other' and included Asian, African and 'ethnicity not otherwise specified'. This group was very small ( $n=4$ ) and they were all mainstream and in the intervention group. There was no statistical difference in ethnicity between the intervention and wait list groups ( $\chi^2=4.59$ ,  $p=.205$ ) (refer to Table 18).

## *Crime*

Violence was the most prevalent category of crime for all participants, accounting for 47% ( $n=26$ ) of the group's crimes. Prisoners

sentenced for violent crimes were predominantly in the intervention group (61%, n=19). The 'other' category mostly contained prisoners with drug-related offences and accounted for 16% (n=9) of the overall group. They were also evenly spread across the intervention (16%, n=5) and wait list control groups (17%, n=4) and were all mainstream prisoners. There were no statistical differences in the intervention and wait list control groups ( $\chi^2=6.73$ ,  $p=.080$ ) (refer to Table 18).

### *Sentence length*

The majority of prisoners in the group were serving short sentences of 1-5 years (38%, n=21). They were also the dominant group across the intervention (39%, n=12) and wait list groups (38%, n=9). Prisoners on life sentences (those with sentences in excess of 20 years) accounted for 25% (n=14) of the total group and were predominantly randomised to the intervention group (32%, n=10). Collectively, prisoners serving sentences between 10.1-20 years were the smallest group and have been amalgamated due to their very small numbers (n=9, 17%). They were evenly distributed across the intervention (13%, N=4) and wait list groups (21%, n=5). There was no statistical difference in the intervention and wait list control groups ( $\chi^2=2.38$ ,  $p=.665$ ) for sentence length (refer to Table 18).

### *Differences in outcome post-intervention*

A one-way analysis of covariance (ANCOVA) between groups was conducted to compare the outcome measure scores between the intervention and wait list groups (Pallant, 2013). The independent variable was the intervention and the dependent variables were the

RPQ and NARQ at completion of the intervention (five weeks) and again at 12 weeks. The pre-intervention RPQ and NARQ scores were used as the covariate in this analysis (Pallant, 2013), to control for any baseline differences between the groups. As shown in Table 19, after adjusting for the pre-intervention scores there was no statistical difference in the total RPQ at five or the 12-week follow-up. Subscale scores were also explored and no statistical difference, with negligible to small effect sizes, was found for vision, vertigo, mood/somatic and cognitive symptoms, at the five- and 12-week follow-ups.

There was a statistical difference in the total NARQ score at five weeks (post-intervention), although the effect size was considered small to medium ( $F [1,38] = 4.68, p = .037, d = .36$ ). The difference in total NARQ scores did not remain statistically significant at 12 weeks, where there was no statistical difference but there was a medium effect size. NARQ subscale scores were also explored and no statistical differences, with negligible effect sizes, were found in the cognitive regulation strategies, calming and distraction strategies, social regulation strategies and externalised strategies at five and 12 weeks (refer to Table 19).

There were few negative file notes recorded for the intervention and wait list groups at five and 12-week follow-up. The range was 0-6 negative file notes or misconducts for the intervention group and 0-3 negative file notes or misconducts for the wait list control group. There was also no statistical difference, with small effect sizes in the negative file notes and misconduct charges at five weeks ( $F [1,6] = .026, p = .872, d = .21$ ) and 12 weeks ( $F [1,4] = .698, p = .410, d = .37$ ) between the intervention and wait list control groups (see Table 19).

**Table 19: Descriptive statistics by intervention and wait-list grouping.**

| <b>Measure</b>                  | <b>Time point</b>              | <b>Intervention<br/>Mean (SD)</b> | <b>Wait<br/>list control<br/>Mean (SD)</b> | <b>Test of<br/>difference</b> | <b>Standardised<br/>mean difference<br/>(ES)</b> |
|---------------------------------|--------------------------------|-----------------------------------|--|-------------------------------|--|
| <b>Post-concussion symptoms</b> |                                |                                   |  |                               |  |
| <b>Total score</b>              | Pre-intervention               | 27 (11.5)                         | 28.0 (13.4)                                |                               | 0.08   |
|                                 | Post- -intervention            | 25.57 (10.5)                      | 24.55 (13.1)                               | $F=.410, p=.53$               | 0.04   |
|                                 | 12 weeks after<br>intervention | 23.13 (11.7)                      | 29.07 (15.3)                               | $F=.408, p=.53$               | 0.11   |
|                                 |                                |                                   |  |                               |  |
| <b>Vision</b>                   | Pre-intervention               | 3.81 (2.2)                        | 3.67 (3.3)                                 |                               | 0.04   |
|                                 | Post- intervention             | 4.44 (4.7)                        | 5.16 (6.8)                                 | $F=61, p=.44$                 | 0.12   |
|                                 | 12 weeks after<br>intervention | 4.18 (5.6)                        | 5.94 (7.9)                                 | $F=2.121, p=.16$              | 0.25   |
|                                 |                                |                                   |  |                               |  |
| <b>Vertigo</b>                  | Pre-intervention               | 5.33 (3.2)                        | 6.08 (3.28)                                |                               | 0.231  |
|                                 | Post- intervention             | 6.04 (6.4)                        | 6.38 (8.3)                                 | $F=.121, p=.73$               | 0.045  |
|                                 | 12 weeks after<br>intervention | 5.45 (6.8)                        | 6.73 (9.0)                                 | $F=1.167, p=.29$              | 0.16   |
|                                 |                                |                                   |  |                               |  |
| <b>Mood/</b>                    | Pre-intervention               | 11.14 (5.6)                       | 11.92 (5.7)                                |                               | 0.138  |

|  |                             |               |               |                                    |       |
|--|-----------------------------|---------------|---------------|------------------------------------|-------|
| <b>Somatic</b>                               |                             |               |               |                                    |       |
|  | Post- intervention          | 10.97 (14.6)  | 11.06 (19.3)  | $F=.003, p=.96$                    | 0.005 |
|  | 12 weeks after intervention | 9.16 (14.4)   | 12.72 (25.0)  | $F=2.807, p=.10$                   | 0.174 |
|  |                             |               |               |                                    |       |
| <b>Cognitive</b>                             | Pre-intervention            | 6.71 (3.2)    | 6.29 (3.5)    |                                    | 0.125 |
|  | Post- intervention          | 6.63 (8.24)   | 7.67 (10.8)   | $F=.821, p=.37$                    | 0.108 |
|  | 12 weeks after intervention | 7 (7.6)       | 8.46 (11.1)   | $F=1.244, p=.27$                   | 0.153 |
|  |                             |               |               |                                    |       |
| <b>Negative affect repair</b>                |                             |               |               |                                    |       |
| <b>Total score</b>                           | Pre-intervention            | 52.14 (8.3)   | 48.88 (9.92)  |                                    | 0.1   |
|  | Post- intervention          | 56.9 (8.38)   | 49.35 (11.37) | <b><math>F=4.68, p=.037</math></b> | 0.36  |
|  | 12 weeks after intervention | 49.63 (13.88) | 47 (13.96)    | $F=.016, p=.90$                    | 0.55  |
|  |                             |               |               |                                    |       |
| <b>Cognitive regulation strategies (CRS)</b> | Pre-intervention            | 18.38 (5.02)  | 17.79 (5.98)  |                                    | 0.106 |
|  | Post- intervention          | 22.32 (14.5)  | 21.82 (29.7)  | $F=.085, p=.773$                   | 0.021 |
|  | 12 weeks after              | 22.07 (16.77) | 20.35 (30.06) | $F=.682, p=.416$                   | 0.07  |

|   |                             |               |               |                  |       |
|---|-----------------------------|---------------|---------------|------------------|-------|
|   | intervention                |               |               |                  |       |
|   |                             |               |               |                  |       |
| <b>Calming and distraction strategies (CDS)</b> | Pre-intervention            | 17.38 (3.6)   | 15.58 (5.14)  |                  | 0.4   |
|   | Post- intervention          | 19.08 (15.3)  | 16.94 (14.95) | $F=3.4, p=.072$  | 0.141 |
|   | 12 weeks after intervention | 18.37 (10.56) | 16.25 (17.8)  | $F=2.67, p=.113$ | 0.144 |
|   |                             |               |               |                  |       |
| <b>Social regulation strategies (SRS)</b>       | Pre-intervention            | 10.95 (3.34)  | 11.92 (2.75)  |                  | 0.31  |
|   | Post- intervention          | 11.06 (9.56)  | 10.88 (10.4)  | $F=.034, p=.854$ | 0.018 |
|   | 12 weeks after intervention | 12.4 (10.32)  | 11.28 (10.99) | $F=.87, p=.35$   | 0.105 |
|   |                             |               |               |                  |       |
| <b>Externalised strategies (ES)</b>             | Pre-intervention            | 5.43 (4.48)   | 3.58 (3.37)   |                  | 0.466 |
|   | Post- intervention          | 14.04 (12.4)  | 14.86 (7.4)   | $F=.866, p=.358$ | 0.08  |
|   | 12 weeks after              | 15.1 (5.08)   | 15.2 (5.84)   | $F=.37, p=.85$   | 0.019 |

|  |                             |           |            |                                |      |
|--|-----------------------------|-----------|------------|--------------------------------|------|
|  | intervention                |           |            |                                |      |
|  |                             |           |            |                                |      |
| <b>Negative file notes and misconducts</b> |                             |           |            |                                |      |
| <b>Total score</b>                         | Pre-intervention            | .86 (1.9) | .20 (.67)  |                                | 0.46 |
|  | Post- intervention          | .44(1.5)  | .20 (.561) | <i>F</i> =.026, <i>p</i> =.872 | 0.21 |
|  | 12 weeks after intervention | .56 (1.5) | .13 (.352) | <i>F</i> =.698, <i>p</i> =.410 | 0.37 |

## Individual scores of those completing the intervention and follow-ups

To determine how participants' scores changed over time, individual change scores were calculated. A positive change in the NARQ was considered to be positive (greater use of positive coping strategies), while a negative change in the RPQ was considered positive (fewer symptoms reported). The scores were calculated from pre-intervention to completion of the intervention (five weeks) and from completion of the intervention (five weeks) to the 12-week follow-up assessment for the RPQ and NARQ, for the intervention and wait list control groups.

The individual change scores for the RPQ intervention group from pre-intervention to completion of the intervention (five weeks) was -1.9 (fewer negative symptoms) and -0.7 (more negative symptoms) from completion of the intervention (five weeks) to the 12-week follow-up. The wait list control group had more polarised results with -4.7 from pre-intervention to completion of the intervention (five weeks) and 2.3 from completion of the intervention (five weeks) to the 12-week follow-up (refer to Table 20). As shown in Table 20, 63% of participants reported a decrease in symptoms post-intervention and 88% at 12-week follow-up. The group mean scores may have been influenced by the few participants reporting a significant increase in symptoms during the course of the intervention and at the 12-week follow-up.

**Table 20: Individual changes to RPQ: intervention group.**

| <b>Unique identifier</b> | <b>Individual change RPQ total 0-5 weeks</b> | <b>Individual change RPQ total 5-12 weeks</b> |
|--------------------------|--|---|
| 4                        | 1  | -1  |
| 5                        | -2   | -1  |

|    |     |     |
|----|-----|-----|
| 6  | -12 | 1   |
| 7  | -3  | -2  |
| 10 | 12  | -3  |
| 11 | 22  | 2   |
| 19 | 4   | -9  |
| 20 | 3   | 9   |
| 25 | -8  | -6  |
| 27 | 14  | -4  |
| 28 | -2  | -1  |
| 30 | -26 | -2  |
| 32 | -13 | -1  |
| 36 | 6   | -6  |
| 39 | -3  | -17 |
| 40 | -24 | 30  |

The individual change scores for the NARQ intervention group from pre-intervention to completion of the intervention (five weeks) were 5.3 and -3.8 from completion of the intervention (five weeks) to the 12-week follow-up. The wait list control group were 0.1 from pre-intervention to completion of the intervention (five weeks) and 1.1 from completion of the intervention (five weeks) to the 12-week follow-up (refer to Table 21).

**Table 21: Individual changes to NARQ: Intervention group.**

| <b>Unique identifier</b> | <b>Individual change NARQ total 0-5 weeks</b> | <b>Individual change NARQ total 5-12 weeks</b> |
|--------------------------|---|--|
| <b>4</b>                 | 7   | -8   |
| <b>5</b>                 | 19  | -12  |
| <b>6</b>                 | 3   | -1   |
| <b>7</b>                 | -7  | 12   |
| <b>10</b>                | 2   | -16  |
| <b>11</b>                | 11  | -3   |
| <b>19</b>                | -6  | -2   |
| <b>20</b>                | 15  | -3   |
| <b>25</b>                | 7   | 5  |
| <b>27</b>                | 2   | -9   |
| <b>28</b>                | 16  | -17  |
| <b>30</b>                | 10  | -8   |
| <b>32</b>                | -10   | -6   |
| <b>36</b>                | -6  | 12   |
| <b>39</b>                | 10  | 7  |
| <b>40</b>                | 11  | -12  |

## Qualitative results

### Participant characteristics

Eighteen participants were interviewed between 12 and 15-weeks following completion of the intervention. This coincided with the completion of the 12-week assessments, but also reflected the qualitative interviewer's availability. One interview was interrupted during the interview and the participant decided not to continue.

The collected data was excluded as the interview had been in progress for less than five minutes and the transcription indicated that the interview remained at the introduction phase. Seventeen interviews were used for analysis purposes.

### Demographics

The participants in the interviews largely reflected the study cohort. The age range was 22-50 years (SD 7.76), with a mean age of 36.71. Participants were largely Māori (60%), 41% were in prison for sexually related crimes, with 42% serving a sentence of less than ten years. Over half of the participants (53%) were randomised to the intervention group and 94% were mainstream prisoners (refer to Table 22).

**Table 22: Demographic information for the qualitative participants.**

|                          | <b>n=</b> | <b>%</b> |
|--------------------------|-----------|----------|
| <b>Age</b>               |           |          |
| 20-29 years              | 4         | 24       |
| 30-39 years              | 6         | 35       |
| 40-49 years              | 6         | 35       |
| 50-59 years              | 1         | 6        |
|                          |           |          |
| <b>Ethnicity</b>         |           |          |
| Māori                    | 10        | 59       |
| European                 | 3         | 18       |
| Pasifika                 | 2         | 12       |
| Other                    | 2         | 12       |
| <b>Category of crime</b> |           |          |
| Violence                 | 5         | 29       |
| Burglary                 | 3         | 18       |

|                            |    |    |
|----------------------------|----|----|
| Sexual                     | 7  | 41 |
| Other                      | 2  | 12 |
| <b>Prison sentence</b>     |    |    |
| 1 - 5 years                | 3  | 18 |
| 5.1-10 years               | 4  | 24 |
| 10.1 - 15 years            | 5  | 29 |
| 15.1 - 20 years            | 1  | 6  |
| More than 20 years         | 4  | 24 |
| <b>Intervention stream</b> |    |    |
| Intervention               | 9  | 53 |
| Wait list                  | 8  | 47 |
| <b>Segregation status</b>  |    |    |
| Voluntary segregation      | 1  | 6  |
| Mainstream                 | 16 | 94 |

Following coding, the participants' experience of TBI and the intervention were divided into three themes.

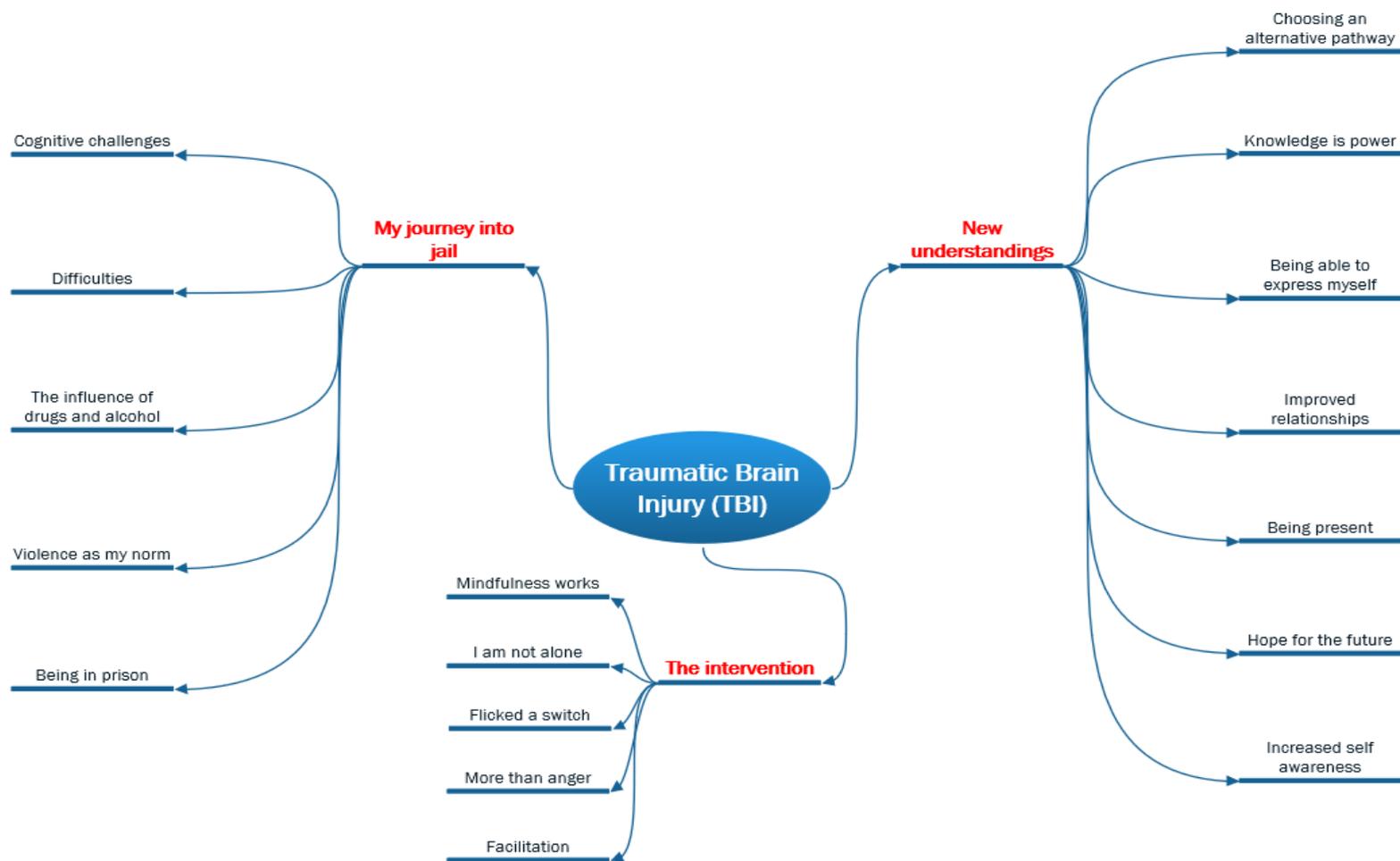
These included:

- My journey into jail
- The intervention
- New understandings.

The themes and sub-themes are reflected in Figure 8. Each of the themes along with sub-themes will be discussed separately in detail.



Figure 8: Mind map of themes & sub-themes



## My journey into jail

Following the intervention, most participants reflected on whether their TBI(s) may have influenced their journey into jail. The sub-themes included the cognitive challenges and difficulties following a TBI, the influence of drugs and alcohol on their functional ability and community living; violence being a normal experience in their life and their experience of being in prison with a TBI. An absence of help-seeking behaviours was evident throughout the interviews, with all participants describing that they had not been previously aware of the potential impacts their injury may have had. Nine participants (53%) interviewed felt that their TBI may have contributed, in part, to their journey into jail. This related to having a different view of the world or self-medicating against some of the symptoms relating to the challenges they experienced following their TBI.

*" ... My case is quite serious. I'm up for murder, and some people came to my friend's house with a firearm and they threatened to shoot us. They let a shot from the air but I didn't know they were shooting in the air, and I started firing back straightaway and I hit two of them and I killed one and injured another one, and I think that, maybe, without the head injury, learning about the fight or flight path and stuff like that, that things may have been different. I may not have even shot at them, you know, because I was that scared and maybe I would have fired in the air too to try and scare them away, and I think about that, if that is still with my head injury, because I would have handled things differently before and that's where a jury sees it as not self-defence because they think of the way that they would have reacted...I thought that was a normal reaction, what I did, and when I got found guilty of murder I couldn't understand it. If you were in my shoes you would do the exact same thing. But no, that's not the truth, some people wouldn't do that. I put that down*

*to my brain injury...I don't think I would even be in prison if I didn't have a brain injury." (TBI006)*

This participant was under 30 years, in prison on a life sentence for a violent crime. In order to protect his identity all other details are omitted.

Conversely, six participants (35%) reported that they felt their TBI did not contribute to their offending, rather they attributed it to poor decision-making or being part of a dysfunctional group (predominantly gangs).

*"There's been times I'm just fighting too much and I've ended up in jail. I must say a few times I have been hit a bit hard and I've felt it for a day or two. I suppose that has led to me doing some pretty serious things like robberies and stuff like that, but again I think it comes down to my choice. I think I can't really blame it on head injuries; it's choice and stability, not enough stability ... Things that I've needed in my life I've gone and taken them because I haven't been stable enough to realise that there's needs and wants and half of the things that I was taking were wants, not needs." (TBI005).*

This participant was a Māori man under the age of 40 years, in prison on a 5-10-year sentence for a sexual crime.

### *Cognitive challenges*

Most of the participants reported experiencing cognitive challenges in current everyday life, particularly in relation to learning difficulties, largely described as being in their childhood and associated with short-term memory. The participants noted that these experiences contributed to their feelings of anger and frustration, along with

being poorly understood, and being ridiculed or ostracised. Ten participants (59%) identified cognitive challenges as a significant issue for them.

*"People thought I was ignorant, you know, because they'd say something to me and then I'd say, 'What?' I felt like I was a bit slower than usual...then after that I would just snap and get angry because I thought they were making fun of me. I just got angry, angry easily, after the injury." (TBI007).*

This participant was a Māori man under the age of 40 years, in prison on a 5-10-year sentence for a sexual crime.

In some cases, participants reflected that they had noticed a difference in their cognitive functioning after their TBI, which impacted on 'slower' thinking than they experienced pre-TBI, along with memory issues.

*[The impact of accident on life]" ... It was quite significant looking back and even to today, I went to, just a couple of years ago, or last year I just finished getting my NCEA Level 3. My learning and trying to remember things definitely ain't the same. I've got to read something and read it again and read it again just to get something to understand...I still can't remember those things and like talking to you now and in five minutes I might give you a different, around about the same, but not quite the same, different parts of what happened could come and change the effect of my answer." (TBI018).*

This participant was a European man under the age of 30 years, in prison for a burglary-related crime with a sentence of 1-5 years.

One participant denied any cognitive difficulties, and the remaining seven participants (41%) did not explicitly denote any cognitive difficulties.

### *Difficulties experienced*

Eight participants (47%) described frequently experiencing symptoms, which may or may not be linked to their TBI. Difficulties included light sensitivity, headaches and dizziness. Throughout the qualitative process this was reflected as an on-going experience and a perceived barrier to what they would term as a normal life. There were also threads of connection between headaches and aggression/anger, along with the use of alcohol and other drugs as a strategy for self-medicating.

*"... I used to get bad headaches. Even now, even now today I still have a sensitivity to light... I was on strong medications. I used to have real bad headaches, used to be easily angered." (TBI036)*

This participant was a Māori man under the age of 50 years, in prison on a life sentence for a violent crime.

*"Concentrating...Headaches, chronic headaches... Dizziness. I suffer from epilepsy as well, but I think it was brought on by the head injuries themselves... I had my first head injury when I was 11 years old." (TBI038)*

This participant was a Māori man under the age of 50 years, in prison for burglary-related crimes on a sentence of 5-10 years.

*"It's hard to balance that because you're trapped within a body that can't function like it used to. I used to be a sports fanatic and I used to be able to run for miles and miles, running around the bays and then do it a second time. I can't even walk for long anymore because I get a headache from the sun." (TBI039)*

This participant was a Māori man under the age of 40 years, in prison for burglary-related crimes on a sentence of 15-20 years.

Ten participants (53%) did not explicitly denote difficulties as an issue for them.

### *The influence of drugs and alcohol*

Seven participants (41%) identified the use of alcohol and other drugs (AOD), with participants describing currently self-medicating against what they detail as the effects and symptoms of their TBI. The participants also identified AOD as a contributor to them coming to prison. In the context of accepting a new world, participants described the use of AOD as helping them cope, including the management of distressing experiences, such as headaches, and, on one occasion, the development of auditory hallucinations. Marijuana was the most prevalent drug described.

*"I didn't know how to cope properly with it [the TBI] so I just drank and drank and drank... I was too kind of shy to go and ask them [the Accident Compensation Corporation]. I went to the bottle instead." (TBI007)*

*"The drinking brought me into prison because I just drank and drank and drank and then I just got angry with someone and dealt with them, where I should have went the other way, you know." (TBI007)*

*"...I turned to marijuana, but then that causes a whole lot of problems in itself and it doesn't exactly resolve things not for me. It just made me less motivated. Then I turned to alcohol and I dabbled in other substances. I know for me those things ain't good for me... I'm that person that if I'm inebriated or if I'm under the influence*

*of methamphetamine or any other psychedelic drugs, once I get a thought I'll act on it... irrational. I'll never travel down that road again."* (TBI036)

*[In relation to the contribution of TBI to coming to prison]"... as soon as I had knocks to my head and I had headaches and stuff, I started smoking weed hard out, smoking weed on the outside. That pretty much took the headaches away but it just made me extremely more tired and lazy."* (TBI040)

This participant was a man of 'other' ethnicity under the age of 30 years, in prison for a violent crime on a sentence of 10-15 years.

*"... I got on drugs trying to escape what happened to me when I was younger and I wasn't against drugs, but I used to hear voices which I thought everybody heard. I thought that was natural but I didn't find out until later that I was actually hearing voices that weren't there. It was very confusing because at one stage I'm getting headaches and that because I'm feeling dizzy, next thing I'm hearing voices..."* (TBI039)

### *Violence as my norm*

Fourteen participants (82%) described violence as being the norm. They also described sports-related violence as an avenue for venting their frustration and managing dysregulated behaviours and mood issues. 82% of the participants also identified violence as the genesis of their TBI, which is in keeping with the prevalence research conducted in the same facility (Mitchell, Theadom & du Preez, 2017).

*"I was 13... I was just abused... I lost consciousness, passed out, when I come too I was still in the same place where I was knocked... That was pretty much my first serious one and there was the last, but after that it*

*was just being bullied, yep... So I took up boxing. That was from a background of family violence and bullying. I thought I could turn things around by taking up the sport of boxing and [taking] all my frustration and anger into the sport of boxing and in many ways it helped me overcome a lot of things... my object was to go into the ring without my head being hit but it just happens instead, that's what it's there for." (TBI015)*

This participant was a Māori man under the age of 40 years, in prison for burglary-related crimes on a sentence of 5-10 years.

*"... I was bashed when I was a kid. Those will be the ones that really hit the [36.38] because dad used to crack me or mum used to crack me, crack me so hard I was flung against the wall and hit my head. Dad was never there, it was a step dad. He used to hang me outside of our two-storey house window by my feet or on a piece of rope to teach me how to stay focused. How's that meant to help any kid? So to open up to someone is very hard... maybe they'll find more people open up about how you got your head injury because why you got your head injury is just a little bit different to how you got your head injury." (TBI038)*

At times the participants described gangs as a place of belonging, often in the context of family violence or parental absence. However, the prevalence of violence within the gang environment was reported as high, but there was an acceptance of this to belong.

*"Most of us men don't want to talk about what happened in our youth. Dad was never there; mum used to crack me; I've never had any role models, so the mean streets are where you turn to. You go from term to term and you get bashed because you're hanging out with the big boys; you think it's cool to get bashed, so you keep going back for more, bash, bash, bash. I was saying before, 16 I'd been knocked out six times. Six times and those are the ones I can remember.*

*There have been many times I've woken up in places that I don't know how I've got there..." (TBI038)*

*"... I used to get beatings just for not anything really, just basic stuff, not doing the dishes and stuff like that, used to get beatings and stuff...I guess from then, I guess I lost my way of who I really was. I was too scared to do anything or be around home or be anywhere near my father, so I kind of isolated myself with all my friends and they're all negative vibes, like bad associates, but at the time I felt comfortable in that zone. I felt like I was safe there instead of being at home and getting a growling or get a hiding for something small...I hung out with them and I felt like I could do whatever I want without having to look over my shoulder or having to flinch. I started doing what they were doing because I actually thought it was something good and they were making money off it... Back then I had nothing to keep me focussed on what my life was really about, like to motivate me to make changes and stuff until I met my partner that I've been with for eight years now. She's been helping me through everything..." (TBI040)*

### *Being in prison*

Fourteen participants (82%) discussed their prison experiences, with four (23%) discussing prison in a negative context, eight (47%) in a positive context, with 12% as neither good nor bad, but rather an outcome of their current situation.

*"I feel much stronger, mentally, physically [in prison]. Mentally I'm able to say no. I'm careful now... it sucks that coming to prison I had to learn all this, and this is from myself because I identified my offending, I identified where I was going wrong out there. So I've done a lot of homework on myself and I've devoted this time to myself. I've devoted this time." (TBO015)*

*[The TBI] " ... It was before I came in and I've been inside for four-and-a-half years. To be honest, I'm a lot safer in here ..."* (TBI039)

*"... Seeing them [the other prisoners] excited to see me again and I don't want that; I don't want anyone to be excited to see me back in here. I want them to come up to me and go, 'What are you doing here, man? You're too good for this, you should be out there'... They're giving you that little push that maybe you didn't get earlier in your life, like the support that you needed and stuff like that. All it takes is somebody just to give you a nudge in the right direction."* (TBI040)

The journey into jail appeared to be complex for many of the participants. Strongly threaded throughout the dialogue was a knowledge deficit about the impact of TBI and importance of getting professional support and care after injury. Nine participants (53%) experienced symptoms that they state contributed to them being incarcerated. Cognitive challenges (including short term memory issues, learning difficulties and frustration), along with violence as the norm, affected 15 participants respectively (88%). 41% of participants described the use of alcohol and drugs to help manage their difficulties, with headaches reported to affecting 47% of the participants.

## The intervention

One part of the interview included discussion around the intervention itself. As previously discussed, this was a manualised programme modified for use in a prison. It was originally developed for the management of anger, based on a single subject

intervention developed for an adolescent with anger management issues (Kelly, 2007).

This is the first time a TBI-specific intervention has been completed in a prison to the knowledge of the researcher, and the participants' feedback was valuable in terms of the acceptability of the intervention and possibility of continuing it beyond the end of the research. It was also important to reflect the lived experience of the participants to better understand the value (or not) of the intervention through their eyes.

During the interviews five sub-themes evolved.

#### *Mindfulness works*

Eleven participants (65%) explicitly made mention of the value of mindfulness, and its application in their daily life. The remaining six participants (35%) did not explicitly discuss mindfulness.

*"Mindfulness is always a big point of any study I think. They should always bring that into, you know, to each everybody about. I think that's a pretty important thing. If more people probably know about mindfulness and about working in your wise mind and all of that kind of stuff, they would probably be less likely to go out and offend, or just make their lives a bit easier, you know, just kind of what I'm thinking...They should teach it more in schools to people that are growing up, you know, who knows what kind of lives they'll have." (TBI011)*

This participant was a European man under the age of 40 years, in prison for sexual-related crimes on a sentence of 10-15 years.

*"... Mindfulness, that's one of the biggest things from the group that I've learned. It's being mindful, but not only of me, but how actually things work and especially with the way I process it, the way I look at it and how I'm going to act with it. Being mindful of others' feelings and just the environment around me..." (TBI036)*

*"Mindfulness. Trying to be mindful, I guess. That's the new thing [16.27] I guess some respect, and all of that I guess for us. Being mindful, mindful of others and being mindful of yourself and surroundings. Patience. Before I didn't have much patience." (TBI051)*

*"...Everything [I] will do will be what I've learned... mindfulness is something you do with every activity. So even being mindful of my actions, that's a big thing, knowing when you're going down the wrong path rather than just walking it. You can be walking down the wrong path and not even know what you're doing, just to be mindful of everything, everything in life is good, prison, non-judgemental, that's one, and awareness." (TBI006)*

### *I am not alone*

Seven participants (41%) discussed the value of sharing their experiences with other participants and the sense of camaraderie during the intervention. This included being vulnerable at times while sharing but appreciating the importance of this for their own learning and that of others. The remaining ten participants (59%) did not explicitly make comments in relation to sharing their experiences.

*"I found it excellent. It was insightful and very helpful. It gave me skills that I otherwise wouldn't have learnt as well as being able to identify my own personal traits that were where I was not alone. It was comforting to know that there were other people in my shoes as well that suffered from the same kind of stuff. But at the*

*same time it was comforting to see that I wasn't uncomfortable enough to be able to share. I felt I shared a lot in that programme, whereas before I was quite a reserved person. So, yeah, my confidence has picked up." (TBI009)*

This participant was a Māori man under the age of 50 years, in prison for sexual-related crimes on a sentence of 5-10 years.

*"About yourself. Not anybody else, just about you. I did it with two other guys on the course and they learned a lot about me and I learned a lot about them and realising that we had... there was a common theme going on between all three of us. If I could push for anything or be an advocate for anything, it would be for this course." (TBI045)*

This participant was a Māori man under the age of 60 years, in prison for sexual-related crimes on a sentence of 10-15 years.

*"We don't know we're not to blame for what's happened... We think we're to blame... They think they're wrong. That's like me when I was beaten up every day, most [of] my life. I thought it was everybody done it and it was scary, but now to know that my next head injury could be my last, I'm very, very careful of what I do now. The TBI programme gave me a reason to start thinking clearer and thinking, okay it's time to open up because it's not what I've got when I go, it's what I gave.' If I can get some knowledge, like I spoke to you about my mate [41.34] this morning about head injuries and my life story [41.43]. He just went, 'Whoa!' He thought he had it rough, but..." (TBI 038)*

### *Flicked a switch*

Nine participants (53%) identified that they had a new understanding of the impact of their TBI and what strategies could be put in place to

address some of the distressing symptoms. A further eight participants (47%) did not explicitly refer to this.

*"... I found it to be positive. I did learn things from it and just how to stop myself from kind of getting into the rage kind of thing and not let it... hopefully stop it before it gets to that point where I lose control....I can describe what's happening to myself, talk through with myself trying to stop it before it gets too out of control...One of the skills that I seem to use is stop what I'm doing, maybe remove myself from the situation, think about it, observe it and then participate. Just things like that, you know, anything to kind of stop me from getting to that point where it just gets overwhelming and then I end up losing control and hurting myself or possibly hurting someone else..." (TBI011)*

*"I had no tools whatsoever... I didn't even know how to sort things out, I didn't know where to go, I didn't know who to talk to, but I guess ... I saw that TBI programme on the kiosk and I applied for it because I knew it was about your brain injuries, but I only thought it was just anything to do with your brain [32.06], but I didn't know that you could be taught the tools to how you feel, your feelings, every single feeling that you have and how you can manage and deal with it. I didn't know any of that. I didn't know it was part of the course until I came in and pretty much got taught that as well. I was surprised. It blew me away because those actually made sense to me. The things I was looking for were right there and I just needed to grab a hold of it and that's what I did, and just to test it all out in here... I guess this is the test...I had nothing else to lose. Whatever I was doing wasn't working and...if there's a chance that they can help me then I'll go with it..." (TBI040)*

*"...My main focus was, since I came to prison, I really said to myself, 'I need to learn how to communicate better with my partner'... That was my main focus because I knew that was my biggest problem. When I*

*did that TBI course, everything just switched. It was like a light just turned on..." (TBI039)*

### *More than anger*

Whilst not a dominant theme, there was one participant (6%) who was vehemently opposed to the singular focus on anger within the intervention. He felt he has mastered his anger and wished to have a greater understanding of the wider issues impacting on men with TBI. This sub-theme was not evident in the remaining 16 participants (94%).

*"... Being in that group therapy they highlighted some stuff to do about anger and stuff. I've got to know those barriers...What bothers me is that I am here and the head injury was part of that reason why I'm here. These are sort of the questions I was hoping to get answered in there. The focus that was brought was based around anger and that was good for 90 per cent of the guys, 99 per cent of the guys, but the course didn't quite answer what I was looking for." (TBI018)*

*"It was good to hear everyone else's different stories on how they were affected by the head trauma and I did participate in it as much as I could, as much I was allowed to participate, but I felt that there was only a little bit of head trauma they were focussed on and anger, which is a big issue in jail, not just in jail but people on the outside, getting frustration turning to anger. But I've learnt to deal with my frustration and anger whereas the scenarios that the boys are bringing up I would have gone through through my years in jail and I've learnt that getting angry is not gonna help none of us." (TBI018)*

### Facilitation

The participants were explicitly asked whether there were aspects of the intervention they would like changed. Nine participants (53%) made comments around extending the length of the intervention beyond five weeks, with the addition of more frequent breaks in each individual session. Within these nine participants, two also stated that they found sharing personal experiences challenging and that they had hoped that the facilitator would provide them with more feedback and/or answers. Five participants (29%) stated they would not change anything in the intervention. One participant (6%) did not enjoy the intervention and explicitly wanted to learn more about TBI and not about anger in the context of TBI.

*"...I believe that that's a very valuable programme for guys in here. There's a lot of guys that I believe that have suffered a lot of TBIs. Like me, they would have been in the dark about things. Now, I believe it's an important part of being able to help someone along their journey because it gives them a different view, 'Hang on, this may have affected me, how can I look at that?' When you become aware of that, it already showed me that I can't live my life with a reckless abandonment, especially when it comes to my brain... Giving them the understanding and the information about it and how it's affected them will open their eyes. It definitely opened my eyes. I believe that this is a very important part within this environment." (TBI036)*

*[The intervention psychologist] "... He's very artistic and straightaway that drew me straightaway, that caught my attention straightaway and I told him, 'Look I'm an artist, that's what I do.' When I saw his diagrams and his word maps and all word associated and all his brainstorming, I'm captivated by that. Not only that, most of the guys in our class were, and so that's what got us in and what kept us within the content and why I came away with so much content. I think they've done a very good job and what they shared, it helped me to understand, so I believe that if it helped me it would help the other guys too. I wouldn't change anything or how it was." (TBI036)*

*"The main thing for me was anger, snapping and since doing the programme I've learnt to notice my anger when it's coming, just deal with things differently, that's the most important thing from the course. They explained to me that, I think it's your frontal lobe, it's a muscle and you've got to just keep practising something and it will get stronger and stronger and then when situations arise one day I'll just be able to just not even feel anger about these sorts of things or let it just pass straight through me." (TBI006)*

The facilitation of the intervention was supported by the participants involved. Over two-thirds (65%) of the participants denoted that their experience was that mindfulness was a helpful skill which they applied to their daily living. Forty one percent noted that they enjoyed the experience of sharing their experiences and understanding that there was a peer support network within the class. Over half (53%) stated that the intervention had provided them with new information that provided a more detailed understanding of their condition and this provided them with essential knowledge. One participant (6%) stated that the course was too narrow and wished to discuss more than anger in the context of TBI. Over half (53%) of participants would have liked to have had a longer intervention, with more breaks. A third (29%) of participants enjoyed the intervention as it was presented and would not like anything changed.

### New understandings

There was a depth of information shared by the participants about their experiences following the intervention and these are discussed under the following sub-themes.

### *Choosing an alternative pathway*

Fourteen participants (82%) denoted that they believed that because of the intervention that had established alternative pathways or ways of being, which they felt contributed to their thoughts and actions. Specifically, participants described taking time for themselves (because they deserved it), breathing (using mindfulness in everyday life), slowing down before acting, choosing how they respond now and seeking a win-win situation.

*"Now that I actually, I know that I can do that [not fight] I will do that more often, rather than just, 'Oh yeah, sweet, let's go in the toilet.' That would have been the old version, the old me, 'Sweet, toilet, let's go.' But rather than thinking like that, I just straight on the spot, bro, we talked about it, let him see it from my side as well as his own side and it worked out pretty well."* (TBI009)

*"... You can choose to, I guess, take a different path to diffuse it and I guess that's where cognitive behavioural therapy stuff, process the thoughts, feelings, actions, kind of process model I guess, is useful because you know that if you cut out one of them it changes the downward flow of what comes out. I guess that's a good thing, to be, 'Okay, why am I feeling like this? How do I manage this? Do I need to remove myself from the situation?' It's a good thing." (TBI013)*

This participant was a Pasifika man under the age of 70 years, in prison for sexual-related crimes on a sentence of 5-10 years.

*"... I've been incarcerated for 21 years... I've learned a lot of things. You know sitting back and with this, it taught me something else. It taught me something that all these other courses didn't really take into*

*consideration. They took into consideration behavioural factors, proximal factors, just all of these kind of things. Looking at my schema, all these other things.” (TBI036)*

*“Before I was never able to speak up and offer them advice and just to see them go through the issues, like, ‘Hey that’s exactly what I’ve been through.’ We both do the same programme and then I come back the following week and I’m like, ‘I did that thing and it actually works, I didn’t actually explode.’ I actually thought and it just relieved the stress and I just went, ‘OK, sweet as!’ As I was explaining myself about how it worked and how it was helping, I guess they found the motivation to do it too, and then they came the following week and they’re like, ‘Actually it works’.” (TBI040)*

*“... I spent a majority of my time in maximum security, but angry at the world and just blaming everyone else for everything instead of being responsible for my own actions and my own choices and that. There’s a dramatic change in who I am. Not only do I see it, but I have guys and people commenting that know me from [ ]: ‘You know you’re different’ and that. That difference is only noticeable if you work at it and maintain it... I believe that I’ve changed dramatically in the way I am.” (TBI036)*

### *Knowledge is power*

Fourteen participants (82%) discussed the changes in their daily living, because of their new knowledge. Specifically, they stated that they understood why they were angry; there were shared learnings, they had an enhanced problem-solving ability and that they had developed a thirst for knowledge about TBI.

*“If you’d asked me a year ago, yeah, like just dealt with it. You know how jail is, just violence. My problem-solving*

*wasn't that good. The only way we knew how to solve our problems was just having fights... That's how jail is and that's how you deal with issues in jail, just have a fight and that's it. But now that I've done that TBI course, I've learned good problem-solving techniques that I put into practice every day. Since I've done that course, everything I learned off that course I put into practice all the time. I'm grateful for that course."* (TBI039)

*"For me, I found it good because before that I don't think I'd be sitting here talking to you about how I'm feeling, what's going on in my mind or what's happened in my life... Positive is my thoughts are a lot clearer. I'm able to sit here with you, a total stranger, and explain what's going on for me and not feel weak, actually getting a bit of empowerment out of it and learning a lot about my anxiety. The biggest thing I've learned actually out of the whole course was being able to sit with what I'm feeling and acknowledging it instead of feeling it and getting angry and not knowing why I'm getting angry. It's also good to feel angry, but it's what I do with it. Before the course, there was only one person I would ever talk to about me, and that's my partner. That's why we're really close and she was my backbone and we always talk. Now, I tell her that I can talk to people about how I feel and she said she's amazed."* (TBO045)

*"It was enlightening. It was good just because it gave me some different views and some tips and how to notice some things myself and in other people, but especially myself. Just the little things like movement, like just the balance and that. I guess in my speech and not understanding things; sometimes I say things but I don't know how to put it out."* (TBI051)

This participant was a Māori man under the age of 40 years, in prison for violent crimes on a life sentence.

*"It was just the learning, the learning part. Just knowledge, the people and just the knowledge and just helping us with understanding what's happening with*

*my brain injury and what's causing it and how it came about and the things that I'm maybe feeling or going through and how that came about and just bringing skills, skills to cope with it... This course taught us stuff that I never knew about before I started this course. It's helped me think of different ways to help with my problems. Yeah, it has."* (TBI054)

This participant was a Pasifika man under the age of 50 years, in prison for violent crimes on a life sentence.

### *Being able to express myself*

Fifteen participants (88%) described how they had been able to express their feelings. Specifically, this related to trying new ways of engaging, having courage and using prison as an environment to try new ways of communicating.

*"Yeah, just this morning. I haven't been able to sleep properly ... I was able to open up to my old cellmate who's now my housemate, open up to him about some of my injuries. He was so taken back. He said, 'You shouldn't be here', because I've been stabbed, I've been softball batted, I've been run down, I've been shot at. I've been beaten up so many times it's not funny. People I thought were my mates used to beat me up. I used to go back to them and get another hiding just because I didn't have a dad... It's hard to explain it, but this morning, talking with my mate... gave me the options to test stuff what I'd learned from TBI, to be able to explain to him that I don't mean to look like I'm a big aggressive; I just come across like that..."* (TBI038)

*"...I am testing myself now. To be honest, I'm kind of liking where I'm at with what I've learned and all the tools I have gained from that programme. I really believe in myself. I never used to have faith in myself. I had no hope whatsoever whether if I will change or*

*make a better lifestyle for myself and just make my family proud. Now I do, now I want to. I am fully focussed on what I want. I know that it takes me a bit longer to figure out stuff, like put things into place, but I eventually get there. [34.19] the only thing I can do is keep pushing and I'll eventually get there. I really think I will do good in the community.” (TBI040)*

*“... I came here sort of thinking one thing and left thinking totally different. I suppose it was the options that they gave throughout and there was no right or wrong, which was really good because people were trying to... we all did it, we tried to think of what's the right answer for this? But there is no right answer and there's no wrong answer. You experience what you experience, and it's OK. It's OK. It's a big learning, especially in this environment. You come away from this, from the course, you can come away from the course and literally when you step out the door you're using the processes that you've just learned. It's pretty strong.” (TBI045)*

### *Improving relationships*

Twelve participants (71%) described improvements in their relationships. This included with self, others in the prison and their families. They also described having an increased awareness of others, their families noticing changes, developing empathy, with an increase in helping behaviours and noting that connection was important to them.

*“I think it changed my attitude. I used to beat myself up from time to time, thinking that I wasn't adequate because of this TBI that I had. Well, at the same time without blowing my own trumpet, I feel like I am actually more intelligent than I allow myself to believe. I don't think I find it hard to take compliments, but I suppose I'm always looking for the negative, but also walking on the positive side of things as well.” (TBI009)*

*"It actually teach[es] me how to think of other people, be in their shoes: think why they'd be emotion; why they're talking to me like this. I think about it and say maybe why they're angry, what I have done and what I have said, and actually help me to see I should try and change also because maybe the way I am or the way I behave is actually bad to people." (TBI004)*

This participant was a man of 'other' ethnicity under the age of 30 years, in prison for 'other' crimes on a sentence of 1-5 years.

*"I'm a lot more mindful, a lot more mindfulness. A lot of empathy for people with brain injuries. [in relation to interaction with other prisoners]... my tone is a bit different. I try and see from their point too." (TBI021)*

This participant was a Māori man under the age of 50 years, in prison for sexual-related crimes on a sentence of 10-15 years.

*"I know for a fact I'll be a better father. I'll be a better husband. I wouldn't take somebody saying something for granted. I'd actually sit and listen, whereas before I would like, say, sit, look and take no notice. Even my partner when she comes to visit me, she's noticed a big difference." (TBI045)*

### *Being present*

Sixteen participants (94%) described the importance of being present. They specifically related this to improving self-confidence, understanding alternative perspectives and having courage.

*"I think I'd be a much better person out there. I won't be thinking like people making fun of me when I can't answer their questions, or just taking time out from the kids if they get annoyed with me, just take time out and*

*breathe instead of going straight to the bottle. I could probably talk more positively to my kids, my partner and everyone; not always being negative from thinking too much. I could apply the triggers: thinking of the consequences of drinking too much before I do anything; maybe have one beer or something with dinner or something or when I finish work instead of glugging it all down.” (TBI007)*

*“I just believe I’ve found a lot more understanding of what mindfulness truly is, and it’s not just about me; it’s about others too... But within that whole thing at any time you can change direction and go any which way.” (TBI036)*

*“...I know if it’s helped me, I believe it will help others... It made me stop and look, stop and look. I’m very fortunate that I actually made it onto that group...” (TBI036)*

*“Just every day now. When I wake up, I wake up more positive. I wake up with a plan in my head of how I’m going to start my day. Rather than just get up and mope around the cell, I will get up and I will just spend a little bit of time thinking about how I’m going to start, whereas before I never took that time. Never took that time at all. Waking up was waking up. I enjoy waking up. Although it’s in prison, it’s my waking up now to me waking up before the course was totally different. I used to wake up in a pissed-off manner, ‘Oh shit, got to go through all this shit again.’ Now it’s waking up and going, ‘OK, right, what am I going to do today? Maybe I’ll start by cleaning my cell up and then making myself a nice breakfast, having a nice cup of coffee by myself. Getting that me time’.” (TBI045)*

*Hope for the future*

Thirteen participants (76%) described having hope for the future. Specifically, this related to a belief that they deserved better; they had the skills to make changes; they wanted better for their families and would not be returning to prison.

*"... I'm not coming back. I've never been away from my kids and wife more than a day. I've been away for them for nearly... it will be thousand days and I've had six grandchildren been born in this time. I've never seen them. I've got photos of them and it breaks my heart to be here. So every day I'm trying to upskill myself."* (TBI018)

*"... What you can give back is better than what you take when you're gone... because there's so many kids out there who would love to know that they can turn their life around without doing drugs and alcohol... I finally found my niche in life that gives me a purpose, but what's going to really drive me now is to be there for my daughter. That's what's going to keep me out of places like this..."* (TBI038)

*"That's what's motivating me more, is just to teach my kids to have good communication. I'm trying to let them know that they can trust me, to talk to me about things instead of shutting down because when I look at my own life, when I grew up and I realised this, that's how we grew up. We did something wrong, got a growling, got a little bit of a hiding. That was normal back when I was young.... All my life, even all my brothers – I've got eight brothers and sisters – we've never had that relationship with our parents to be able to talk about what's happening. When I did that TBI course and I realised all of that, I was like, 'Fuck, I don't want that for my kids. I want my kids to be able to tell me what's wrong'."* (TBI039)

*"...My goal is not to come back to prison, to have a better relationship with my partner, to teach my kids to*

*be open and not come to prison. It will be just to focus on myself, not worry about what other people think... My partner used to say to me it's like walking on egg shells...She's been telling me on the phone she sees the changes, but she said: 'Can I do it when I get out?' When she first started saying that it used to piss me off, but then I thought about it and I said, 'Actually that's good that she's saying it because it puts that in my mind, so I'm aware of it, so if I'm aware of it then I know I can...' (TBI039)*

### *Increasing self-awareness*

Seventeen participants (100%) described an increase in their self-awareness following the intervention. Specifically, participants discussed breaking out of their comfort zones, understanding triggers, being comfortable with making mistakes and being vulnerable and asking for help.

*"...Everything will do will be what I've learned... mindfulness is something you do with every activity. So even being mindful of my actions, that's a big thing, knowing when you're going down the wrong path rather than just walking it. You can be walking down the wrong path and not even know what you're doing, just to be mindful of everything, everything in life is good, prison, non-judgemental, that's one, and awareness". (TBI006)*

*"...It's just having to just re-evaluate the situation – this is getting a bit too out-of-hand, I'm getting angry, I'll apologise for what I said earlier, I shouldn't have said it the way I said it, but it was nothing directed to him, it was directed to other men... I'm not perfect. There are still a lot of things I need to work on... that if things aren't going the way that they're supposed to, you've got to take some time off for yourself, pull yourself away from that... all it takes is I just pull myself away from it... it's really got me hooked, these four-leaf clovers. I think anything I do that doesn't feel right to me, I'll just pull myself away from it, I literally pull myself away from it..." (TBI013)*

*"...you can choose to, I guess, take a different path to diffuse it and I guess that's where cognitive behavioural therapy stuff, process the thoughts, feelings, actions, kind of process model I guess, is useful because you know that if you cut out one of them, it changes the downward flow of what comes out. I guess that's a good thing, to be, 'OK, why am I feeling like this? How do I manage this? Do I need to remove myself from the situation?' It's a good thing." (TBI012)*

This participant was a European man under the age of 50 years, in prison for sexual-related crimes on a sentence of 10-15 years.

*[on the impact of TBI programme on skill acquisition] ... to be able to talk to you, to be able to speak with my sister about things so there's not stress on my shoulders because I would get headaches and then when I get stressed I get migraines..." (TBI038)*

The participants were able to clearly articulate their experiences of the TBI intervention and the changes they had implemented following it. Of the interviewed participants, 82% stated they had been able to develop an alternative pathway, with the same number attributing the change to their new knowledge. Increasing confidence in expressing themselves was described by 88% of the participants, with 72% noting an improvement in relationships. Almost all participants (94%) denoted being able to be present in the moment, with 100% noting increasing self-awareness. More hope for the future was expressed by 76% of the participants, with improved focus on their families and an awareness of the impact of imprisonment on them and their families.

## Feedback from the facilitator

One of the intervention facilitators was interviewed to understand their experience of the intervention. The intervention psychologist was present for all the sessions. The information provided was rich, and echoed the participant's views in many ways. Whilst not possible to complete a separate thematic analysis because of the very small sample size (n=1), the information provided valuable information from a delivery perspective. The facilitator approached the group from a collaborative perspective, aiming to work alongside the participants.

*"Yeah and I think for me, if you're going to ask me why maybe this is working, I think maybe because I... should I say I return the autonomy back to themselves and they decide what to do. They decide what needs to be changed instead of me saying, 'Hey you have a substance issue, that's why you're in a prison cell. Quit drinking. You have a lot of violence offences because you obviously have a bit of interpersonal aggression issues so change that.' Instead they actually identified those issues right from the beginning and then we tried to use the interventions they mention in the [04.37] to ask them or to assist them to explore potential solutions." (TBI facilitator)*

The facilitator noted that initially he experienced some issues with the order of the intervention programme. This was discussed with the supervisor of the intervention and agreement was gained that following the first two groups that this would be adjusted to make it flow better; however, the content remained unchanged.

*"They're [21.40] starting feeling anxious and frustrated. 'Hey mister, hey mister, hey [21.17], we've talked about this before already, right? We talked about CBT, why are we talking about this again? We talked about*

*mindfulness, why are we just covering? Is there any new content?' So the first two groups was kind of, should I say, a bumpy ride; but then after we changed the order of that, it began to make sense to us, us meaning me and [21.44], and when the material, the manual, after we tweak it a little bit, after, the manual began to make sense to us. It helped us to deliver it and it made sense to the men as well. But the content, the content is all there. The content is definitely useful. I believe it is just the order."* (TBI facilitator)

The facilitator described enjoying the intervention and stated that he learnt a lot from his experiences with the groups. Seeing the participants transform and lead the sessions were very positive experiences, as he watched the participants develop new skills and grow in confidence.

*"Like when we're feeling angry, it's because sometimes we feel our rights have been violated or we've been treated unfairly. What else would you feel when you are treated unfairly? Anxious, whatever. So we're starting to actually... should we say, broadening the layers of emotion. so from the second time or the third time, we started talking about mood check-in, we're starting to kind of go deeper. You're feeling good. What do you mean by feeling good? What kind of emotions would you guys categorise or put it under the box of feeling good?... So people start exploring happiness, excitement, whatsoever, ecstasy, whatever. 'Oh, I don't feel good.' 'What, you mean you feel bad?' 'I feel bad.' 'What kind of emotion?' They can actually be categorised in this part of bad feelings. So people are starting to... what I'm saying is we try to normalise the whole process of identifying, understanding own emotion which I'd normalise that...So from there, I believe what we did is we tried to normalise that having those feelings doesn't necessarily mean you're not man enough. So more than once if you keep on talking about it means you care; it means you have a heart."* (TBI facilitator)

The intervention was not without its challenges. The TBI facilitator described oppositional behaviour, especially in the early parts of the intervention. In time, the facilitators were able to defer to the group to manage this through mindfulness skills application.

*"There are always some, I'm going to use this word, naughty ones. Those are the challenging moments that they try to provoke a certain kind of resistance between... or provoke conflicts between us facilitators and the participants... what we did back then was we make sure that we do support each other, between me and [36.03]. We actually set up the kawa [group rules] right from the beginning and we know that we both don't tolerate certain behaviours, saying if they happen we have to catch that right away. The funny thing is, sometimes if the behaviour isn't that severely problematic, we actually ask the group to use mindfulness skills to pick up those behaviours." (TBI facilitator)*

Delivering the intervention under a mental health umbrella was noted to be helpful, as it is neutral, since it is not required by the parole board for consideration of early release from prison. The prisoners choose whether they participate or not and it is about their perceived needs. This was echoed by the participants when they described not having a right or wrong answer, but rather it being about them.

*"This is my own experience: make it relevant. Definitely make it relevant. I think for those who run this programme [39.59] if this programme's delivered under the mental health scope, it will be really beneficial for a facilitator to [40.07] in a really neutral stance and try to encourage autonomy. So the men identified their problems, the men figured out what they can do and our job is just to present sort of, shall we say, options and then pick certain tools they think they can use to help*

*them out. Be open-minded. Encourage them to be open-minded... I constantly mention the term curiosity. Just, 'Aren't you curious? If you react in a different way, what kind of outcome would it be? I'm not saying it's going to be a good outcome, but just be curious, otherwise you'll always end up doing the same thing over and over again.' So I think when we deliver this under mental health scope, they gave us this luxury to just be as neutral as we can."* (TBI facilitator)

## Summary

Qualitative interviews were conducted with 55% of the participants (n=17) who completed the TBI intervention and assessments up to 12 weeks following the intervention.

A semantic, inductive, experiential thematic analysis (Braun & Clarke, 2006) was conducted to understand the participants' experience of TBI and the intervention/study process. Through the process of this thematic analysis, three main themes arose, namely: the journey into jail, the intervention and new understandings.

The journey into jail was characterised by cognitive challenges, difficulties, the influence of alcohol and drugs, violence as a norm and the actual prison experience. The intervention outlined the actual facilitation, the sense that the participants were not alone, that it 'flicked a switch' and mindfulness works, but that the intervention should have been more than anger.

Following the intervention, there was a sense of new understandings, which included knowledge as power, being able to express themselves, improving relationships, being present in the moment,

hope for the future and having an increased sense of self-awareness. For several participants, they articulated being desperate for something new to help them in their lives.

*"I guess I was at a stage where I felt like I was on a small thing of ice, and I was about to sink and probably not come back up, so I was pretty much at my breaking point in my life. I knew that I needed the help, and if that was it, I was going to take it. So I took it because at the end of the day there was nothing else for me, no one else was helping me... You need the help you need from specialists, from people that know their stuff. That TBI, it definitely changed me after that." (TBI040)*

From a facilitator's perspective the intervention was valuable, but not without its challenges. The net effect was positive from the facilitators' perspective and echoed some of the sentiments of the participants, around new understandings (skill acquisition) and taking time for themselves, with no pressure to reply with the correct answer, but rather reflecting their thoughts and emotions.

## CHAPTER 9: DISCUSSION (PART TWO)

### Quantitative

This study sought to determine the feasibility of a five-week manualised CBT and MBSR intervention for prisoners who had a lifetime experience of TBI. Specifically, it was hypothesized that there would be a reduction in symptoms and negative file notes and an increase in negative affect repair between the groups post-intervention, and this would be sustained at the 12-week follow-up. This intervention proved to be feasible to implement with both mainstream and segregated male prisoners who had disclosed a lifetime prevalence of TBI, with a high proportion of participants completing the intervention. There was no statistical difference between the groups on post-concussion symptoms and negative file notes, yet there was a significant improvement in the scores, with a medium effect size in the intervention group on the NARQ. The statistically significant improvement in NARQ scores observed post-intervention was not sustained at the 12-week follow-up.

### Trial feasibility

Whilst the study intervention proved feasible to implement overall, there were challenges in recruiting eligible participants, specifically voluntarily segregated prisoners. This prevented recruitment of the proposed 72 participants. One of the reasons for low recruitment of voluntary segregated prisoners was that these prisoners would not consent to attending the intervention away from their accommodation area. Following the relocation of the intervention to their accommodation block, it was observed that this did not result in any change in the recruitment of this cohort. This led to only a quarter of

the study cohort identified as having voluntary segregation status, when the aim had been half. There is no specific literature to support retention of prisoners who are in voluntary segregation; however, it has been noted that assessing readiness to change is a determinant in retaining participants in therapy (Trimble et al., 2015). Whilst participation in this study was entirely voluntary, there is anecdotal evidence to suggest that voluntary segregation prisoners wilfully attend activities to get out of their accommodation area and then when doing so decide not to continue, because the programme was not what they expected or they were not ready for change. Notwithstanding that, it is important to retain voluntarily segregated prisoners, as they represent higher numbers of certain offence categories such as sexual offending and violence (where the victim may have a relative or gang connections in the prison). It is important not to exclude this group as it would mean a large number of individuals may miss out on the opportunity to learn new skills and gain new insights.

## Attrition

During the intervention just over half of the participants completed the entire study protocol, including the 12-week assessment. The 'drop out' rate was much higher than a recent meta-analysis around psychotherapy 'drop out', which was reported to be 19.7% (Swift & Greenberg, 2012). However, therapy 'drop out' rates have been reported as being as high as 47% (Wierzbicki & Pekarik, 1993). The main reason for attrition in this study was failure to attend sufficient sessions (80% was required in the intervention protocol). The reasons provided for missing sessions included organised sports days, in-prison work commitments / visits or the prisoner missing the appropriate morning movements around the prison to attend the

session on time. This is also reflected in the literature, where failure to complete the prescribed number of sessions was the main reason noted for premature discontinuation of therapy (Swift & Greenberg, 2012). It is challenging to draw comparisons between the general public and prisoners; however, there was no literature available at the time of writing that either supported or challenged the attrition rate in this study. Moving forwards, there would be additional benefit in restating the requirements of the intervention and also following up and cautioning participants as they started to miss sessions. However, this was discussed in detail, both in writing and face-to-face at the time of recruitment. In the future it would be beneficial to speak directly with the participants who 'dropped out' of the study and seek to understand their reasons for exiting the intervention in more detail. At the time of writing this was not possible due to the blinding requirements of the researcher and turnover of the intervention team.

## Study demographics

The study sample broadly reflected that of the national prison muster, supporting the applicability of the findings. For example, the mean age of the sample was 37 years, which is comparable to the mean age of 36 found in the prison during a previous study (Mitchell et al., 2017). The ethnic mix of the sample was comparable to that of the national prison muster, with over half of the participants identifying as Māori (Department of Corrections, 2018). This was also reflected in a TBI prevalence study, which was conducted in the same prison, where half of the prisoners with TBI identified as Māori (Mitchell et al., 2017). There are limited published intervention studies that capture indigenous populations, so it is difficult to compare the findings of this study to that of the literature from an intervention perspective

(Lakhani et al., 2017). However, the small sample size prevents analysis of outcomes by ethnicity, but does suggest that the intervention is accessible for people from different cultural backgrounds. Given half of the prison identifies as Māori, the intervention could have been made more culturally sensitive by incorporating Māori values and principles into the intervention.

Almost half of the intervention group had been incarcerated for violent crimes. This is supported by extensive bodies of literature around the increased propensity to violence in the context of TBI (Farrer & Hedges, 2011; Ferguson & Coccaro, 2009; Davies et al., 2012; Elbogen et al., 2015; Farrer et al., 2012; Marsh & Martinovich, 2006; Morrell et al., 1998, Fazel et al., 2011; Fishbein et al., 2016; McKinlay et al., 2014; Durand et al., 2016; O'Rourke et al., 2016; Lane et al., 2016; Chitsabesan et al. 2015; Durand et al., 2017; Farrer et al., 2013; Gordon et al., 2017, and Graves et al., 2015). The crime category of 'violence' is also similar to the national muster statistics, with violence accounting for two in five of all prisoners in NZ (Department of Corrections, 2018). Sexual offenders accounted for a quarter of the study cohort. The sexual offender cohort was slightly greater in the study, when compared to the national prison muster, where sexual offences accounted for one in five offences (Department of Corrections, 2018). There is evidence to suggest that having a TBI may increase the incidence of sexual offending, so it is not surprising that this is reflected in the study participants (Farrer & Hedges, 2011; Cattelani et al., 2010, and Simpson et al., 1999). There was no statistical difference between the intervention and wait list control groups based on offence type.

## The intervention

At the time of writing, there were no published studies on manualised CBT/MBSR interventions in prison for the management of anger with TBI survivors. However, there were a number of community-based studies that examined the effectiveness of CBT and MBSR in the context of anxiety, depression and increasing self-awareness or self-efficacy (Bradbury et al., 2008; Simpson et al., 2011; Bedard et al., 2014; Ashman et al., 2014; Hsieh et al., 2012; Ponsford et al., 2016; Cicerone et al., 2008; Anson & Ponsford, 2006; Cullen et al., 2018; Ownsworth et al., 2000, and Backhaus et al., 2016). The published studies utilised various implementation strategies including group, individual and phone-based interventions for both TBI survivors and their families. There were also a small number of community-based studies exploring anger or aggression (Hart et al., 2015; Hart et al., 2012; Medd & Tate, 2000, and Walker et al., 2010). All of the studies demonstrated at least a mild improvement in symptoms, but most were not sustained long-term.

There is scant research into Māori-specific CBT/MBSR interventions, for the management of TBI-related symptoms. There was one study that modified CBT to incorporate Māori values (Bennett et al., 2014). Given the importance of connecting with the indigenous people of NZ, alternative delivery models need to be considered and trialled to assess the suitability and acceptance by Māori prisoners. One such model has been discussed (Elder, 2012), which incorporates Māori values into a model for the management of TBI in Māori survivors. This model would require modification for a prison environment, because of the level of the family involvement (which is challenging to achieve in a prison for therapeutic interventions), but a number of the strategies have been included such as prayers at the beginning of each session and the development of a group contract (called a

'kawa'). The exploration of a Māori-specific TBI intervention should be considered for future research.

Whilst there are studies which have been completed in prison, only four studies were found (at the time of writing) related to interventions with a health focus, however they did not relate to TBI (Mak & Chan, 2018; Xu et al., 2016; Rocha et al., 2014, and Umbach et al., 2018). A number of published studies were evident from prison-based interventions, with these largely being offence-focussed or criminogenic (Mapham & Hefferon, 2012; Shuker & Newton, 2008; Rocha et al., 2014, and Ramos et al., 2017). The studies were either conducted in small groups or with individuals. There was a range of very different delivery models. Despite not being the primary deliverable, mental health gains were evidenced from the offence-focussed studies.

The existing literature provided valuable information in the development of the intervention. The intervention was seen as a good fit for the prison. It was based on a manualised intervention originally designed for adolescents with anger management issues and had been developed for relatively new practitioners, with structure and repetition that was appropriate for those with TBI (Kelly, 2007). It was a ten-session individual format utilising CBT and MBSR (Kelly, 2007). For this study, it was adapted for the adult male prison context by changing some of the role plays and homework examples. There was also some change to the order of the sessions, to ensure that the intervention flowed for an adult cohort with some possible cognitive challenges.

## Reduction in symptoms related to TBI

Following the intervention there were trends of effect, with the intervention group showing a lower mean group score on the RPQ than controls at the 12-week follow-up. However, there was no statistical difference in the intervention and wait list groups across the three different time points (pre-intervention, post-intervention and 12 weeks following the intervention). Analysis of individual change scores suggested that differences between the groups may have been affected by a few individuals with large increases in symptoms over time. It is not clear what caused these increases in symptoms, as these would have been expected to be relatively stable, given many injuries reported had occurred many years prior. As the symptoms measured are not specific to TBI (Wang, Chan & Deng, 2006), it may be the case that other factors such as stress around appeals or family tensions could be linked to an increase in symptoms, as the wider circumstances of the participants' lives were not able to be measured during this study. Or it may also be that the intervention increased prisoner awareness of the difficulties that they were experiencing.

## Improvement in utilisation of strategies to manage symptoms of TBI

The intervention provided a number of strategies, under the treatment modalities of CBT and MBSR, as well as psych-education about TBI. The NARQ was used to measure negative affect repair, meaning it measured the use of largely positive strategies to assist with mood enhancement (Eberle, 2009).

Following the intervention, there was a statistically significant difference in the total NARQ scores between the intervention and wait list controls. It was interesting to see that there were no differences between the groups on the subscales of this measure, suggesting that there was not one specific coping strategy that was more effective. Specific strategies were discussed by the participants at the qualitative interviews. They included active use of the MBSR techniques, and the knowledge gained from the CBT techniques, including taking time before acting.

Unfortunately, the difference between the intervention and wait list controls was not maintained at 12 weeks. It is unclear as to the reasons for this, but there are numerous studies that denote the drop-off in utilisation of skills or the effect of interventions over time (Byrne & Coetzer, 2016 and Medd & Tate, 2000). Conducting the intervention over a longer period of warrants further exploration. Further, the possibility of involving participants' families in a coherent and structured manner may assist with longer-term changes.

### Negative file notes and misconducts

The evaluation of negative file notes and misconducts proved to be very challenging, mostly because there were very few negative file notes for the participants during the course of the study, preventing any observation of differences between the groups post-intervention. As previously discussed, this intervention was based on a manual developed for adolescents with anger issues (Kelly, 2007). One of the measures was in-school infractions. Kelly (2007) did not find significant results in the in-school infractions, as there were also few prior to the intervention; however, the participant was eventually

suspended from school. There was evidence in the literature that prisoners with TBI were more likely to gather in-prison infractions (Merbitz et al., 1995 and Shiroma et al., 2012). It was on this basis that it was felt that negative file notes and misconducts would be an interesting measure to evaluate both pre- and post-intervention. Notwithstanding that, the results added no value to the overall outcome of the study. This would warrant some further exploration, to ascertain whether the recording of file notes and misconducts on the study site was an issue or whether this needs to be rationalised as an outcome measure.

## Strengths

There were several strengths relating to this study. At the time of writing this was the first published, specific intervention for prisoners with distressing symptoms following a TBI. It was based on a manualised programme which, now developed, can be implemented in other prisons without the requirement for significant investment. Prisoner feedback indicates that the intervention has made a positive change for them and includes stating there is an enhanced level of knowledge around TBI and the associated symptoms, as well as having a suite of possible self-management strategies. The study provided the participants with an alternative to historical ways of reacting to stimuli; so from an individual quality of life perspective there may be changes which allow the individual to have more control of their emotions, which in turn increases confidence.

## Limitations

The intervention had several limitations. This was a single-centre RCT of male adult, sentenced prisoners in a large city in NZ. The study did not include youth offenders, females or remand prisoners. There would have been considerable benefit in attempting the intervention in the youth offender population to assess whether skill acquisition assisted them in changing pathways to a more pro-social approach. Further, it would have also been beneficial to work within the community sentence environment, given the large number of offenders serving their sentences in the community, with home detention, curfews and probation (Department of Corrections, 2017).

There was no engagement with the participants' families to seek to understand their significant others' experience of TBI or by including them in aspects of the intervention, which would have been helpful in assisting the participants' learning and reflection, and also contributing to the families' understanding of TBI.

The study did not seek to understand the non-TBI pre-morbid states of the participants, which would have been helpful in better understanding a more comprehensive picture of each participant, as there are a number of factors that contribute to the acquisition of a TBI and also criminogenic activities, not all of which are the same. Aspects of prisoners' lives such as socio-economic deprivation, years of schooling, family situation and history of drug and alcohol use prior to coming prison would add detail that would assist with the care of the prisoners and better inform possible changes to the intervention if required.

Further, the study did not assess the on-going utilisation of the skills or reduction in TBI-related symptoms beyond 12 weeks. It would

have been beneficial to continue the follow-up assessments longer to better understand any further drop-off of utilisation of the learnings from the intervention as this may have influenced possible changes to the intervention. Also, for some individuals their RPQ symptoms did increase over time, rather than decrease and this requires further exploration to better understand the triggers for this. Self-reported assessments have been criticised for their recall bias and inaccuracies (McKinlay, 2014), so it would be beneficial to assess what influenced the change for study participants, as prison life is known to be stressful, with increased risks, including suicide (Einat, Einat, Gura & Segev, 2017). Further, there was no assessment of participant knowledge of the psych-education provided about TBI. It would have been beneficial to better understand their level of knowledge to adjust the intervention manual if required.

A further limitation is around the eligibility for the intervention. Any prisoner who was identified as having a TBI on arrival at the prison was eligible for the intervention. However, prisoners often commented during the TBI screening process that they were concerned that if they disclosed a TBI history they would be profiled as a troublemaker. This meant when they indicated an interest in the intervention they were excluded, as the study protocol required a positive TBI screen or evidence of a TBI in prison. Prisoners inherently have trust issues and this will only change over time if the TBI screen is incorporated into all prisons and becomes part of the standard prison health assessment. Since the study, further information has been provided for all prisoners arriving at the study site. Staff have also been educated on the need to 'set the scene' for prisoners when conducting the TBI assessment to reassure them that the information is medical and confidential and will be used to assist the team to plan care and support for them.

## Conclusion

This pilot study revealed that a CBT and mindfulness-based intervention was feasible to implement within a prison setting and showed trends of effectiveness in improving negative affect repair strategies. However, changes to the methods of recruitment and delivery of the intervention for segregated prisoners are needed. The addition of booster sessions or a longer intervention time may be beneficial to ensure maintenance of the skills and the connection with the group and facilitator.

## Qualitative

This thematic analysis sought to understand the participant experiences of their TBI, the intervention and their lives after completion of the intervention. Specifically, the purpose of the qualitative analysis was to determine acceptability of the intervention, and to identify any necessary modifications or unexpected outcomes following the treatment and to augment the quantitative data.

### My journey into jail

Following the intervention, a number of the participants reflected on the antecedents to their prison experience. Just over half of the study participants disclosed that they felt that their TBI may have contributed, in part, to their journey into prison, with a different world view and self-medication with illicit substances being identified as issues.

Almost two-thirds of the participants identified cognitive challenges, described themselves as being slower than prior to their TBI and struggling at school, noting that this led them to feel angry and frustrated, from being poorly understood and ridiculed. In a recent prison prevalence study, two in five participants identified their first TBI prior to the age of 15 years (Mitchell et al., 2017). Further, their TBI experiences may have contributed to cognitive challenges at school. There have been links established between childhood TBI and criminal behaviour later in life; although it is noted that caution should be taken with determining a causal link (Jackson et al., 2017 and Anderson, Catroppa, Morse, Hantou & Rosenfeld, 2009). Almost half of the participants identified difficulties, such as headaches, dizziness and light sensitivity, which are common PCS symptoms following TBI (Hoffman et al., 2011 and Roe, Sveen, Alvsaker & Bautz-Holter, 2009).

Drugs and alcohol are very prevalent in NZ prisons; with two-thirds of NZ prisoners having an identified alcohol and/or drug issue; with half of all crimes being committed by offenders under the influence of drugs and/or alcohol (Department of Corrections, n.d.). In the thematic analysis, two out of five participants identified alcohol and drugs as a means of treating uncomfortable symptoms following their TBI and helping them cope with their 'new world'. Marijuana was identified as the drug of choice by this cohort. There is a large body of evidence that reflects what the participants shared and noted: that alcohol and drugs were at times used to mediate symptoms, manage adverse life events and also deal with a downwardly adjusted self-awareness (Rosema et al., 2014 and Kennedy et al., 2017).

There were a large number of factors identified as contributing to each individual's journey to jail, with violence being a dominant theme. More than three-quarters of the participants noted that violence was their norm, with some describing this being attributed to their family of origin, and others as part of their journey through life. TBI has been associated with an increase in the survivor's level of violence (Farrer & Hedges, 2011), but a causal relationship cannot be established because of the socio-demographic variables for each individual, which includes levels of deprivation, education, and family history of violence and alcohol (Fazel et al., 2011).

Once in prison, life can be very stressful, with increased rates of violence and suicide (Fazel et al., 2017; Favril et al., 2017, Xu et al., 2016, and Pratt et al., 2015). Less than a quarter of the participants noted that prison was bad. Surprisingly, more than half felt that prison was a positive place, as it gave them a protected space to feel safe and to work on their rehabilitation. At times, the prison experience was seen as a learning experience to better understand what different pathways were needed in order not to return.

There was a complex interplay between the factors that influenced the participants' journey into jail, many of whom demonstrated a knowledge deficit and on-going disabling symptoms, for which they self-medicated. The causal relationship between their TBI and violence was unclear, with some noting a violent upbringing and others stating it was an after-effect of their TBI.

## The intervention

The commentary about the intervention was largely favourable. Two-thirds of the participants found the MBSR component of the programme valuable and had incorporated it into their daily lives. MBSR has been widely used in the community and prisons for the management of mood-related disorders, drug and alcohol issues and in the management of anger (Kelly, 2007; Azulay et al., 2013; Andrewes et al., 2014; Bedard et al., 2014, and Bay et al., 2016). Whilst the methodology had a sound scientific foundation, its implementation in a prison, specifically for TBI, had not been trialled previously (at the time of writing).

When discussing the distressing or embarrassing sequelae of a TBI in a group environment, it can be challenging for individuals to be vulnerable. Two in five of the participants noted that the group format allowed them to share their experiences and learn from others, which created a sense of camaraderie. There is evidence to suggest as confidence grows in group dynamics and the group process, a heightened sense of cohesion and intimacy can be a by-product, which, in turn, leads to more meaningful engagement (Forsyth, 2010). It was noted in the thematic analysis that a number of the participants disclosed feeling reluctant to share their stories, but, over time, noting the courage of other group members, took a leap of faith, which they felt they benefited from.

Given the levels of misdirected self-care strategies illuminated in the thematic analysis, it appears that the psych-educational component of the intervention allowed the participants to gain a better understanding of TBI. Just over half of the participants identified that the psych-educational component around TBI and anger had given them new understandings of the impact of their TBI and the strategies they wanted to put in place. A participant noted that the

intervention should have been about more than anger, as this was not an issue for him, and he felt the narrow focus did not help prisoners to develop new skills. However, the remaining participants did not comment on this particular matter. In relation to the configuration of the intervention, over half of the participants wanted the intervention to be longer (in weeks), with more breaks; and the literature strongly supports the addition of booster sessions to assist with the integration and maintenance of the negative affect repair strategies (Byrne & Coetzer, 2016 and Medd & Tate, 2000). A third of the participants stated they would not change anything in the intervention.

While it was noted that there were objective declines in the utilisation of strategies to repair negative affect over time, the thematic analysis provided rich information which indicated that the skills learnt were being utilised and were having an impact on the lives of the participants, all very positively.

### New understandings

There are limited studies into post-traumatic growth in prisons. However, there was a similar thematic analysis conducted with a community sample following an intervention involving TBI survivors and positive psychology (Karagiorou et al., 2018). The themes were very similar in that they stated they had an appreciation for life, related to others and had optimism (Karagiorou et al., 2018). From this study's thematic analysis, more than three-quarters of the participants stated they had experienced post-traumatic growth, with an opportunity to take an alternative pathway, taking time for themselves, using MBSR in their daily living, taking time before acting

and choosing different responses. It is noted that this is somewhat in conflict to the quantitative results for the NARQ.

Part of post-traumatic growth is developed with the acquisition of new knowledge. More than three-quarters of the participants identified their new knowledge as powerful in terms of understanding their anger and having an enhanced ability to problem-solve. Almost all of the intervention participants found confidence in being able to express themselves, having courage to try to utilise new skills and being able to use the prison as a test environment, which they described as safe. Almost three-quarters described improving relationships with themselves, their family and within the prison, as well as having hope for their future, with a strong focus on their families, which they identified were important to them. Improving relationships was also seen in the only published qualitative study undertaken in a prison (Mapham & Hefferon, 2012). This further supports the vulnerability of prisoners and the possibility of making changes through therapy.

Almost all of the participants articulated the importance of being present and in the moment (based on MBSR skills), which in turn gave them courage, improved their self-confidence, self-awareness and allowed them to appreciate different perspectives. Self-efficacy and self-management are seen as critical for new beginnings (Ownsworth et al., 2000). A number of studies explored the concept of self-efficacy in therapy and found some success, not necessarily with behavioural changes, but certainly with perceived satisfaction and their perception of changes (Backhaus et al., 2016; Bay et al., 2016; Cicerone et al., 2008, and Medd & Tate, 2000). The changes articulated by the participants allowed them to move beyond their

comfort zones, gaining confidence, making mistakes and allowing themselves to be vulnerable and ask for help.

## Strengths

There were several strengths noted in this thematic analysis. This is the first published study of its kind in the field of TBI rehabilitation and therapy in a prison. The thematic analysis provides rich information around the 'lived experience' of the participants, which will contribute to the understanding and development of further enhancements to the programme and inform the care of prisoners with TBI in the future. The participants were able to articulate a high level of information-sharing, both inside the prison and with their families. This may not have been visible without a qualitative analysis. The pre-intervention injury description provided by the participants was also helpful in enabling future activity to target high-risk areas for education, and provide packages of care for those groups following a TBI. As most mild TBI are not medically-attended, this may not have been especially visible, without the detailed descriptions provided.

## Limitations

As with any study, limitations were found. The thematic analysis was undertaken in a male sentenced prison in Auckland. The families were not invited to contribute to the research. It would have been beneficial to get the prisoners' families' perspectives on the post-traumatic growth of the participants and any changes that were made to the family unit as a result of that. Further, there were no family education sessions, which may have also been helpful in assisting

them to understand some of the changes they may have witnessed with their family members, and this may have extended to their care and management of their children in the context of TBI in the community. Given the relatively short follow-up period, it is unclear whether the participants held the same view up to six or 12 months following the intervention, and what support they believed was required in order to maintain the changes they gained from the intervention. This may have also included following them up into the community to assess the ease of application to their substantive lives in the community.

## Conclusion

The thematic analysis provided an opportunity to better understand the lived experience of the participants involved in the intervention, including the intricacies of each individual's experience, of their TBI, their journey into jail and their new understandings. The rich descriptions threaded throughout the thematic analysis provided information that may assist with the management of prisoners with a TBI. Further, given the knowledge shared, individuals with TBI in the community may experience improving knowledge around accessing care following a TBI and how to prevent them in the first instance.

## CHAPTER 10: INTEGRATED DISCUSSION

This thesis aimed to understand the extent of TBI and inform the management of TBI within an adult male population. The two parts of the thesis addressed different aspects of the research question and consequently it is important to explore the separate study findings as a cohesive whole to facilitate translation of the findings.

In order to understand how to manage TBI, it is important to understand the scope of the burden and to inform who might benefit from intervention. The first part of the study sought to determine the lifetime prevalence of TBI in a male prison. Two-thirds of prisoners in this ASCF cohort experienced at least one lifetime TBI, which is aligned to prison prevalence information in the international literature (Shiroma et al, 2010). Nearly one third of participants had experienced multiple injuries suggesting that TBI histories were common within the prison population. Two in 5 participants experienced their first TBI injury before the age of 15 years. Participants who identified as Māori or imprisoned for violent, sexual or burglary offences were independently predictive of TBI suggesting that these sub-groups may benefit most from the intervention.

The intervention proved feasible in terms of recruiting those most at risk of TBI and persistent effects including Māori, those who had committed violent offences and those serving short prison sentences, suggesting the potential utility of such an intervention to try to reduce the burden of TBI in adult male prison facilities.

The high proportion of childhood TBI found in study one and augmented with the theme of the 'journey to jail' in study two is of concern, but also provides valuable information about the possible direction of future studies and raises questions as to whether interventions to support parent/guardian recognition and management of TBI in childhood could change the trajectory for some individuals, especially for those with additional risk factors such as those from lower socio-economic groups. These findings are also supported by emerging literature suggesting a link between childhood TBI and criminality (McKinlay, 2014; Ryan et al., 2015, and Schofield et al., 2015). Plunket in NZ are currently trialling a parent education intervention (ACC, 2017). This work could be augmented by an additional falls prevention and TBI awareness and management component for children being included into every health consultation, pre-school and school programme which could provide parents with more detailed information around the prevention and management of TBI for their young children, who are noted to be at high-risk.

One advantage of the way that the intervention (study two) in this PhD was designed was that TBIs could have been sustained during any part of the prisoner's lifetime and there was no need to determine if the person was experiencing any on-going effects or to try and relate them to a specific injury. The intervention aimed to increase knowledge and awareness and facilitate development of coping skills for any problems experienced increasing the potential reach of the intervention. This was important given in the prevalence study many prisoners stated needing reassurance when disclosing information about their injury history and therefore this was purposefully left out of the group intervention to reduce any concerns.

Both studies in this thesis were only conducted in an adult male prison population. There is a need to further extend this work to seek to understand the prevalence of TBI in female, youth and remand prisons as well as the approximately 36,000 offenders being managed under community sentences, such as home detention and probation (Department of Corrections, 2016). It would be important to test the feasibility of the intervention within these other populations where there may be some unique considerations but for whom may also benefit from the same assessments and rehabilitation opportunities. Including the wider context of offender and prisoner population would provide more comprehensive information about the true prevalence of TBI in NZ remedial services, which, in turn, would more comprehensively inform their care requirements.

Conducting assessments during the remand period may provide valuable information around the care of this population who often arrive in a poor health state, both physically and mentally (Chow et al., 2018 and Goncalves et al., 2017). This would allow the prison health services to initiate contact with the appropriate neurological or concussion services to commence support and rehabilitation. Further, screening all youth prisoners may result in changes to the young person's offending trajectory. Whilst this cannot be confirmed due to the complex interplay of factors, wrap-around care may assist youth with distressing symptoms of repeated TBI, which may reduce the contact incidence with the police and custodial services. Both the prevalence and intervention components of this thesis demonstrate that there is a high burden of TBI in prison populations. The intervention component of this thesis highlights that there may be potential interventions that can help to reduce the burden if implemented and if the results are reliably replicated.

On reflection, both the studies within this thesis could have been strengthened by gathering collateral information from the families/whānau of the participants, both in order to check details of TBI events and the behaviours that were distressing or troublesome for the families, as those who have experienced a TBI often lack insight. Corroboration of childhood TBI details would have been useful given the high incidence of this in the study cohort. Understanding the prisoners more holistically would assist with understanding the ante- and postcedents of TBI. However it is noted that there would be many ethical and practical considerations of such an approach.

Also, exploring some of the factors highlighted in the literature, loosely termed as reserves, would provide a more comprehensive assessment of the prisoner profile. Factors such as socio-economic status, maternal age, schooling, family relationships, and the presence and absence of violence or drugs in the family of origin are all noted to impact on the journey to prison and are heightened in the context of TBI and would have been useful socio-demographic data for both parts of this thesis. Understanding the impact of these factors would provide valuable information which may impact on the journey to prison, if the appropriate support services were enhanced.

A large longitudinal study would be important to contribute to the knowledge base around the cause and effect of TBI and criminality. This has not been completed in NZ previously, and could better inform strategy and policy required to support TBI survivors who embark on crime or criminals who acquire TBI through their criminogenic behaviour. This would better inform more specific interventions, rather than applying the same intervention regardless of the direction of travel in terms of cause and effect.

The prison environment was highlighted as being an important context for understanding and managing TBI. For example, high prevalence was identified in part one and in part two many participants described prison as a safe space to spend time working on getting themselves well, while others found it challenging. In addition, prisons are noted to be violent environments when compared to the community (Sanchez & Wolff, 2017) and consequently a place where there may be an increased risk of sustaining a TBI. This in turn can increase the potential incidence and impact of TBI on prisoners. Further work understanding incidence of TBI whilst incarcerated would be important to inform prevention and management initiatives. There has been a pilot study conducted into the utilisation of therapeutic courts in NZ for alcohol and drug-related offending (Ministry of Justice, 2016). TBI is a health issue, which has behavioural and emotional issues, and impacts on a survivor's connection with the criminal justice system, based on a complex interplay of factors. Extending the therapeutic court concept to include TBI may provide opportunities to explore support options for the TBI survivor embarking on criminogenic activity, which may in turn influence their pathway. Research into this would provide valuable information about whether there are alternative pathways for TBI survivors engaged in criminal activity. To inform TBI management within the prison context it would be helpful to better understand the prisoners' experiences of the current impacts of TBI on their functioning within the prison context in order to better understand the scope of care and rehabilitation that can be possible.

Part two of this thesis utilised a modified manualised programme, with the inclusion of CBT and MBSR, which were adapted for a prison environment. Whilst the study found there were therapeutic gains immediately following the intervention, with statistical significance in

emotional regulation strategies between the intervention and wait list groups, these decreased over time. This was also reflected in the international literature, which recommended booster sessions or longer sessions as the reported studies also found treatment gains were lost over time (Byrne & Coetzer, 2016, Medd & Tate, 2000, and Ponsford et al., 2016). Despite the loss of treatment gains, the study provides valuable information into the treatment of distressing symptoms following a TBI. The inclusion of both quantitative and qualitative measures provided a unique opportunity to speak with the participants to better understand their experience of TBI, the intervention and any changes they may have incorporated into their lives following the intervention. The insight into post-intervention growth allowed an opportunity to experience the participants' translation of the skills and strategies learnt into their everyday lives, and how that was shared with their family. Further, where changes were seen in the participant's experience of concussion related measures and negative affect these were noted to be insignificant or were not sustained over time. The qualitative information reflected shifts in thinking and implementation of the strategies taught. Without a mixed methods approach this may not have been realised. This has also provided information around the intervention structure and content and the application to a prison environment as well as possible enhancements for the future which may include family involvement.

Moving forwards continuing to screen all newly arriving prisoners is important as is exploring the option of targeting more challenging prisoners for interventions. Extending the intervention to this cohort would be important to assess the impact on heavily documented anti-social behaviours (such as high/maximum security, youth and violent offending in prisons) to explore whether a targeted intervention for

high-risk prisoners effects change through the provision of psych-education around TBI and assistance with strategies for the management of symptoms.

Further, the option to conduct additional measures around symptom management longitudinally would be beneficial to assess whether the skills are retained over time. It is noted that the NARQ was not statistically significant from the wait list controls at 12 weeks, but the addition of booster sessions or a longer programme would need to be explored to assess the success of this. The addition of further measures or exploring different measures warrants further exploration. Given the intervention provides for self-advocacy the changes could be measures of mood and self-efficacy as has been seen in a previous study where the General Self-Efficacy Scale (GSES) was utilised in a somewhat similar study (Hawley, Gerber & Morey, 2017).

## Strengths

There were several strengths relating this thesis overall. The prevalence study provided valuable, NZ-specific information to assist with understanding the burden of TBI in NZ prisons, at least in terms of prevalence. The study location has continued to offer screening to all consenting prisoners. Establishing this as a 'business as usual' activity assists and informs the care and management of the prisoners, from their point of arrival.

The study is powerful for the participants and provides them with an alternative to historical ways of reacting to stimuli; so from an

individual quality of life perspective, the skills acquired may assist individuals to gain in confidence.

## Limitations

Whilst this thesis utilised a unique opportunity associated with the opening of a new NZ male sentenced prison, there were limitations. At the time of the prevalence study the sample was statistically different to that of the national prison estate. This means that the results cannot be reported as being fully reflective of a NZ prison population and this makes extrapolation challenging. It is noted that this aspect of the study was undertaken in 2015 and is no longer the situation in the prison, where the prison population now reflects available beds, rather than specific crime or security types.

As with many self-reporting formats, recall bias and inaccuracies are risks, with some challenges witnessed around the sequencing of prisoners' reporting of their most recent to least recent TBI. Self-reporting was utilised in both the prevalence component and the intervention component of the thesis. Self-reporting has been raised in the literature, with the 'gold standard' being reflected as interview based assessments and corroboration with medical records (McKinlay and Albicini, 2016).

One of the challenges with the intervention was gaining a wide cross section of prisoners from within ASCF. In the prevalence study there were high rates of consent to provide TBI prevalence information. However in the intervention the total participant pool was reduced by the reluctance of segregated prisoners to become involved. By the very nature of the voluntary segregation status prisoner's fear for

their safety within the prison and all attempts to mitigate their fears did not result in any changes in consent to participate.

## CHAPTER 11: CONCLUSION

The prevalence of TBI in prison is much higher than seen in the community. In this study the prevalence of TBI was in the mid-range of prison studies conducted internationally. Prisoners predominantly gain their TBI through violent means and do not seek medical assistance. There is evidence of a knowledge deficit about the impact of TBI in prisoners, and evidence of absence of help-seeking behaviours. Many prisoners denoted that they felt their TBI, in part, may have contributed to their journey to prison and their contact with the criminal justice service, mostly because of self-medication with illegal substances and through acts of violence.

Through the intervention, prisoners were able to reflect on their journey into prison, the impact of violence on their lives and their personal symptoms of TBI. They were able to develop strategies for the management of their distressing symptoms and the impact of this on their interactions within the prison and with their families.

This study has made an original contribution to prison knowledge, in better understanding TBI in a NZ prison environment, and the impact of an intervention to address self-reported distressing symptoms. However, this study is the beginning of the scope of work that should be undertaken.

Successfully reducing the incidence of TBI, treating TBI early and managing prisoners with TBI reduces distress for the prisoners, their families, the victims of their offences and staff. It is important that momentum is maintained to grow this knowledge base.

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# APPENDICES

## Appendix A: Ethics Approval Kohuora Ethics Committee Approval (2015)

Bringing service to life

**serco**

Serco New Zealand Limited  
Private Bag 94065  
Manukau  
Auckland 2241  
T +64 9 250 5900  
www.serco.com

24 February 2015

Tracey Mitchell  
Head of Healthcare  
Auckland South Corrections Facility

Dear Tracey,

RE: Ethics Application: **15/001 Prevalence of traumatic brain injury within a South Auckland Correctional Facility (ASCF).**

Thank you for submitting your application for ethical review to the Kohuora Ethics Committee (KEC). The committee have considered your application and this has been approved. The committee believe it is ethical and will provide valuable information that will inform the care of the men at ASCF.

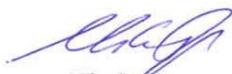
It is a condition of approval that KEC is notified of any adverse events or if the research does not commence.

Please note that only the approved research may be undertaken. Any alterations to the planned research will be required KEC approval prior to implementation.

An annual report is required should you approved research extend beyond one year. Once your research has been completed a report will also require submission.

All the very best with your research,

Yours sincerely,



Mike Inglis  
Prison Director  
Auckland South Corrections Facility

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Auckland University of Technology Ethics Committee (AUTEC)  
Approval (2015)



A U T E C  
S E C R E T A R I A T

27 February 2015

Alice Theadom

Faculty of Health and Environmental Sciences

Dear Alice

Ethics Application: **15/41 Prevalence of traumatic brain injury within a South Auckland Correctional Facility.**

Thank you for submitting your application for ethical review to the Auckland University of Technology Ethics Committee (AUTEC). I am pleased to confirm that your ethics application has been approved for three years until 24 February 2018

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 24 February 2018;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 24 February 2018 or on completion of the project;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring

that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz).

All the very best with your research,



Kate O'Connor  
Executive Secretary

**Auckland University of Technology Ethics Committee**

Cc: Tracey Mitchell [tracey.mitchell@serco-ap.co.nz](mailto:tracey.mitchell@serco-ap.co.nz); Mathew Kalloor; Elizabeth de Preez

# Kohuora Ethics Committee Approval (2017)

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**serco**

Serco New Zealand Limited  
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Manukau  
Auckland 2241  
T +64 9 250 9900  
www.serco.com

24 April 2017

Tracey Mitchell  
Head of Healthcare  
Auckland South Corrections Facility

Dear Tracey,

RE: Ethics Application: **17/003 Understanding and managing Traumatic Brain Injury (TBI) in a South Auckland Corrections Facility - a pilot randomised control trial to test the efficacy of a psychological intervention**

Thank you for submitting your application for ethical review to the Kohuora Ethics Committee (KEC). The committee have considered your application and this has been approved. The committee believe it is ethical and will provide valuable information that will inform the care of the men at ASCF.

It is a condition of approval that KEC is notified of any adverse events or if the research does not commence.

Please note that only the approved research may be undertaken. Any alterations to the planned research will be required KEC approval prior to implementation.

An annual report is required should you approved research extend beyond one year. Once your research has been completed a report will also require submission.

All the very best with your research,

Yours sincerely,



Mike Inglis  
Prison Director  
Auckland South Corrections Facility

SERCO INTERNAL

# Auckland University of Technology Ethics Committee (AUTEC) Approval (2017)



## AUTEC Secretariat

Auckland University of Technology  
D-88, WU406 Level 4 WU Building City Campus  
T: +64 9 921 9999 ext. 8316  
E: [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz)  
[www.aut.ac.nz/researchethics](http://www.aut.ac.nz/researchethics)

26 April 2017

Alice Theadom  
Faculty of Health and Environmental Sciences

Dear Alice

Ethics Application: **17/120 Understanding and managing Traumatic Brain Injury (TBI) in a South Auckland Corrections Facility - a pilot randomised control trial to test the efficacy of a psychological intervention**

Thank you for submitting your application for ethical review to the Auckland University of Technology Ethics Committee (AUTEC).

I am pleased to confirm that your ethics application has been approved for three years until 26 April 2020.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 26 April 2020;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 26 April 2020 or on completion of the project;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz).

All the very best with your research,



Kate O'Connor  
Executive Secretary  
Auckland University of Technology Ethics Committee

Cc: [traceylm@vodafone.co.nz](mailto:traceylm@vodafone.co.nz)

# Health and Disability Ethics Committee (2017)



Health and Disability Ethics Committees  
Ministry of Health  
133 Molesworth Street  
PO Box 5013  
Wellington  
6011

0800 4 ETHICS  
hdec@moh.govt.nz

12 April 2017

Ms Tracey Mitchell  
Auckland South Corrections Facility  
21 Kiwi Tamaki Road  
Wiri 2104

Dear Ms Mitchell

|     |              |  |
|-----|--------------|--|
| Re: | Ethics ref:  | 17/NTB/22  |
|     | Study title: | A pilot randomised control trial of group cognitive behavioural therapy (CBT) to assist prisoners to manage mood and persistent symptoms following TBI and occurrence of violent episodes. |

I am pleased to advise that this application has been approved by the Northern B Health and Disability Ethics Committee. This decision was made through the HDEC-Full Review pathway.

#### Conditions of HDEC approval

HDEC approval for this study is subject to the following conditions being met prior to the commencement of the study in New Zealand. It is your responsibility, and that of the study's sponsor, to ensure that these conditions are met. No further review by the Northern B Health and Disability Ethics Committee is required.

#### Standard conditions:

1. Before the study commences at *any* locality in New Zealand, all relevant regulatory approvals must be obtained.
2. Before the study commences at *any* locality in New Zealand, it must be registered in a clinical trials registry. This should be a WHO-approved (such as the Australia New Zealand Clinical Trials Registry, [www.anzctr.org.au](http://www.anzctr.org.au)). However <https://clinicaltrials.gov/> is acceptable provided registration occurs prior to the study commencing at *any* locality in New Zealand.
3. Before the study commences at a *given* locality in New Zealand, it must be authorised by that locality in Online Forms. Locality authorisation confirms that the locality is suitable for the safe and effective conduct of the study, and that local research governance issues have been addressed.

#### Non-standard conditions:

- Therapy group PISC: - add version number and date to footer.
- Please remove Kate O'Connor AUTEK as a contact and add the full contact details for HDEC (Phone:0800 4 ETHICS Email: [hdec@moh.govt.nz](mailto:hdec@moh.govt.nz)).
- Please review the following sentence on p.3 and insert the missing word: 'We do not know if people will find this group therapy programme or not'.
- Please remove the tick box option or reword Clause 8 on consent form concerning ongoing use of collected data if participant withdraws consent to

further participation. You will not be able to extract the data from your published thesis / journal articles. It is acceptable to retain the right to use data that has already been collected, to maintain the scientific integrity of the results.

- Focus Interview PISC: --under 'What are my rights', add the right to review the transcript of the audio taping before it is used.
- Please replace the need to request a copy of the study results verbally or in writing, with a statement that everyone will be offered a copy. The consent form already has a tick box where they can say yes or no to the offer.

Non-standard conditions must be completed before commencing your study. Non-standard conditions do not need to be submitted to or reviewed by HDEC before commencing your study.

If you would like an acknowledgement of completion of your non-standard conditions letter you may submit a post approval form amendment. Please clearly identify in the amendment that the changes relate to non-standard conditions and ensure that supporting documents (if requested) are tracked/highlighted with changes.

For information on non-standard conditions please see section 128 and 129 of the Standard Operating Procedures at <http://ethics.health.govt.nz/home>.

#### After HDEC review

Please refer to the *Standard Operating Procedures for Health and Disability Ethics Committees* (available on [www.ethics.health.govt.nz](http://www.ethics.health.govt.nz)) for HDEC requirements relating to amendments and other post-approval processes.

Your next progress report is due by 11 April 2018.

#### Participant access to ACC

The Northern B Health and Disability Ethics Committee is satisfied that your study is not a clinical trial that is to be conducted principally for the benefit of the manufacturer or distributor of the medicine or item being trialled. Participants injured as a result of treatment received as part of your study may therefore be eligible for publicly-funded compensation through the Accident Compensation Corporation (ACC).

Please don't hesitate to contact the HDEC secretariat for further information. We wish you all the best for your study.

Yours sincerely,



Kate O'Connor  
Chairperson  
Northern B Health and Disability Ethics Committee

Encl: appendix A: documents submitted  
appendix B: statement of compliance and list of members

**Appendix A**  
**Documents submitted**

| <i>Document</i>   | <i>Version</i> | <i>Date</i>       |
|---|----------------|-------------------|
| Declined letter for previous application in respect of the same (or substantially similar) study: HDEC Decline letter | 1              | 19 October 2016   |
| Confidentiality agreement transcriptionist  | 1              | 29 October 2016   |
| Survey/questionnaire: Negative Affect Repair Questionnaire  | 1              | 17 September 2016 |
| CV for CI: CV of CI   | 2              | 07 January 2017   |
| Survey/questionnaire: Rivermead post concussion questionnaire   | 1              | 07 January 2017   |
| PIS/CF: Patient information sheet   | 2              | 07 January 2017   |
| PIS/CF: Consent form-qualitative interview  | 3              | 04 April 2017     |
| PIS/CF: Consent form - group intervention   | 3              | 04 April 2017     |
| Recruitment advertisement   | 3              | 04 April 2017     |
| Survey/questionnaire: Qualitative interview questions   | 2              | 07 January 2017   |
| Evidence of scientific review: Scientific evidence  | 2              | 07 January 2017   |
| Whanau information sheet  | 2              | 07 January 2017   |
| Protocol: TBI Study protocol  | 3              | 04 April 2017     |
| Covering Letter: T.Mitchell cover letter  | 2              | 04 April 2017     |
| TBI Intervention manual   | 1              | 04 April 2017     |
| Provisional approval letter HDEC  | 1              | 17 February 2017  |

**Appendix B**  
**Statement of compliance and list of members**

Statement of compliance

The Northern B Health and Disability Ethics Committee:

- is constituted in accordance with its Terms of Reference
- operates in accordance with the *Standard Operating Procedures for Health and Disability Ethics Committees*, and with the principles of international good clinical practice (GCP)
- is approved by the Health Research Council of New Zealand's Ethics Committee for the purposes of section 25(1)(c) of the Health Research Council Act 1990
- is registered (number 00008715) with the US Department of Health and Human Services' Office for Human Research Protection (OHRP).

List of members

| Name                       | Category  | Appointed  | Term Expires |
|----------------------------|---|------------|--------------|
| Mrs Malaga Erick           | Lay (consumer/community perspectives)                           | 01/07/2015 | 01/07/2018   |
| Mr John Hancock            | Lay (the law)   | 14/12/2015 | 14/12/2018   |
| Mrs Phyllis Huitema        | Lay (consumer/community perspectives)                           | 19/05/2014 | 19/05/2017   |
| Dr Nora Lynch              | Non-lay (health/disability service provision)                   | 24/07/2015 | 24/07/2018   |
| Miss Tangihaere Macfarlane | Lay (consumer/community perspectives)                           | 19/05/2014 | 19/05/2017   |
| Mrs Kate O'Connor          | Lay (ethics/moral reasoning)                                    | 14/12/2015 | 14/12/2018   |
| Mrs Stephanie Pollard      | Non-lay (intervention studies)                                  | 01/07/2015 | 01/07/2018   |
| Mrs Leesa Russell          | Non-lay (intervention studies), Non-lay (observational studies) | 14/12/2015 | 14/12/2018   |

Unless members resign, vacate or are removed from their office, every member of HDEC shall continue in office until their successor comes into office (HDEC Terms of Reference)

<http://www.ethics.health.govt.nz>

# Appendix B: Tools

## TBI Screening tool

Bringing service to life



### ASCF Traumatic Brain Injury (TBI) Screening tool

Prisoner Name: \_\_\_\_\_ PRN: \_\_\_\_\_

Date of Birth: \_\_\_\_\_

Date of Assessment: \_\_\_\_\_

Assessment completed by: \_\_\_\_\_

1. Have you ever been involved in an accident, where you hit your head and were left feeling dazed and confused or lost consciousness? (Circle one)

Yes                  No

2. If yes, how many times?

\_\_\_\_\_

#### Accident Details (To be completed for each injury – up to 5 injuries)

1. What happened?

Please briefly describe what you were doing and how you sustained the injury

\_\_\_\_\_

\_\_\_\_\_

2. How old were you at the time of the accident?

\_\_\_\_\_

3. Did you lose consciousness? (Circle one)

Yes                  No

4. If yes, how long for?

Minutes: \_\_\_\_\_

Hours: \_\_\_\_\_

Days: \_\_\_\_\_

5. After the accident, did you experience any of the following? (tick as appropriate)

|                          |                                   |
|--------------------------|-----------------------------------|
| <input type="checkbox"/> | Not remembering what had happened |
| <input type="checkbox"/> | Fits or seizures                  |
| <input type="checkbox"/> | Vomiting                          |
| <input type="checkbox"/> | Headache                          |
| <input type="checkbox"/> | Loss of balance                   |
| <input type="checkbox"/> | Visual disturbance                |
| <input type="checkbox"/> | Memory difficulties               |

## Participant Information Sheet



|                    |   |                        |                                   |
|--------------------|---|------------------------|-----------------------------------|
| Study title:       | <b>Understanding and managing Traumatic Brain Injury (TBI) in a South Auckland Corrections Facility</b> |                        |                                   |
| Locality:          | <b>Auckland South Corrections Facility (ASCF)</b>   | Ethics committee ref.: | <b>17/NTB/22</b>                  |
| Lead investigator: | <b>Tracey Mitchell</b>  | Contact phone number:  | <b>Via CMS Health application</b> |

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You are invited to take part in a study about managing symptoms and emotions using a talking intervention. Whether or not you take part is your choice. If you don't want to take part, you don't have to give a reason, and it won't affect the care you receive. If you do want to take part now, but change your mind later, you can pull out of the study at any time.

This Participant Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, whānau, friends, or healthcare providers. Feel free to do this.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 7 pages long, including the Consent Form. Please make sure you have read and understood all the pages.

### **What is the purpose of the study?**

After a brain injury (or concussion) people can experience on-going symptoms such as dizziness, headaches and difficulties concentrating which can make daily tasks difficult. People can also find it more difficult to manage emotions such as anger, and anxiety. The purpose of

this study is to establish whether people who have had a brain injury can be assisted to manage their symptoms and emotions better.

This study has not been done in a NZ prison before. It is an intervention study which means there is a therapy programme which all men who have agreed to participate will receive. It is blinded which means I do not know who is participating. If you agree to participate you will be assigned to a group by someone that does not know you. You will then be provided with an intervention within the next 6 months and will be asked to complete questionnaires and have your Integrated Offender Management System (IOMS) file notes looked at.

This research will contribute to some study I am doing. It is called a Doctor of Philosophy (PhD). You will not be advantaged or disadvantaged by participating in the research. I will not be involved in the therapy intervention and I will not have access to any information where you will be identified as part of this study.

The study is currently being considered by the Northern Region Health and Disability Ethics Committee, the AUT Ethics Committee and the Kohuora Ethics Committee.

### **What will my participation in the study involve?**

You have been invited to participate in this research because you shared your experiences of head injury with us when you arrived at the prison. You will not be identified in the study except for your age, ethnicity, crime category and prison sentence. Your name will never be shared with anyone outside of the prison.

The research involves you taking part in ten (10) one-hour sessions of group therapy across five (5) weeks. This means two sessions per week. Men will be randomly allocated to groups. Each group will have 12 men and then the next group of 12 men will go through the same process until all 72 men have had the opportunity to participate in the group therapy. This may mean some men may be waiting up to 6 months to have the group therapy. Normal care will be provided at this time. You will not be excluded from any healthcare. We aim to have all the groups completed by December 2017.

If you agree to participate in the research we will ask you to complete two assessments prior to the group therapy, at the end of five weeks and again at the end of the group therapy. The tests are being completed to see whether there are any changes in your symptoms relating to your head injury and your thoughts/feelings about your life. You will also be asked whether you would be prepared to participate in an interview, so we can better understand how you felt about the group therapy. The data will only be collected for the purposes of this research. You will not be identified in any information shared with anyone else.

In total, should you wish to be involved in all aspects of the study we would ask you give us 14 hours of your time across 6 months.

We will also monitor your file notes and misconducts from the time the study starts (after you have consented to being included in the study). This will be done to see whether there is any change in your interactions and behaviour following the intervention. No medical notes will be accessed for this study aside from the tests discussed above.

### **What are the possible benefits and risks of this study?**

Sometime group therapy can bring up sad or upsetting things. Sometimes this can be very distressing.

Should you become upset during the group therapy, the prison mental health nursing team will be available to support you. This can be done via the Custodial Management System (CMS) or you can ask any of the healthcare team for support. Should you become very distressed and feel at risk of harm to yourself or others then please talk to one of the officers immediately.

A cultural liaison person (Kapi Peita) and the prison chaplain (Graham Lackley) will also be available as part of the prison team should you have any issues you would like to discuss with them or additional support you may require.

We do not know if people will find this group therapy programme helpful or not as it has not been used before. It is hoped that you may have a better understanding of the impact of your head injury on your interactions with others and behaviour to learn some ways of managing some of those challenges. There is very little information available on how we can assist people who have experienced a head injury, especially in prisons. This study provides an opportunity for us to develop something that may help all prisoners in NZ over time.

This study will also help me to complete my study.

#### **Who pays for the study?**

There is no cost or payments to you to participate in this study.

#### **What if something goes wrong?**

If you were injured in this study, which is unlikely, you would be eligible to apply for compensation from ACC just as you would be if you were injured in an accident at work or at home. This does not mean that your claim will automatically be accepted. You will have to lodge a claim with ACC, which may take some time to assess. If your claim is accepted, you will receive funding to assist in your recovery.

#### **What are my rights?**

Your participation in this study is voluntary. You are free to decline to take part, or to withdraw from the research at any time, without experiencing any disadvantage. You have the right to access information about you which has been collected as part of this study.

You will be told of any new information about negative or positive effects relating to the study that may impact on your health.

Your privacy will be maintained, and the psychologist will be the only person who will have access to your details within the research. I will only have access to information where your name has been removed. No information will be shared with other people where you will be identified.

If you are unable to fully understand the information in this document the healthcare team can help you read all the information about the study. It is very important that you understand what you are agreeing to and the amount of your time it will take.

What happens after the study or if I change my mind?

Once the study is complete you will continue to have access to healthcare as you have throughout the study.

The study information will be stored in a password protected database and will be held for 10 years. Any paper copies of consent forms will be scanned into the secure database and will be destroyed in a confidential waste bin.

If you wish to receive feedback from the research I would be happy to provide you with a summary of the findings. . Please remember that the write up of this research is planned to be finished in 2018 so it may take some time before this is available.

Who do I contact for more information or if I have concerns?

Any concerns regarding the nature of this study can be notified in the first instance to my Project Supervisor:

Dr Alice Theadom, AUT North Shore Campus, 90 Akoranga Drive, Auckland,1142.

If you want to talk to someone who isn't involved with the study, you can contact an independent health and disability advocate on:

Phone : 0800 555 050  
Fax : 0800 2 SUPPORT (0800 2787 7678)  
Email : [advocacy@hdc.org.nz](mailto:advocacy@hdc.org.nz)

For Maori Health support please contact :

*Kapi Peita*

*Via CMS*

You can also contact the health and disability ethics committee (HDEC) that approved this study at:

Ministry of Health

Health and Disability Ethics Committees

PO Box 5013

Wellington 6140

## ▲ Whanau Information Sheet:

### Date Produced:

7 January 2017.

### Project Title

Understanding and managing Traumatic Brain Injury (TBI) in a South Auckland Corrections Facility - a pilot randomised control trial to test the efficacy of a psychological intervention.

### An Invitation

I am researching Traumatic Brain injury or head injury in prisoners and am developing an intervention which I hope will assist prisoners with some of the symptoms relating to their head injury. These sometimes make life challenging and contribute to men being in prison or getting into trouble in prison.

This research will contribute to some study I am doing. It is called a Doctor of Philosophy (PhD). I am also the Head of Healthcare but this study is very separate to my role in the prison. The men will not be advantaged or disadvantaged by participating in the research.

A therapy intervention will be run by a trained psychologist with experience in group therapy. I will not be involved in this and I will not have access to any information where the men will be identified as part of this study.

### What is the purpose of this research?

This study hopes to help men with distressing symptoms they may experience following their head injury although as this has never been done before in a NZ prison we cannot guarantee the results each man will experience. The study will help with new knowledge about helping NZ prisoners with head injuries. If our study is successful, we hope this will be trialled in other prisons in NZ to possibly help other prisoners who have had experiences of a head injury.

### How the men were identified and why they are invited to participate in this research?

All men will be invited to participate and they will not be identified in the study except for their age, ethnicity, crime category and prison sentence. Their name will never be shared with anyone outside of the prison. They have been invited to participate in this research because they shared their experiences of head injury with us when they arrived at the prison and we want to understand whether we can help them with any ongoing symptoms.

### Participation in this research?

If the men agree to participate in the research, they will be asked to sign a consent form. They will be provided with any support required to fully understand what they are consenting to. Their participation in this research is voluntary (it is their choice) and they can withdraw at any time without being disadvantaged.

The Psychologists will be available to speak to any family members about the study in general terms. Any detailed information about a specific prisoner can only be discussed with their written consent. They will be available in the visits area. Please ask your loved one to notify the health staff if you would like this to happen and it will be arranged at a mutually agreeable time.

### What will happen in this research?

The research involves taking part in ten (10) one-hour sessions of group therapy across five (5) weeks. Each group will have 12 men and then the next group of 12 men will go through the same process until all 72 men have participated in the therapy. This may mean some men may be waiting up to 6 months to have the therapy. Normal care will be provided at this time and they will not be excluded from any healthcare.

There will be questionnaires they will be asked to complete at 3 different times. They will also be invited to participate in an interview so we can understand their personal experiences of being involved in the study. Data collected about the men (where they are identified) will not be shared with anyone else.

We will also monitor their file notes and misconducts as it is hoped that if these have been a challenge for the men that the negative file notes and misconducts may decrease after the intervention.

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**What are the discomforts and risks?**

Sometime group therapy can bring up sad or upsetting things which the men may not find comfortable to discuss. If you find your loved one is distressed during your calls or visits with then please make contact with the healthcare team on the numbers listed below or notify one of the officers in the visits area if that is where your concern arises.

**How will these discomforts and risks be alleviated?**

Should any man become upset during the group therapy process we will offer them access to the prison mental health nursing team. A cultural liaison person and the prison chaplain will also be available as part of the prison team should they have any issues they would like to discuss.

**What are the benefits?**

We have no prison based research around the benefits we may expect from joining this study. However, it is hoped that the men may have a better understanding of the impact of their head injury on their behaviours and developing ways of managing some of those challenges. There is very little information available on how we can assist people who have experienced a head injury, especially in prisons. This study provides an opportunity for us to develop something that may help all prisoners in NZ over time.

This study will also help me to complete my study but this is not the primary focus.

**How will their privacy be protected?**

Confidentiality will be maintained as the psychologist and intern psychologist will be the only people to have access to any man's identifiable details within the research. I will only have access to information where the man's name has been removed and a special number assigned. No information will be shared with other people where the man will be identified.

**What are the costs of participating in this research?**

There is no cost to the men in terms of money. The main cost is each man's time. The study involves ten (10) sessions each 1 hour long across a five (5) week period and completion of 3 questionnaires at 3 different times. In total, should they wish to be involved in all aspects of the study they will be asked to give 14 hours of their time across 3 months.

**Time to consider this invitation?**

Each man has three weeks to consider this invitation.

**Feedback on the results of this research?**

If any of the men wish to receive feedback from the research I am happy to provide them with a summary of the findings. This can be requested verbally or in writing to me. Please remember that the writing up of this research is supposed to be finished in 2018 so it may take some time before it is available.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this study can be notified in the first instance to my Project Supervisor, *Dr Alice Theadom, AUT North Shore Campus, 90 Akoranga Drive, Auckland, 1142.*

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEK, Kate O'Connor, *AUT North Shore Campus, 90 Akoranga Drive, Auckland 1142.*

Any questions or concerns about your loved one during this study should be notified to Healthcare team, 21 Kiwi Tamaki Road, Wiri, Auckland 2104 or via the prison switchboard (09) 250 5900. Their consent will be required to speak to you directly but should you be concerned about their mental health or risk then please call immediately.

## Consent form



*An interpreter is available on request.*

Please tick to indicate you consent to the following

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I have read or have had read to me in my first language, and I understand the Participant Information Sheet.

---

I have been given sufficient time to consider whether or not to participate in this study.

---

I have had the opportunity to use a legal representative, whanau/ family support or a friend to help me ask questions and understand the study.

---

I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.

---

I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without this affecting my medical care.

---

I consent to the research staff collecting and processing my information, including information about my health and my IOMS file notes.

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If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed.

---

I consent to my GP or current provider being informed about my participation in the study and of any significant abnormal results obtained during the study. Yes  No

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I agree to an approved auditor appointed by the New Zealand Health and Disability Ethic Committees, or any relevant regulatory authority or their approved representative reviewing my relevant medical records for the sole purpose of checking the accuracy of the information recorded for the study.

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I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.

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I understand the compensation provisions in case of injury during the study.

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I know who to contact if I have any questions about the study in general.

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I understand my responsibilities as a study participant.

---

I wish to receive a summary of the results from the study. Yes  No

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**Declaration by participant:**

I hereby consent to take part in this study.

Participant's name:

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Signature:

Date:

---

**Declaration by member of research team:**

I have given a verbal explanation of the research project to the participant and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name:

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Signature:

Date:

---

## Negative Affect Repair Questionnaire

Nicole Eberle – Negative Affect Repair Questionnaire

Items of the modified NARQ scales. Items are Likert-scaled with scale points 0 (never), 1 (rarely), 2 (occasionally), 3 (often), 4 (always).

---

### Scale - Cognitive regulation strategies

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#### To cope with my bad mood and to try to make myself feel better,...

- ... I try to think positively.
  - ... I reflect on the situation, so that I can keep calm.
  - ... I try to reappraise the situation.
  - ... I analyse the situation to try to understand why I feel the way I do.
  - ... I avoid people or things that caused me to feel bad.
  - ... I think about pleasant situations from the past.
  - ... I compare myself to someone who is worse off than I am.
  - ... I think about my feelings objectively.
- 

### Scale - Calming and distractive strategies

---

#### To cope with my bad mood and to try to make myself feel better,...

- ... I do things to distract myself.
  - ... I do things that I enjoy, such as pampering myself.
  - ... I exercise.
  - ... I accept things the way they are.
  - ... I relax with music.
  - ... I keep busy doing things.
- 

### Scale - Social regulation strategies

---

#### To cope with my bad mood and to try to make myself feel better,...

- ... I try to suppress my feelings. (*R*)
  - ... I consider asking other people for their advice.
  - ... I talk with my friends.
  - ... I express my feelings.
  - ... I do not show other people how bad I am feeling. (*R*)
- 

Nicole Eberle – Negative Affect Repair Questionnaire 69

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### Scale - Externalizing strategies

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#### To cope with my bad mood and to try to make myself feel better,...

- ... I hurt myself.
- ... I punish myself.
- ... I drink alcohol or take some drugs to help me relax.
- ... I take medication to stabilize my mood.
- ... I think about death or dying.

(*R*) = revised item scores

## Rivermead post-concussion symptoms questionnaire

### The Rivermead Post-Concussion Symptoms Questionnaire\*

After a head injury or accident some people experience symptoms which can cause worry or nuisance. We would like to know if you now suffer from any of the symptoms given below. As many of these symptoms occur normally, we would like you to compare yourself now with before the accident. For each one, please circle the number closest to your answer.

- 0 = Not experienced at all
- 1 = No more of a problem
- 2 = A mild problem
- 3 = A moderate problem
- 4 = A severe problem

Compared with before the accident, do you now (i.e., over the last 24 hours) suffer from:

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| Headaches.....  | 0 | 1 | 2 | 3 | 4 |
| Feelings of Dizziness .....                             | 0 | 1 | 2 | 3 | 4 |
| Nausea and/or Vomiting .....                            | 0 | 1 | 2 | 3 | 4 |
| Noise Sensitivity,<br>easily upset by loud noise .....  | 0 | 1 | 2 | 3 | 4 |
| Sleep Disturbance.....                                  | 0 | 1 | 2 | 3 | 4 |
| Fatigue, tiring more easily .....                       | 0 | 1 | 2 | 3 | 4 |
| Being Irritable, easily angered .....                   | 0 | 1 | 2 | 3 | 4 |
| Feeling Depressed or Tearful .....                      | 0 | 1 | 2 | 3 | 4 |
| Feeling Frustrated or Impatient .....                   | 0 | 1 | 2 | 3 | 4 |
| Forgetfulness, poor memory .....                        | 0 | 1 | 2 | 3 | 4 |
| Poor Concentration .....                                | 0 | 1 | 2 | 3 | 4 |
| Taking Longer to Think .....                            | 0 | 1 | 2 | 3 | 4 |
| Blurred Vision.....                                     | 0 | 1 | 2 | 3 | 4 |
| Light Sensitivity,<br>Easily upset by bright light..... | 0 | 1 | 2 | 3 | 4 |
| Double Vision .....                                     | 0 | 1 | 2 | 3 | 4 |
| Restlessness .....                                      | 0 | 1 | 2 | 3 | 4 |

Are you experiencing any other difficulties?

1. \_\_\_\_\_ 0 1 2 3 4
2. \_\_\_\_\_ 0 1 2 3 4

\*King, N., Crawford, S., Wenden, F., Moss, N., and Wade, D. (1995) *J. Neurology* 242: 587-592

## Appendix C: Intervention Manual

### **The Mindfulness-Based and Cognitive-Behaviour Therapy For Traumatic brain injury (TBI) Manual**

Modified for TBI from the manual formulated by Kelly (2007)

Kelly, Jeffrey R., (2007). Mindfulness-based and Cognitive-behaviour Therapy for Anger-management: an Integrated Approach. *PCOM Psychology Dissertations*. Paper 68.

#### **Sessions**

This programme is a ten-session programme to help you understand the effects of brain injury and how it can affect the decisions you make and how you behave. Implementation of the entire programme is designed to take ten weeks. The structure of the sessions is designed to create consistency among sessions and predictability to each session's activities in order to facilitate the goals of each session.

The structure of the sessions uses a cognitive-behavioural treatment format and will include: (1) an agenda-setting exercise, (2) a brief mood check-in/update, (3) a bridge from the previous session, (4) a review of the homework, (5) a discussion of the agenda items, (6) an assigning of new homework, and (7) a summary and feedback discussion. This format will be

used following the first session, however the nature and scope of the first session necessitates the need for an altered format initially. Each session is designed to last for approximately ninety minutes. All aspects of each session need to be covered, therefore sessions might need to carry over to the next meeting. In this case, the activities not covered in a session should become priorities for the next session's agenda.

### **Session Size**

This is a group counselling programme. Session participants include the programme facilitator and twelve participants.

### **Goals of the Programme**

The goal of the programme is to help individuals who have experienced Traumatic brain Injury (TBI) (which includes concussion) to understand the possible longer term effects of these injuries and help them to manage their behaviour. This is accomplished through teaching cognitive and behavioural strategies. These strategies can be used to appropriately deal with anger-provoking situations. It is a psychoeducational programme that teaches individuals the cognitive, affective, behavioural, and physiological aspects of TBI and anger. Through the use of the mindfulness-based and cognitive-behavioural based activities, individuals will gain the skills and perspective necessary to effectively deal with distressing symptoms of TBI including anger.

### **Facilitator Requirements**

The facilitator implementing the sessions needs to have the educational qualifications necessary to function as a counselling provider. Considering that this programme is designed for implementation in a prison, the facilitator should be a master-level psychologist who has prison experience and group counselling procedures. Experience in the fields of cognitive; cognitive-behaviour, and/or mindfulness-based cognitive therapy would be ideal, however this programme and manual are designed in such a way as to not be a requirement. Suggested readings are provided at the beginning of each session for the facilitator without knowledge of the psychological perspectives previously noted. These readings provide the background knowledge needed to successfully implement each session for those without experience in these perspectives and can also serve as reinforcement for those with experience in these perspectives.

### **Suggested Readings**

Beck, J. S. (1995). *Cognitive therapy: Basics and beyond*. New York, NY: The Guilford Press.

Kabat-Zinn, J. (1990). *Full catastrophe living*. New York, NY: Delacorte Press. Mindfulness-Based 185

Kabat-Zinn, J. (1994). *Wherever you go there you are: Mindfulness meditation in everyday life*. New York, NY: Hyperion.

Kabat-Zinn, J. (2005). *Guided mindfulness meditation* [CD]. New York, NY: Sounds True.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression*. New York, NY: The Guilford Press. Mindfulness-Based 186

## Session One

The first session serves to provide an introduction to the programme facilitator, to the guidelines that dictate the group counselling relationship, to the programme, and to establish goals for the participants. After the introductions and overview of the programme, the participants will have a better understanding of the approach, how the sessions will transpire, and lay out of the foundation for future sessions.

### Session Content

A. The first activity requires setting the agenda. The sequential order for setting this session agenda includes: (1) an introduction; (2) a description of counselling guidelines; (3) a description of the time, frequency, and duration of sessions; (4) a description and rationale for session structure; (5) a description of the rationale and activities for this programme; (6) homework assignment; (7) an open discussion; (8) and a summary of the session.

B. The facilitator will introduce himself or herself to the participants. A brief discussion about their background and their function within the prison system should occur. The background information, namely the group's collective TBI history (summary of information) and willingness to engage that the facilitator has about the participants should be broadly discussed. The participants should be allowed to clarify or add additional information about themselves during this time should they wish.

C. The counselling guidelines are established. This includes confidentiality issues and termination of programme guidelines (Jacobs & Hartshorne, 2003).

D. Issue a statement about the time (approximately 90 minutes), frequency (two times per week), and number of sessions (ten-sessions) for the programme.

E. A description and overview of the session structure is provided. The rationale for using this structure should follow the overview. It should be described as an approach to session structure that facilitates activity completion for each session. Since there are time constraints for each session, using this approach will decrease the likelihood of not covering all activities and topic areas. It also provides consistency and structure to the sessions and the overall programme. The participants are able to place a topic on the agenda, which is covered under the open discussion. The facilitator encourages the participants to provide topics for this allotted time. This provides a sense of collaboration to the participants. Agreement on this format between the facilitator and participants should be secured before continuing.

F. The rationale for this programme is provided. The programme is described as a psychoeducational approach to TBI and anger-management that incorporates specific activities that will increase the likelihood of effectively handling challenging emotions. The concept of psychoeducation is described as a learning process that will teach participants to identify the thought processes that occur in response to situations, how these thought processes affect mood, perception, and physiology, and how these concepts influence behaviour. The mindfulness approach is described with the use of a hand out (see Hand out 1.1) that contains various definitions and by explaining that mindfulness cultivates awareness, which will allow an individual to be more able to engage in activities that will ultimately lead to more desirable outcomes. Mindfulness practice will foster the skill of awareness. With greater awareness will come a greater ability to engage in cognitive behavioural activities and exercises at the time of the event.

G. Issue a statement explaining that this programme utilizes both psychoeducational activities and mindfulness activities. These activities include goal setting, education about TBI and anger, identifying triggers, assertiveness training, problem-solving, breathing exercises, meditation, and mindfulness perspective taking.

H. The homework assignment for this session requires the participants to describe during the next session their goals for participating in this programme. The participants are instructed to write their goals on the Goal Sheet hand out (see Hand out 1.2). This assignment can be as simple as a single statement or goals presented in a bullet format.

I. The participants are offered the opportunity to ask any questions or make any comments following the homework assignment.

J. The facilitator should summarize the session by reviewing all activities following the introduction. This is accomplished by issuing statements that this programme is a psychoeducational programme that teaches individuals the cognitive, affective, physiological, and behavioural impact of TBI and components of anger, that all sessions will follow the same format, that this programme utilizes the cognitive-behaviour and the mindfulness approaches and activities, and a review of the homework assignment.

K. A time and date is established for the next session.

**Hand outs:**

Hand out 1.1 Definitions of Mindfulness

Hand out 1.2 Goal Sheet

## **Handout 1.1**

### *Definitions of Mindfulness*

"Mindfulness means awareness centred on the here and now without excessive preoccupation with memories of the past or fantasies about the future"

Horowitz (2002)

"(Mindfulness) ... moments of peace and stillness, even in the midst of activity"

Jon Kabat-Zinn (1990)

"Mindfulness means paying attention in a particular way: on purpose, in the present moment, and non-judgementally."

Jon Kabat-Zinn (1994)

*Mindfulness=Awareness*

## Handout 1.2

### *Goal Sheet*

**Directions:** Please list your goal(s) for participating in this programme. It is important that you use 'SMART' goals that are Specific, Measureable, Achievable, Realistic and Time bound.

Goal:

Goal:

Goal:

Goal:

## Session Two

The second session serves to provide an introduction to TBI and the impact on people following TBI. The session's contents are educational in nature. The goal of the session is to educate participants in the physiological, the cognitive, the affective, and the behavioural aspects of TBI and anger. This will lay the foundation for future activities and provide valuable insight into the processes related to TBI and anger. The homework assignment is an extension of session content. It serves as a reinforcement exercise, as well as providing perspective to how TBI and anger is experienced and handled in the "real world" setting. The Assertiveness Worksheet has participants generate solutions and behaviours to scenarios in an assertive versus aggressive, passive, or passive-aggressive nature.

### Suggested Readings

Beck, J. S. (1995). *Cognitive therapy: Basics and beyond* (pp. 25-62). New York: The Guilford Press.

### Session Content

A. The first activity entails setting the agenda. The sequential order of the agenda for this session include: (1) the link between TBI and thoughts/emotions; (2) a mood check-in, (3) a review or bridge from the previous session, (4) a review of the homework, (5) a psycho-educational exercise on the cognitive-behavioural model and how this model is applied to TBI, (6) an assigning of homework, (7) an open discussion, (8) and a summary and feedback discussion.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in is a rating of the participant's anger that was experienced between sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)". Clarification might need to be made as to what these numbers mean or how a value is assigned. This can be clarified by also issuing the statement, "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." This self-report evaluation can be used for comparison purposes in the future and provides the facilitator with information as to the participant's recent functioning. Each participant will have their own self-evaluation of their mood.

D. The review of the previous session follows the mood check-in. The core objectives and activities of the previous session contained a discussion about how sessions will be structured, how this programme utilizes a psychoeducational approach, how the mindfulness approach and activities will be incorporated into this programme, and how homework assignments will

be assigned between sessions. Issuing a statement to elicit any questions that might have been formulated between sessions should be made. Time to answer any questions should be given. If there are no questions, then proceed to the next activity.

E. A review of the homework assignment follows the review. The homework assignment between sessions entailed the participants formulating goals for participation. The Goal Sheet should be reviewed. The participant's goal(s) should be acknowledged, and if this/these goal(s) appear to be achievable, then a statement about the positive likelihood should be made. If the goal(s) appear(s) too broad, unrelated to anger-management improvement, or unachievable, then a refining or rewording of the goal(s) can be discussed.

This evaluation must be made with collaboration between the participants and facilitator. Since the focus of this programme is on psychoeducation, on perspective building, on teaching effective strategies to deal with symptoms of TBI including anger, and on teaching maintenance strategies, the participant's goal(s) need(s) to be framed within these parameters. If appropriate goals cannot be formulated after collaboration, then the participant should be referred to another counsellor or support person within the prison.

F. The psychoeducational component follows the bridge from the previous session. This component begins with a discussion about TBI and anger. This programme considers anger to be defined as an emotional state that is experienced on multiple levels. These levels include the cognitive, the affective, the physiological, and the behavioural. The participants are asked to explain what they think this definition means. Collaboration between the participants and facilitator might be needed, and is encouraged. Since this programme's definition of anger is broad, more specific descriptions should be elicited from the participants. This will promote a more personal understanding, or frame of reference, of the emotion. Next, the participants are taught about the cognitive behavioural model. This can be done through using personal examples of situations that evoked anger. First, explain how situations, or events, evoke thoughts, which result in emotions, which creates physiological changes in the body, which eventually influences behaviour. Ask the participants for an event that led them to act in a negative manner. Examples can be used to explain how an activating event evokes cognitions. Issue statements that people are thought to largely bring their beliefs into play when activating events occur. Beliefs are the cognitions, thoughts, and ideas people hold as true. These cognitions evoke an emotional response. In this example, anger is the most likely emotion evoked. The feeling of this emotion evokes physiological changes in the body. This process then influences how individuals react. It might be helpful to use a model of this process. The Cognitive Model Worksheet (see Hand out 2.1) is a visual representation of this model and will provide a more concrete reference in order to grasp this interplay of concepts. Explaining the components of each concept, at each stage in the process, is essential. It might be helpful to use the participant's example of an anger-provoking situation during the explanation.

G. The assigning of homework is the next activity. The Assertiveness Worksheet (see Hand out 2.2) is to be completed by the participants. This exercise requires an introduction to communication styles that are used when people interact. The Communication Styles for Interaction hand out (see Hand out 2.3) is given to the participants. The facilitator reads the hand out to the participants. The participants are instructed to use the hand out as a guide, or reference, when completing the homework assignment. The homework assignment requires the participants to respond to the scenarios presented in the worksheet in an assertive manner. The participants should be asked if they have any questions about the assignment.

H. The open discussion activity follows homework assignment. This agenda item is filled during the initial session agenda setting activity. If a question, or topic, was placed on the agenda at the beginning of the session, then this is the time to address the item placed on the agenda by the participants. If there was no item placed on the agenda at the beginning of the session, then the participants should be asked if any questions, or thoughts, have arisen during the session that have not been discussed. This process for the open discussion will be followed throughout each future session.

I. The review and summary activity follows the open discussion. The review and summary includes brief discussions about: the goals of the participants; the definition of anger; how anger fits into the cognitive-behavioural model; what it means to interact in an assertive manner; and the homework assignment.

Since this session's contents and activities will be shaped through the use of personal examples to convey the various concepts, the review and summary of the session should be framed within the context of the discussion.

J. An appointment should be made for the next session.

### **Hand outs**

Hand out 2.1 Cognitive Model Worksheet

Hand out 2.2 Assertiveness Worksheet

Hand out 2.3 Communication Styles for Interaction

Hand out 2.4 TBI information

**Handout 2.1**

***Cognitive Model Worksheet***

**EVENT»»BELIEFS»»EMOTION»»PHYSIOLOGY>>>>**

**BEHAVIOUR**

|                |            |         |              |              |
|----------------|------------|---------|--------------|--------------|
| <b>Trigger</b> | Thoughts   | Anger   | Heart Rate   | Fight/Flight |
|                | Ideas      | Anxiety | Sweat Glands | Aggression   |
|                | Cognitions | Sadness | Blood Flow   | Avoidance    |

**Hand out 2.2**

*Assertiveness Worksheet*

**Directions:** Respond to the situations below with an assertive response.

You receive a call from your partner and she is angry that you are in prison because she is struggling to manage the kids at home. She tells you she doesn't want to talk to you. You say,

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You have been on a long lock yesterday and this morning you have been told this is going to happen again and you won't be unlocked until after lunch. It is very hot and humid in your cell. Your cell mate has not had a shower today. You say,

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You have been rushing most of the afternoon after going to the gym and visits. You are very hungry and join the line for the microwave to heat your noodles. As you are second from the front a man jumps the queue and puts his noodles into the microwave. You say,

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You receive your parole board report from your case manager. The report states that you have been refusing to engage in rehabilitation programmes. You say,

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## Hand out 2.3

### ***Communication Styles for Interaction***

**Passive**-You let people walk all over you without saying anything about it. You don't want to cause any trouble or be a bother to others. You rarely make a choice, preferring to let others decide. You put the needs of others before your own and often feel resentful.

**Aggressive**-You settle your problems forcefully and don't care how others feel about it. You want your needs met and don't care how it affects others. You can be loud and don't listen well to what others say.

**Passive-Aggressive**-You are not outright aggressive but you use more passive means to express your aggressive intentions. You might not show up at your scheduled appointment or take medication because you are feeling angry with the staff.

**Assertive**-You solve your problems and stand up for yourself, but not without listening to others and considering their needs as well. You ask for what you want in a non-confrontational manner. You don't use aggression, like fighting, to solve your problems.

*While there are times that it is appropriate to be passive or aggressive, the generally preferred strategy for communication is assertiveness. It enables you to stand up for your rights and needs without causing more problems and conflicts in your life!*

## **Hand out 2.4: TBI information**

A traumatic brain injury (or TBI) occurs when there is an external force to the head (such as being hit in the head by a ball, being kicked or punched in the head or falling over and hitting the head on the ground). The impact can disrupt how the brain works and can make the person feel dazed and confused or find it difficult to remember what happened.

Sometimes people lose consciousness (get knocked out) after a brain injury, but this does not have to occur for a person to have experienced a brain injury. Doctors talk about traumatic brain injury in terms of being mild, moderate or severe. A concussion is a form of mild traumatic brain injury. Whilst called a 'mild' injury, its effects may not necessarily be mild for the person. The effects can also 'add up' so people who have experienced more than one injury may find they experience more difficulties or are slower to recover.

### **So, what does a brain injury “look” like?**

Brain Injury can be very difficult to see simply by looking at a person. It is often called the “invisible injury” because most of the problems involve thinking and emotions. Some brain injuries may also be difficult to see on a brain scan. Family members, friends and professionals may not “see” your brain injury at all, which can lead to a lot of frustration for everyone.



### **What does a brain injury “feel” like?**

#### **Survivors of brain injury say it feels like:**

Living in a cloud.

Getting really drunk.

Being hung-over 24/7.

Being in a hot tub way too long.

Waking up from fainting.

Looking inside your head & seeing mushroom soup.

Floating around weightless in a total black abyss with no gravity. Can't tell what is up, down or sideways. Can't get a handhold on anything.

Trying to read multiple posters in a dark room with a narrow beam flashlight. As soon as you move the beam to a new spot, the first spot you looked at disappears.

### **What happens after a brain injury?**

We used to think people recovered quickly after a brain injury, but we now know that people can experience a wide range of symptoms that can last for many years afterwards. Because brain injuries can be hard for other people to understand and because they can make it hard for the person to function in everyday life, brain injuries can affect employment, social relationships and behaviour.

For example, people can experience;

### **Physical Effects – This includes physical changes in body functions**

- ◆ Energy crashes – gets tired very easily, needs long naps to recover
- ◆ Sleep problems – can't get to sleep, wakes up frequently, can't wake up
- ◆ Headaches – very intense, sharp, burning or jolting
- ◆ Chronic pain – on-going pain in body
- ◆ Ringing in the ears – also known as tinnitus, often sounds like crickets
- ◆ Changes in senses – sight, smell, taste and hearing
- ◆ Changes in appetite – doesn't feel hunger, or never feels full after eating
- ◆ Altered body temperature – doesn't feel heat or cold, body temperature fluctuates
- ◆ Difficulty swallowing – coughs or chokes when eating or drinking
- ◆ Changes in speech – stutters, mixes words up
- ◆ Balance/co-ordination – loses balance, falls down, staggers when walking
- ◆ Paralysis/weakness – has noticeably less strength in arms or legs
- ◆ Numbness/tingling – feels like limb's falling asleep
- ◆ Muscle spasms – shaking, stiff or jerking muscles
- ◆ Seizures – convulsions

### **Cognitive Effects – This includes changes in thinking abilities**

- ◆ Difficulty focusing – mind seems to wander, easily distracted
- ◆ Memory problems – forget things short term, and/or spotty long term memories◆

- ◆ Slowed thinking – world feels too fast, can't keep up
- ◆ Flooding – brain gets overwhelmed and shuts down
- ◆ Trouble understanding – takes longer to learn
- ◆ Learning from experience – keeps doing the same things over and over
- ◆ Perseveration – excessive fixation on some thoughts, trouble letting go
- ◆ Rigid thinking – things are only “black & white”, there is no in-between
- ◆ Difficulty with planning or organising activities or making decisions

### **Psychosocial Effects – changes in emotions and social behaviour**

- ◆ Reduced self-awareness – not able to see yourself or your problems honestly
- ◆ Increased self-focus – see only their own needs, finds it hard to see others' point of view
- ◆ Emotional fluctuations – emotions are very intense, change rapidly, do not fit
- ◆ Depression – grieving over what is lost, sad, suicidal
- ◆ Anxiety and/or stress – feel stressed, jittery, restless, frightened
- ◆ Impatience and anger – has a quick temper, sometimes very threatening
- ◆ Impulsivity – acts without thinking first, with no thought to consequences
- ◆ Difficulty coping with change – can either be spur of the moment, or routine change
- ◆ Lower motivation and follow through – trouble getting started and finishing
- ◆ Changes in social skills – difficulties following socially acceptable behaviours
- ◆ Misperceptions – misunderstands people and things
- ◆ Changed sexual interest – has either decreased or increased interest
- ◆ Relationship problems – difficulty with family, friends and spouse
- ◆ Use of alcohol/ drugs – self-medication to cope with daily problems
- ◆ Reduced ability to work – cannot keep pace, cannot return to old job
- ◆ Changes in self-identity – changes in personality, does not know how to define self

Accessed from: <http://nbia.ca/symptoms-brain-injury/>

The effects of a brain injury can be very different for different people. Some people may recover within a few days or weeks, but many people find that they can't do things as well as

they used to which can be very frustrating. In general, the symptoms should lessen over time as the brain heals. , but may worsen because of the survivor's inability to accept help, or adapt to the brain injury. For this, and other reasons, it is not uncommon for psychological problems to surface, and worsen after brain injury. The good news is that many of these challenges are easily dealt with using compensatory, or coping strategies.

### **What can help?**

Taking regular breaks. Having a rest does not mean sitting down and using the computer, making a phone call, watching TV or listening to your music as this actually is hard work for the brain. Resting a brain injury means going for a walk in the exercise yard or sitting quietly in your cell, ideally with the lights off,

Making sure you get enough sleep. Sleep is vital to how we function, it helps the body repair itself. Poor sleep can make people feel tired, find it harder to think and function; and increases the risk of accidents or emotional outbursts. After a brain injury the effects of poor sleep can make symptoms even worse. Some people find it helpful to have a 20-30 minute rest late morning or early afternoon if they are starting to feel tired or irritable. You can achieve this during the lunch time lock. Avoid napping after 4pm as this can make it harder for you to fall or stay asleep at night.

Physical activity can help. It is best to take part in physical activity in the morning or late afternoon. When not in prison it is important to remember that if you exercise late at night, the chemical changes that occur in the body with activity will make you feel more alert and awake and will make it harder to fall asleep. It is best to build up the amount of activity you do gradually. The body can find it harder to recover if you push yourself too much too soon.

Talking to a health professional about any difficulties can be helpful as they may be able to suggest things to help you to cope

Change what you are doing regularly, trying to focus on one thing for several hours can be exhausting to the brain, doing things in shorter blocks of time (such as 20 minutes) and then having a 5 minute break can be easier to get things down.

### Session Three

Session three begins to introduce the first of the mindfulness activities. Although the first session contained an introduction to mindfulness, this session will utilize a mindfulness exercise. The Thoughts and emotions exercise will be introduced. It is the starting point of mindfulness practice in this programme because it is believed that one must become mindful of the thoughts, breath and body in order to gain greater awareness of the self. This exercise is important to the programme because anger is generally felt so strongly throughout the body.

The aim of this exercise is to bring detailed awareness to thoughts and emotions and where they are experienced in your body. It will help to develop concentration, calmness, attention, and mindfulness. This exercise will hopefully foster greater awareness of the body's physiological responses to anger-provoking situations. Once one becomes mindful of their thoughts and body, then he will have a greater opportunity to handle emotions in a more appropriate way. Be sure to use a quiet room and surrounding environment for this exercise. Distractions, interruptions, and noisy environments will likely detract from the exercise. Practicing this exercise and an additional cognitive-behavioural exercise will encompass the homework assignment. The Anger Provocation Triggers exercise will begin the process of self-exploration and understanding of how anger affects him/her on different levels (Rose, 1998).

It entails the examination of anger on a personal level through the cognitive behavioural model (Friedberg & McClure, 2002). This exercise will become a key to implementing future intervention strategies of the programme.

#### Publications.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression* (pp. 99-125). New York, NY: The Guilford Press.

#### Session Content

A. The agenda setting exercise is the first activity for session three. The agenda will include: the link between TBI and thoughts/emotions; the mood check-in; the bridge from the previous session; the homework review; the introduction to the Thoughts and emotions exercise; the open discussion; the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in the second session. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. A brief discussion about the goals that were set by the participants, the definition of anger, how anger fits into the cognitive-behavioural model, and what it means to interact in an assertive manner. This should lead to a review of the homework assignment.

E. The review of the homework assignment entails having the participants read aloud the assertive responses to the scenarios provided on the worksheet. Evaluation and collaboration between the participants and facilitator might be needed to respond to scenarios in an assertive manner. Alternative responses might be necessary, but the participants should not be made to feel that the responses provided are wrong. A review of the possible interaction styles might be necessary if it appears that the participants have not grasped the concept. If there are no questions, and if the facilitator feels the participants have grasped the concept, then move on to the next item on the agenda.

F. The thoughts and emotions meditation is the next item on the agenda. Inform the participants that the next activity is an exercise in awareness. Inform them of the name of the exercise. Inform them that this exercise involves intentionally attending to various thoughts and emotions. The objective for doing the thoughts and emotion exercise is to become aware of physical sensations in the body. This will be accomplished by attending to one's breath, while moving one's mind through the different parts of the body. This exercise entails bringing awareness to a particular part of the body, to hold it in awareness for a short period of time, and to release and "let go" of that part of the body before moving on to the next part. Inform the participants that throughout the upcoming dialog that these instructions are guides, that there is no right or wrong ways to do this exercise, and that stray thoughts, or distractions, are normal. These distractions and thoughts are not to be avoided or suppressed. They are going to happen. They should be acknowledged and observed. Follow the dialogue as outlined in the Thoughts and emotions Meditation hand out (see Hand out 3.1).

G. Following the thoughts and emotions exercise, it is important to discuss how the experience went for the participants. It might be helpful to remind them that success or failure is not the proper outlook. It is important that the facilitator embrace the participant's difficulties as positive events. The aim of the exercise is to become aware of whatever one feels, or thinks, at the time.

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in Session Two.

I. Assigning homework is the next activity on the agenda. The homework assignment entails completing the Anger Provocation Triggers worksheet (see hand out 3.2). An anger trigger needs to be explained to the participants. Asking what they think an anger trigger means is helpful at first. If the definition provided is sufficient, then explain the homework assignment. If the definition provided needs further clarification, or development, then provide the participants with a definition. The main idea is to convey that an anger trigger is an event, or even possibly a thought, which occurs. When it does, this occurrence initiates a change in mood, thought, or body functioning that sets a course for anger to be experienced and potentially negative behaviours to be exhibited. Ask the participants to list two, or more, personal anger triggers. The worksheet also requires listing how often these anger triggers occur and how angry they become as a result of the trigger. The other homework assignment requires the participants to practice the body scan exercise once between sessions. It will be helpful to express to the participants that finding a quiet place to practice this exercise either in their cell or a corner of the exercise yard will help minimize distractions.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the assertiveness exercise completed as homework, about the body scan exercise, about the difficulties experienced during this meditation exercise, and about the homework assignments.

K. A meeting should be scheduled for the next session.

**Hand outs**

Hand out 3.1 Thoughts and emotions Meditation

Hand out 3.2 Anger Provocation Triggers

### Handout 3.1

#### *Thoughts and emotions*

**Background:** Feelings are often labelled as positive (happy, confident, joyful, brave, etc) or negative (sad, scared, hurt, angry etc). In mindfulness practice, feelings are not good or bad; they just are what they are – emotions that might be comfortable or uncomfortable, easy or difficult. We are often taught to feel that the experience of some feelings is wrong – “You mustn’t feel like that,” “Be positive,” “Don’t be sad/scared/hurt” – and that the experience of some feelings is right – “Be happy/brave,” “Lighten up,” “Move on, get over it.”

This exercise is simply about noticing whatever you are feeling, at the moment you are feeling it, with a gentle, non-judgmental acceptance and curiosity.

Commence with mindfulness of the breath.

Allow yourself now to notice any emotions or feelings you are experiencing. If names for these emotions come that is fine – if they don’t, just be aware of them vaguely.

Notice where they are located in your body – your head, throat, chest, stomach, abdomen, gut? Notice if the physical sensation moves, drifts or shifts.

Notice what they make you feel like – nauseous, queasy, calm, relaxed, tense?

Notice any thoughts that come with the emotions – be aware of them just as thoughts, curiously and without judgment.

Allow yourself to just sit with and notice with awareness the shifting and movement of thoughts, feelings and physical sensations in your body.

Finally, bring your awareness back to your breath for a couple of minutes.

Accessed from: <https://www.livingwell.org.au/wp-content/uploads/2012/11/9-ThoughtsSensationsEmotions1.pdf>

**Hand out 3.2**

***Anger Provocation Triggers***

**Directions:** Please list below at least two situations, thoughts, or events that occur that cause you to feel angry. Indicate how often this tends to happen to you on average (e.g., 1x/day, 5x/week). Finally, indicate how angry you feel when the anger trigger occurs on a scale from 1 to 10, with 1 equal to "not very angry" and 10 equal to "extremely angry."

| <b>Anger Trigger</b> | <b>How Often</b> | <b>How Angry</b> |
|----------------------|------------------|------------------|
|                      |                  |                  |
|                      |                  |                  |
|                      |                  |                  |
|                      |                  |                  |
|                      |                  |                  |
|                      |                  |                  |
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## Session Four

The fourth session contains exercises that are both cognitive-behaviourally based and based on the practice of mindfulness. Now that the participants have identified personal anger triggers, the first aim of this session is to establish the connection between an anger trigger and subsequent thoughts, feelings, physiological changes, and behaviours. This discussion will build upon the discussion held in session two, and will reinforce the concepts of the cognitive behavioural model that were previously introduced. The other aim of this session is to transition from the thoughts and emotions exercise introduced in the previous session, which focused on bringing awareness to parts of thoughts and emotions, to the Sitting Meditation exercise (Segal et al., 2002), which focuses on bringing awareness and attention to the breath. The connection between the cognitive-behavioural exercise and the mindfulness exercise will begin to emerge. It is believed that once a greater ability to understand the cognitive-behavioural processes involved in anger is established and a greater ability to attend is established through mindfulness practice, then the better equipped one will be to effectively deal with their anger.

Once again, be sure to use a quiet room and surrounding environment for the meditation exercise.

### Suggested Reading

Kabat-Zinn, J. (2005). *Sitting meditation*. On *Guided mindfulness meditation*[CD]. New York, NY: Sounds True.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression* (pp. 157-188). New York, NY: The Guilford Press.

### Session Content

A. The agenda setting exercise is the first activity for session four. The agenda will include: the link between TBI and thoughts/emotions; the mood check-in; the bridge from the previous session; the homework review; the thoughts, feelings, and behaviours exercise, the introduction to the Sitting Meditation exercise; the open discussion; the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the thoughts and emotions exercise, obstacles confronted during the exercise, and anger triggers.

E. The review of the homework entails first discussing the participant's experience of practicing the thoughts and emotions exercise sessions. This discussion should include any further barriers that the participants might have had during practice. The anger triggers worksheet is the next activity that requires discussion. The personal anger triggers listed by the participants should be reviewed. This review will lead to the next activity on the agenda.

F. The Thoughts, Feelings, and Behaviours exercise is the next activity on the agenda. Remind the participants of the Cognitive Model exercise from Session Two. A review of the concepts would be beneficial. One of the anger triggers listed by the participants should be used as an example to relate how this event affects the individual. The connection between how an event causes thoughts and feelings to occur should be discussed. The participants should be asked what thoughts, what feelings, what bodily sensations, and what images go through their mind when this anger trigger occurs. Through the use of their statements, their thoughts, feelings, and physiological sensations should be identified. The facilitator should work collaboratively with the participants on this exercise. The participants should be asked what behaviours typically occur in response to the anger trigger. The relationship between one's cognitive processes and behaviour can be established at this point.

G. The Sitting Meditation is the next exercise on the agenda. The participants should be asked to get in a comfortable sitting position. A position that is comfortable, yet still having a proper posture, is most desirable. Once this is established, the participants are asked to bring attention to the breath. The focus is to pay close attention to the breathing process. Each inhale and exhale should be attended to through its full course. The participants should be made aware that the mind is expected to drift from attending to the breath. When this happens, they are instructed to take note of the thought that made them wander, then simply bring attention back to the breath. Wandering from attention to the breath and becoming able to bring attention back will improve the ability to attend in other areas of life. This exercise should last for approximately ten minutes. Follow the Sitting Meditation hand out (see Hand out 4.1) for complete transcript instructions.

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

I. The homework assignment between sessions will consist of practicing the sitting meditation exercise. The participants are asked to practice for one ten minute session. After practicing, the participants should be asked to write any comments down about the practice session. These comments can include obstacles or any thoughts that occur during practice. It will be helpful to express to the participants that finding a quiet place to practice this exercise in their cell or a quiet corner of the exercise yard will help minimize distractions and reduce obstacles.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the Thoughts, Feelings, and Behaviours exercise, the Sitting Meditation exercise, about the difficulties experienced during this meditation exercise, and about the homework assignment.

K. A meeting should be scheduled for the next session.

### **Hand outs**

## Hand out 4.1 Sitting Meditation

## Hand out 4.1

### *Sitting Meditation*

1. Settle into a comfortable sitting position. Allow your back to adopt an erect, dignified, and comfortable posture. Gently close your eyes.
2. Bring your awareness to the level of physical sensations by focusing your attention on the sensations of touch and pressure in your body where it makes contact with the floor and whatever you are sitting on. Spend a minute or two exploring these sensations.
3. Now bring your awareness to the changing patterns of physical sensations in the lower abdomen as the breath moves in and out of your body.
4. Focus your awareness on the sensations of slight stretching as the abdominal wall rises with each in breath and of gentle deflation as it falls with each outbreath. As best you can, follow with your awareness the changing physical sensations in the lower abdomen all the way through as the breath enters your body on the in breath and all the way through as the breath leaves your body on the outbreath. Perhaps noticing the slight pauses between one in breath and the following out breath, and between one out breath and the following in breath.
5. There is no need to try to control the breathing in any way. Let the breath breathe itself. As best you can, also bring this attitude of allowing to the rest of your experience. There is nothing to be fixed, no particular state to be achieved. As best you can, simply allow your experience to be your experience, without needing it to be other than it is.
6. Your mind will wander away from the focus on the breath in the lower abdomen to thoughts, daydreams, and drifting along. This is perfectly all right. This is what minds do. When you notice that your awareness is no longer on the breath, gently congratulate yourself. You may want to acknowledge briefly where the mind has been. Then, gently bring the awareness back to a focus on the sensations in the lower abdomen.
7. As best you can, congratulate yourself each time on reconnecting with your experience in the moment, gently escorting the attention back to the breath, and simply resume following in awareness the changing pattern of physical sensations that come with each in breath and outbreath.
8. As best you can, bring a quality of kindness to your awareness, perhaps seeing the repeated wanderings of the mind as opportunities to bring patience and gentle curiosity to your experience. Adapted from Segal, Williams, and Teasdale (2002)

## Session Five

At this point in the programme, the participants have begun to establish a mindfulness practice in their life. Session five is designed to continue and support mindfulness practice. The session includes a ten-minute sitting meditation practice session, where the attention will remain on the breath. Along with the sitting meditation, an additional meditation exercise is introduced called the 3- Minute Breathing Space. Segal et al. (2002) described this exercise as a "mini meditation." The aim of this exercise is to bring mindfulness practice to everyday life. The eventual goal of this exercise is to have the participants incorporate this exercise as a coping mechanism in the future when anger provoking events occur. The cognitive-behavioural activity for this session includes an introduction to the Anger-Provoking Events Calendar exercise. Previous sessions have discussed the cognitive-behavioural model with respect to anger and personal anger triggers. This exercise will draw upon those discussions and require the participants to record and track anger provoking situations in their life.

### Suggested Reading

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression* (pp. 157-188). New York, NY: The Guilford Press.

### Session Content

A. The agenda setting exercise is the first activity for session five. The agenda will include the link between TBI and thoughts/emotions; the mood check-in; the bridge from the previous session; the homework review; sitting meditation practice; an introduction to the 3-Minute Breathing Space exercise; the open discussion; the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the sitting meditation exercise and the Thoughts, Feelings, and Behaviours discussion.

E. The review of the homework entails first discussing the participant's experience during practicing the sitting meditation between sessions. This discussion should include any further barriers or comments that the participants might have had during practice.

F. Sitting meditation practice is the next exercise on the agenda. This exercise should be practiced for approximately ten-minutes. Following practice, there should be a brief discussion about the experience.

G. An introduction to the 3-Minute Breathing Space is the next activity on the agenda. Describe to the participants that this exercise is designed to start bringing mindfulness into everyday life. There are three steps to the exercise.

The first step is to recognize and acknowledge where one is at that moment. The next step involves bringing attention to the breath. The third step involves extending awareness to include the breath and the body as a whole. Follow the 3-Minute Breathing Space transcript (see Hand out 5.1).

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

I. An introduction to the Anger-Provoking Events Calendar follows the open discussion. Using the Anger-Provoking Events Calendar worksheet (see Hand out 5.2), describe the aspects of the worksheet. Ask the participants to list at least one situation that provoked anger. An example might be beneficial to further explain the worksheet. It might be helpful to use one of the participant's anger triggers or refer back to the previous discussion in which the cognitive-behavioural model was explained. The worksheet requires the participants to indicate whether they are aware of their anger at the time of the event, to indicate how their body felt during the event, to indicate their thoughts during the event, to indicate their reaction(s) to the event, and to indicate what thoughts they now had after the event. Additional homework assignments between sessions will consist of practicing the sitting meditation exercise and the 3-minute breathing space. The participants are asked to practice the sitting meditation for one ten-minute session. After practicing, the participants should be asked to write any comments down about the practice session. These comments can include obstacles or any thoughts that occur during practice. The participants are also asked to practice the 3-minute breathing space exercise three times a day.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the sitting meditation exercise, about the difficulties experienced during this meditation exercise, about the 3-minute breathing space, and about the homework assignments.

K. A meeting should be scheduled for the next session.

### **Hand outs**

Hand out 5.1 3-Minute Breathing Space

Hand out 5.2 Anger-Provoking Events Calendar

## **Hand out 5.1**

### *3-Minute Breathing Space*

#### **1. Awareness**

Bring yourself into the present moment by deliberately adopting an erect and dignified posture. If possible, close your eyes. Then ask: "What is my experience right now ... in thoughts ... in feelings ...and in bodily sensations?"

Acknowledge and register your experience, even if it is unwanted.

#### **2. Gathering**

Then, gently redirect full attention to breathing, to each in breath and to each outbreath as they follow, one after the other. Your breath can function as an anchor to bring you into the present and help you tune into a state of awareness and stillness.

#### **3. Expanding**

Expand the field of your awareness around your breathing, so that it includes a sense of the body as a whole, your posture, and facial expression. *The breathing space provides a way to step out of automatic pilot mode and reconnect with the present.*

The key skill in using Mindfulness Based Cognitive Therapy (MBCT) is to maintain awareness in the moment. Nothing else.

From Segal, Williams, & Teasdale (2002)

**Hand out 5.2**

*Anger-Provoking Events Calendar*

**Directions:** Please complete each section, the best you can, after you have experienced an anger trigger.

| Trigger | Awareness<br>(Y/N) Body | Experience Reaction<br>Thoughts | Thoughts After |
|---------|-------------------------|---------------------------------|----------------|
|         |                         |                                 |                |
|         |                         |                                 |                |
|         |                         |                                 |                |
|         |                         |                                 |                |
|         |                         |                                 |                |
|         |                         |                                 |                |
|         |                         |                                 |                |

## Session Six

Session six focuses on practicing the meditation exercises introduced to this point in the programme. Practice during session meetings is important because it gives the facilitator an opportunity to work through barriers and obstacles with the participants following practice. Homework assignments are reinforcing and adding to session discussions and are establishing a mindful lifestyle for the participants, however ensuring that the participants are completing homework assignments between sessions is left to the participants. This session will discuss how to use and bring the mindfulness perspective to everyday life. Using the 3-minute breathing space exercise as a coping technique when anger-provoking situations occur is the focus of this session. The various cognitive-behavioural exercises discussed to this point in the programme should have established the groundwork for identifying and becoming aware of anger's effect on individuals.

This heightened awareness is used in conjunction with the mindfulness exercises to provide a strategy for effectively dealing with anger.

### Session Content

A. The agenda setting exercise is the first activity for session six. The agenda will include the link between TBI and thoughts/emotions; the mood check-in; the bridge from the previous session; the homework review; sitting meditation practice; an introduction to the 3-minute breathing space exercise as a coping strategy; the open discussion; the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the sitting meditation exercise and the 3-minute breathing space exercise.

E. The review of the homework entails first discussing the participant's experience during practicing the sitting meditation and 3-minute breathing space exercises between sessions. This discussion should include any further barriers or comments that the participants might have had during practice. The Anger-Provoking Events Calendar should be reviewed after discussing homework meditation practice. Reviewing the worksheet will give the facilitator an

opportunity to work collaboratively with the participants. This review will provide an assessment of how well the participants are grasping the cognitive-behavioural model as it applies to anger. Clarification and further discussion about the model might be necessary at this time.

F. Sitting meditation practice is the next exercise on the agenda. This exercise should be practiced for approximately ten-minutes. Following practice, there should be a brief discussion about the experience.

G. Using the 3-minute breathing space as a coping mechanism is the next item on the agenda. Issue a statement expressing that the 3-minute breathing space is going to be used at times when anger-provoking events occur in addition to the times it is practiced during the day. The facilitator should discuss with the participants that when the awareness of anger occurs, which might be due to a trigger, random thought, or physiological change that the 3-minute breathing space can be used to effectively deal with the emotion. This can be accomplished through two ways. The participants are instructed to either practice the breathing space as they would during scheduled practice or to simply bring awareness to what is happening in the mind and body at the time anger is being experienced. Since anger-provoking events can occur randomly, the ability to follow the usual 3-minute breathing space exercise might not be possible, or recommended. Momentarily bringing awareness to the breath, mind, and body, will foster the ability to appropriately respond to the emotion. The participants should be encouraged to use the skills they have learned to this point in identifying and becoming aware of cognitions, physiological changes, and behaviours related to anger in order to use this coping strategy and be reassured that the ability to do so is within their grasp.

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

I. Homework assignment is the next item on the agenda. The homework assignments between sessions will consist of practicing the sitting meditation exercise, the 3-minute breathing space exercise, and attempting to use the 3-minute breathing space as a coping mechanism. The participants are asked to practice the sitting meditation for one ten-minute session, and practice the 3 minute breathing space exercise three times a day. The participants are also asked to write down on the Anger-Provoking Events Calendar worksheet the attempts that were made to use the new coping strategy.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the sitting meditation exercise, about the 3-minute breathing space exercise as a coping mechanism, and about the homework assignments.

K. A meeting should be scheduled for the next session.

## Session Seven

The emphasis of session seven is on the mindfulness perspective and practice. The Attitudinal Factors exercise focuses on Kabat-Zinn's (1990, 1994) attitudinal factors and how they are related to experiencing life. Kabat-Zinn explains that the attitudinal factors are at the core of mindfulness practice. They cultivate awareness, enable one to build a strong meditation practice, and are, in turn, strengthened through mindfulness practice.

### Suggested Readings

Kabat-Zinn, J. (1990). *Full catastrophe living* (pp. 31-46). New York, NY: Delacorte Press.

Kabat-Zinn, J. (1994). *Wherever you go there you are: Mindfulness meditation in everyday life* (pp. 35-64). New York, NY: Hyperion.

### Session Content

A. The agenda setting exercise is the first activity for session seven. The agenda will include the link between TBI and thoughts/emotions; the mood check-in, the bridge from the previous session, the homework review, sitting meditation practice, the introduction to the Attitudinal Factors exercise, the open discussion, the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the sitting meditation practice and the 3-minute breathing space exercise as a coping mechanism. This brief review should lead the session into the next activity.

E. The review of the homework entails first discussing the participant's experience during practicing the sitting meditation and 3-minute breathing space exercises between sessions. This discussion should include any further barriers or comments that the participants might have had during practice. The Anger-Provoking Events Calendar should be reviewed after discussing homework meditation practice. The homework assignment asked the participants to document on the worksheet any occasion where they used the 3minute breathing space as a coping mechanism. Reviewing the worksheet will provide an opportunity to discuss the use

of the exercise as a coping mechanism. The barriers and obstacles to using the exercise as a coping mechanism might become evident. Remember, simply becoming aware of the breath when experiencing anger will influence how they experience the emotion. The participants might need further encouragement to simply become aware of the breath or to implement the full 3-minute breathing space exercise.

F. Sitting meditation practice is the next exercise on the agenda. This exercise should be practiced for approximately ten-minutes. Following practice, there should be a brief discussion about the experience.

G. The Attitudinal Factors exercise is the next item on the agenda. The facilitator should hand out the Attitudinal Factors worksheet (see Hand out 7.1). The attitudinal factors include non-judging, patience, beginner's mind, trust, non-striving, acceptance, and letting go. The facilitator should read through the worksheet with the participants. Each factor should be discussed thoroughly through a collaborative approach between the facilitator and participants. The facilitator might ask the participants the questions, "What do you think this attitudinal factor is attempting to say," and/or "Do you feel you already use this factor in your life," and/or "How do you think you can use, or apply, each attitudinal factor in your life."

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

I. Homework assignment is the next item on the agenda. The homework assignments between sessions will consist of practicing the sitting meditation exercise, the 3-minute breathing space exercise, and continued attempts to use the 3-minute breathing space as a coping mechanism. The participants are asked to practice the sitting meditation for one ten-minute session, and practice the 3-minute breathing space exercise three times a day. The participants are also asked to document on the Anger-Provoking Events Calendar worksheet the attempts made to use the new coping strategy.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the sitting meditation exercise, about the 3-minute breathing space exercise as a coping mechanism, about the Attitudinal Factors exercise, and about the homework assignments.

K. A meeting should be scheduled for the next session.

### **Hand outs**

Hand out 7.1 Attitudinal Factors

## Hand out 7.1

### *Attitudinal Factors*

*Non-judging* is assuming the stance of an impartial witness to your own experience. The habit of categorizing and judging our experience locks us into mechanical reactions that we are not even aware of and that often have no objective basis.

*Patience* means that we understand and accept the fact that sometimes things must happen in their own time. It requires us to be open to each moment as it is and to allow things to unfold in their own time.

The *Beginner's Mind* allows us to be receptive to new things. It allows us to be open to new possibilities. It helps prevent us from getting stuck in old patterns of thought based on our past experiences and knowledge.

*Trust* means taking responsibility for being yourself and learning to listen to and trust your own being. The more you trust yourself, the more that allows you to trust other people.

*Non-striving* means appreciating that often the best way to achieve your goals is to back off from striving for results and instead start focusing carefully on seeing and accepting things as they are, moment to moment.

*Acceptance* means seeing things as they actually are in the moment. You come to terms with things as they are and accept them. The sooner we are able to accept a problem, the sooner we are able to heal or grow from it.

*Letting go* means non-attachment to our thoughts and feelings. You purposely put aside the habit of elevating some experiences and rejecting other experiences.

You practice observing and letting your experience be what it is, whether it is negative or positive.

(Kabat-Zinn, 1990, 1994)

## Session Eight

The focus of session eight is on introducing the problem-solving process. Much of the literature (D'Zurilla & Nezu, 2001; Lochman, Whidby, & Fitzgerald) With some minor variations, the literature identifies the main components of the problem-solving process as including problem identification, generation of multi-response solutions; decision-making; and evaluation. The problem-solving exercise introduced in this programme will utilize a cognitive-behavioural approach to the problem-solving process. At this point in the programme, it is felt that the participants will also bring the mindfulness perspective to the problem-solving process. By previously teaching the cognitive-behavioural model and with mindfulness practice, the participants will be able to incorporate the two perspectives into the problem-solving process. These perspectives should influence the participants at each level of the problem-solving process.

### Suggested Readings

D'Zurilla, T. J., & Nezu, A. M. (2001). *Problem-solving therapies*. In Dobson, K. S. (Ed.), *Handbook of cognitive-behavioural therapies* (pp. 211-245). New York, NY: The Guilford Press.

Lochman, J. E., Whidby, J. M., & FitzGerald, D. P. (2000). *Cognitive behavioural assessment and treatment with aggressive children*. In Kendall, P. C. (Ed.), *Child & adolescent therapy: Cognitive-behavioural procedures* (pp. 64-66). New York, NY: The Guilford Press.

### Session Content

A. The agenda setting exercise is the first activity for session eight. The agenda will include the link between TBI and thoughts/emotions; the mood check-in, the bridge from the previous session, the homework review, sitting meditation practice, the introduction to the problem solving exercise, the open discussion, the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the attitudinal factors. Each attitudinal factor should be reviewed, and the participants should be asked if they have any questions about any factor.

E. The review of the homework entails first discussing the participant's experience during sitting meditation practice and 3-minute breathing exercises. This discussion should include any further barriers or comments that the participants might have had during practice. The Anger-Provoking Events Calendar should be reviewed after discussing homework meditation practice. The homework assignment asked the participants to document on the worksheet any occasion where they used the 3-minute breathing space as a coping mechanism.

F. Sitting meditation practice is the next exercise on the agenda. This exercise should be practiced for approximately ten-minutes. Following practice, there should be a brief discussion about the experience.

G. The introduction to the problem-solving process is the next item on the agenda. Use the Problem-Solving worksheet (see Hand out 8.1) as a visual aide when introducing this exercise. This exercise should be introduced by stating that all people have problems, that most problems can be handled effectively, and that problem-solving is usually more effective if not handled impulsively. By being able to stop impulsive reactions when problems occur, we can learn to respond to problems, which will ultimately lead to more effective ways to deal with problems. This is the point in which mindfulness practice enables greater awareness of a problem, and referring back to the cognitive-behavioural model enables greater awareness of physiological, cognitive, and affective changes when problems occur. Taking what has already been taught, we can apply this to the first step in the problem-solving process, which is called "problem identification." Placing the problem solving process in the context of the participant's problems might be useful.

The Anger Triggers and/or the Anger-Provoking Events Calendar worksheets might be helpful in identifying a persistent problem for the participants. If completing these forms has been problematic or not completed, then ask for a problem that the participants have recently faced. Problem identification involves acknowledging the problem as a problem and examining all the aspects of the problem. Once the problem has been identified, generating possible responses to the problem is the next process involved in problem solving. The participants should be asked to generate various potential responses to the problem. These responses should be recorded on the worksheet. The next step in the problem-solving process involves decision making. Among the various responses generated by the participants, a decision should be made with regard to what response would likely be most effective at resolving the problem. A review of potential consequences and outcomes should take place collaboratively between the participants and facilitator. This collaborative exercise will aide in the evaluation process, which is the last step in the problem-solving process. The participants should be encouraged to evaluate each response generated and choose among them the most effective means of resolving the problem. The participants should be informed that utilizing this process might not be readily available for use at the time of a problem, however with practice, which can be done following a problematic situation, when there is time to go through this process, this skill will develop for more immediate use.

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

I. Homework assignment is the next item on the agenda. The homework assignments between sessions will consist of practicing the sitting meditation and the 3-minute breathing space exercises. The participants are asked to practice the sitting meditation for one ten-minute session and practice the 3-minute breathing space exercise three times a day. The participants

are also asked to document on the Anger-Provoking Events Calendar worksheet the attempts made to use the problem-solving process between sessions.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the sitting meditation practice, about the problem-solving exercise, and about the homework assignments.

K. A meeting date and time should be established for the next session.

### **Hand outs**

#### 8.1 Problem-Solving

## **Hand out 8.1**

### *Problem-Solving*

Problem Identification»»»»

*Acknowledge the problem as a problem!*

Possible Responses»»»»

*How can I respond to the problem?*

Decision-Making»»»»

*What response 'would be most effective at resolving the problem?*

Consequences»»»»

*What are the consequences related to each decision?*

Evaluate

*Pick your response!*

## Session Nine

The focus of session nine is on review, reinforcement, and connecting the models discussed throughout this programme. The agenda for this session will include a review of previous mindfulness and cognitive-behavioural exercises. Reviewing past exercises provides an opportunity for clarification of any lingering questions, while also providing an opportunity for reinforcement of previously learned concepts. A summative exercise that connects the cognitive behavioural model with mindfulness practice is the core exercise of this session. Conveying how these two models can work together when experiencing anger is the goal of this session. Although there are no new exercises to be introduced during this session from either the mindfulness-based or cognitive-behavioural perspectives, it is an important session to the overall programme because it aids in the continuing development of a mindfulness practice and an effective approach to handling anger.

### Session Content

A. The agenda setting exercise is the first activity for session nine. The agenda will include the link between TBI and thoughts/emotions; the mood check-in, the bridge from the previous session, the homework review, sitting meditation practice, the connecting exercise between the cognitive-behavioural model and mindfulness, the open discussion, the assigning of homework; and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the problem-solving process, however this will be during the connecting exercise. Therefore, a statement should be issued that the problem-solving process will be further discussed shortly, but if there are any questions about the process, then they can be addressed at this time.

E. The review of the homework entails first discussing the participant's experience during sitting meditation practice and 3-minute breathing space exercises. This discussion should include any further barriers or comments that the participants might have had during practice. The Anger-Provoking Events Calendar should be reviewed after discussing homework

meditation practice. The homework assignment asked the participants to document on the worksheet any occasion where they used the 3-minute breathing space as a coping mechanism or when the participants engaged in the problem-solving process between sessions.

F. Sitting meditation practice is the next exercise on the agenda. This exercise should be practiced for approximately ten-minutes. Following practice, there should be a brief discussion about the experience.

G. The connecting exercise is the next item on the agenda. This exercise begins by reviewing the cognitive-behavioural model as it is related to anger. Activities and discussions from previous sessions utilized personal examples from the participants when explaining the model. The use of past discussion topics can be utilized, or any, more recent, examples that the participants have provided from homework assignments can be used. It is important to cover all aspects related to experiencing anger. This includes the cognitive, affective, physiological, and behavioural aspects. Incorporating the mindfulness exercises can be done at each level of the anger experience. The seven attitudinal factors can be applied to the cognitive aspect of anger influence, which then influences the other aspects related to anger. Mindfulness practice (i.e., meditation, 3-minute breathing space) instils greater awareness, which can influence each aspect related to anger. The goal of this discussion is to convey the idea that through changing the way one relates to the anger experience by using a mindfulness perspective, an individual can create a change in the way anger is experienced. This will ultimately lead to an effective way to respond to the emotion.

H. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

I. Homework assignment is the next item on the agenda. The homework assignments between sessions will consist of practicing the sitting meditation and the 3-minute breathing space exercises. The participants are asked to practice the sitting meditation for one ten-minute session and practice the 3 minute breathing space exercise three times a day. The participants are also asked to document on the Anger-Provoking Events Calendar worksheet the attempts made to use the problem-solving process between sessions.

J. The review and summary of the session is the next activity on the agenda. This includes brief discussions about the sitting meditation practice, about the connecting exercise, and about the homework assignments.

K. A meeting date and time should be established for the next session.

## Session Ten

The previous session concentrated on integrating all of the perspectives utilized in the TBI programme. The final session of this programme is designed to encourage introspection on the part of the participants. This is accomplished through reviewing the expectations and goals the participants held at the outset of the programme. Current knowledge and views are explored to assess the influence of the programme on the participants. This session is the final opportunity for questions to be addressed, for discussion on remaining obstacles and barriers, and for discussion on areas that continue to require improvement. The activities and discussions also focus on maintaining a mindfulness practice for the future.

### Session Content

A. The agenda setting exercise is the first activity for session ten. The agenda will include the link between TBI and thoughts/emotions; the mood check-in, the bridge from the previous session, the homework review, sitting meditation practice, a discussion about goal attainment, a discussion about obstacles and barriers left to overcome, a discussion about the work left to be done with respect to experiencing anger, the open discussion, the assigning of homework, and the review and summary.

B. People with a TBI often report that they struggle to manage their emotions after the incident, in part because of the injury itself, and in part because the injury causes particular symptoms such as difficulty in concentration and attention, decrease in memory and sometimes it is just harder to do every day activities and tasks.

These symptoms can in turn also contribute to an increase in emotions such as anger, anxiety and sadness. Anger is often an emotion that is reported by people who have had a TBI and this programme focuses particularly on building skills to help you manage your anger better, but these skills can also be applied to a whole range of emotions that you think gets in the way of living a life that feels meaningful and worthwhile.

C. The mood check-in will follow the same procedure as outlined in previous sessions. Issue a statement, "Thinking back since the time we last met, on average, how has your anger been on a scale from zero (0) to ten (10)." "Zero anger would suggest that you have been anger-free since we last met, and a ten would suggest that you have been so angry that you have lost control and hurt another person, yourself, or damaged something." Please record this self-evaluation for future reference.

D. The bridge from the previous session is the next item on the agenda. This should include a brief discussion about the integration of the two perspectives, if there are any questions about how the two perspectives can be used together, then they can be addressed at this time.

E. The review of the homework entails first discussing the participant's experience during sitting meditation practice and 3-minute breathing space exercises. This discussion should include any further barriers or comments that the participants might have had during practice. The Anger-Provoking Events Calendar should be reviewed after discussing homework meditation practice. The homework assignment asked the participants to document on the worksheet any occasion where they used the 3-minute breathing space as a coping mechanism or when the participants engaged in the problem-solving process between sessions.

F. Sitting meditation practice is the next exercise on the agenda. This exercise should be practiced for approximately ten-minutes. Following practice, there should be a brief discussion about the experience.

G. A discussion about goal attainment is the next item on the agenda. The Goal Sheet that was completed by the participants after the first session should be used to open the discussion. This discussion should be collaborative in nature, however the participant's perception as to whether their initial goal(s) was/were met should provide insight as to whether the programme was beneficial. Although the potential exists that the goal(s) was/were not met, the potential also exists that the programme had influence in other areas of the participant's life. If this is the case, then this should be explored. In the event that the programme was not felt to be beneficial, then the participants should be referred for another approach to counselling.

H. The next item on the agenda is a conversation about obstacles and barriers that are left to overcome. Due to the unpredictable nature of what obstacles are left to overcome, this discussion will be influenced by the participant's admissions. A collaborative discussion should ensue to problem-solve if possible, or in the spirit of the mindfulness perspective, the obstacle might need to be accepted.

I. The next item on the agenda is a discussion about what areas, or aspects, related to anger the participants continues to need improvement in. Once again, this discussion is unpredictable and subjective in nature. Generating a plan of action to facilitate improvement in these areas is important. The participants should end this programme with a feeling that they can continue to improve in areas of weakness. Once again, a referral for continued counselling might be necessary.

J. The open discussion is the next activity on the agenda. Follow the session content description for this activity as outlined in previous sessions.

K. Homework assignment is the next item on the agenda. The homework assignment for the future is to expand upon and maintain their mindfulness practice and utilize the exercises taught to them throughout the programme.

L. The review and summary of the session is the final activity on the agenda. This includes brief discussions about the sitting meditation practice, about goal attainment, about obstacles and barriers left to overcome, about the work left to be done with respect to experiencing anger, and about maintaining a mindfulness practice.

## Appendix D: Interview Documentation

### Participant Information Sheet

Interview



|                    |   |                        |                                   |
|--------------------|---|------------------------|-----------------------------------|
| Study title:       | <b>Understanding and managing Traumatic Brain Injury (TBI) in a South Auckland Corrections Facility</b> |                        |                                   |
| Locality:          | <b>Auckland South Corrections Facility (ASCF)</b>   | Ethics committee ref.: | <b>17/NTB/22</b>                  |
| Lead investigator: | <b>Tracey Mitchell</b>  | Contact phone number:  | <b>Via CMS Health application</b> |

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You are invited to take part in an interview following completion of a programme about managing distressing symptoms relating to a TBI using a talking intervention. Whether or not you take part is your choice. If you don't want to take part, you don't have to give a reason, and it won't affect the care you receive. If you do want to take part now, but change your mind later, you can pull out of the study at any time.

This Participant Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the interview, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, whānau, friends, or healthcare providers. Feel free to do this.

If you agree to take part in this interview, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 6 pages long, including the Consent Form. Please make sure you have read and understood all the pages.

**What is the purpose of the Interview?**

The purpose of this interview is to establish the experiences of men who were involved in the talking intervention which hoped to assist with the management of symptoms following a head injury.

The interviewer will not be known to you. They will ask questions where it is hoped you can share your experiences with us, so we can better understand whether the study has provided assistance and also understand some of the challenges and possible improvements that may be needed.

The interview is the final part of the process prior to the writing up of all of the study information

This research will contribute to some study I am doing. It is called a Doctorate of Philosophy (PhD). Whilst I understand I am also the Head of Healthcare this study is very separate to my role in the prison. You will not be advantaged or disadvantaged by participating in the interview. I will not be involved in the interview and I will not have access to any information where you will be identified as part of this study.

The study is currently being considered by the Northern Region Health and Disability Ethics Committee, the Auckland University Ethics Committee and the Kohuora Ethics Committee.

### **What will my participation in the study involve?**

You have been invited to participate in this interview because you have participated in the study intervention (talking therapy). You will not be identified in the interview except for your age, ethnicity, crime category and prison sentence. Your name will never be shared with anyone outside of the prison.

The interview will involve approximately one [1] hour of your time. It will occur in a private space in the healthcare centre. The interview will be audiotaped and will be transcribed by someone who does not know you. The interview will seek to understand your experiences of the group intervention and whether there were any learnings from it. The data will only be collected for the purposes of this research. You will not be identified in any information being shared with anyone else.

In total, should you wish to be involved in the interview we would ask you give us 1 hour of your time which will occur in one session.

### **What are the possible benefits and risks of this study?**

Sometime talking about your experiences can bring up sad or upsetting things which you may not find comfortable to discuss. Sometimes this can be very distressing.

Should you become upset during or after the interview the prison mental health nursing team will be available to support you. This can be done via the Custodial Management System (CMS) or you can talk with any of the healthcare team about your need for support. Should you become very distressed and feel at risk of harm to yourself or others then please talk to one of the officers immediately.

A cultural liaison person (Kapi Peita) and the prison chaplain (Graham Lackley) will also be available as part of the prison team should you have any issues you would like to discuss with them or additional support you may require.

This study will also help me to complete my study but this is not the primary focus.

### **Who pays for the study?**

There is no cost or payments to you to participate in this interview.

### **What if something goes wrong?**

If you were injured in this study, which is unlikely, you would be eligible **to apply** for compensation from ACC just as you would be if you were injured in an accident at work or at home. This does not mean that your claim will automatically be accepted. You will have to lodge a claim with ACC, which may take some time to assess. If your claim is accepted, you will receive funding to assist in your recovery.

### **What are my rights?**

Your participation in this study is voluntary. You are free to decline to participate, or to withdraw from the research at any practicable time, without experiencing any disadvantage. You have the right to access information about you which has been collected as part of this study.

You will be told of any new information about negative or positive effects relating to the study that may impact on your health.

Your privacy will be maintained as the psychologist and intern psychologist are the only people who will have access to your details within the research. I will only have access to information where your name has been removed and a special number assigned. No information will be shared with other people where you will be identified.

If you are unable to fully understand the information in this document the healthcare team can help you read all of the information about the study. It is very important that you understand what you are agreeing to and the amount of your time it will take.

### **What happens after the study or if I change my mind?**

Once the interview is complete you will continue to have access to healthcare as you have throughout the study. It is unknown whether the talking intervention will continue after the study as it will depend on the results of the study.

The study information will be stored in a password protected database and will be held for 10 years. Any paper copies of consent forms and interview notes will be scanned into the secure database and will be destroyed in a confidential waste bin.

If you wish to receive feedback from the research I would be happy to provide you with a summary of the findings. This can be requested verbally or in writing. Please remember that the write up of this research is planned to be finished in 2018 so it may take some time before this is available. In order for me to provide this feedback I will need to know that you were involved in the study

### **Who do I contact for more information or if I have concerns?**

Any concerns regarding the nature of this study can be notified in the first instance to my Project Supervisor, Dr Alice Theadom, AUT North Shore Campus, 90 Akoranga Drive, Auckland, 1142.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTECH, Kate O'Connor, AUT North Shore Campus, 90 Akoranga Drive, Auckland 1142.

If you want to talk to someone who isn't involved with the study, you can contact an independent health and disability advocate on:

Phone: 0800 555 050  
Fax: 0800 2 SUPPORT (0800 2787 7678)  
Email: [advocacy@hdc.org.nz](mailto:advocacy@hdc.org.nz)

For Maori health support please contact : *Kapi Peita Via CMS*

You can also contact the health and disability ethics committee (HDEC) that approved this study on:

Ministry of Health  
Health and Disability Ethics Committees  
PO Box 5013  
Wellington 6140

## Consent Form- interview



*An interpreter is available on request.*

**Please tick to indicate you consent to the following (Add or delete as appropriate)**

***Please only include yes/no boxes if the statement is truly optional (i.e – that a person could still participate if they answer no).***

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I have read, or have had read to me in my first language, and I understand the Participant Information Sheet.

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I have been given sufficient time to consider whether or not to participate in this interview.

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I have had the opportunity to use a legal representative, whanau/ family support or a friend to help me ask questions and understand the interview.

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I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.

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I understand that taking part in this interview is voluntary (my choice) and that I may withdraw from the interview at any time without this affecting my medical care.

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I consent to the research staff collecting and processing my information, including information about my health, my IOMS file notes and interview notes. I am also aware that the interview will be audiotaped and later transcribed.

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If I decide to withdraw from the study, I agree that the information collected about me up to the point when I withdraw may continue to be processed. Yes  No

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I consent to my GP or current provider being informed about my participation in the interview and of any significant abnormal results Yes  No

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obtained during the study.

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I agree to an approved auditor appointed by the New Zealand Health and Disability Ethic Committees, or any relevant regulatory authority or their approved representative reviewing my relevant medical records for the sole purpose of checking the accuracy of the information recorded for the study.

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I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.

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I understand the compensation provisions in case of injury during the study.

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I know who to contact if I have any questions about the study in general.

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I understand my responsibilities as a study participant.

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I wish to receive a summary of the results from the study.

Yes

No

**Declaration by participant:**

I hereby consent to take part in this study.

Participant's name:

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Signature:

Date:

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**Declaration by member of research team:**

I have given a verbal explanation of the research project to the participant, and have answered the participant's questions about it.

I believe that the participant understands the study and has given informed consent to participate.

Researcher's name:

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Signature:

Date:

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## Participant Interview Questions:

Date Produced: 4 March 2017

Introduction/Karakia/Greeting:

My Name is XXXX and I have been contracted By AUT to undertaken these interviews so we can understand your experiences of brain or head injury, the intervention that you have recent completed and any changes you may have experienced following the intervention. This interview will be recorded so we can focus on our discussion.

The interview should take about 30 minutes

For identification purposes – todays date is XXXX, your participant number is TBI xxxx (do not state their name at this stage).

Would you like to start with a karakia?

Is there anything you require (water etc) prior to us starting the interview?

Note: please feel free to use the participant's first name but please do not include their surname. I need to remain blinded. If there are areas of interest that the participant raises please explore this in more detail. The questions are indicative only

Your experiences of TBI:

Can you tell me about your head injury/ies?

What impact has your head injury had on your life?

What are the main challenges for you?

In what way (if any) do you think your head injury contributed to you coming to prison?

Your experience of prison with a TBI:

What is your experience of being in prison?

Does your head injury impact on the way you manage yourself in prison and if so how?

The intervention:

How have you found the recent TBI programme you recently completed?

What changes have you noticed (if any)?

What were the challenges for you during the programme?

Explain a recent situation (if there is one) where you were able to use the skills learnt from the study

Tell me about the way you manage yourself in and around the prison. Is it any different to prior to the programme?

How do you think you will be able to apply what you have learnt to your life outside of prison?

How will that look different for you (if at all)?

Are there any changes to the programme that you would like to see?

Do you have any other questions or comments?

## Appendix E: Sample of thematic analysis

| Themes                      | Subthemes             | Evidence  |
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| <b>Cognitive challenges</b> | Learning difficulties | “People thought I was ignorant, you know, because they’d say something to me and then I’d say what? I felt like I was a bit slower than usual...then after that I would just snap and get angry because I thought they were making fun of me. I just got angry, angry easily, after the injury.” (TBI007) |
|                             | Short term memory     | “...concentration, because I used to be a fast thinker, I used to be wittier, but now... back then I just couldn’t focus properly”. (TBI007)  |
|                             | Frustration           | [Impact of accident on life]“... It was quite significant looking back and even to today, I went to, just a couple of years ago, or last year I just finished getting my NCEA Level 3. My learning and trying to remember things definitely ain’t the same.   |

I've got to read something and read it again and read it again just to get something to understand...I still can't remember those things and like talking to you now and in five minutes I might give you a different, around about the same but not quite the same, different parts of what happened could come and change the effect of my answer". "...Even trying just to write a simple letter to my wife and my kids I struggle because before, what we tend to do before we start to write, we sort of got a little story in our head to go on, but as I'm writing I'm forgetting what my story is about, so I'm taking instead of half an hour to write a letter, it can be up to a couple of days. I'm getting a bit frustrated – just thinking about that and where was I going, where was my story heading to?... I just try and bring myself back to the now and okay so

there's a bridge we pass...I'm not trying to stay in that moment and keep myself frustrated to try and force myself to think because sometimes it might come back, sometimes it won't, I don't even bother going there. These are things I've taught myself to not worry about that. It's gonna come when it does and let's wait for that time... instead of staying in that past, what I'm trying to think of or future, I come back to the now". (TBI018)

"...my grandfather died and they wanted me to get phone numbers and stuff because it's my home but I couldn't remember the phone numbers, they wanted an address, but because of the experience of my grandfather dying I couldn't... just normal people without a brain injury would have these problems thinking and remembering these things because it was a

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|  |  | <p>traumatic, a loved one just died, so it got frustrating for me...I had to leave that situation and just go and come back and try to find these things out, just giving them my wife's name and asking them to look at the computer with my wife's name and getting them to ring my wife and get this stuff". (TBI021)</p> <p>Concentrating...Headaches, chronic headaches...Dizziness. I suffer from epilepsy as well but I think it was brought on by the head injuries themselves... I had my first head injury when I was 11 years old". (TBI038)</p> <p>"It's hard to balance that because you're trapped within a body that can't function like it used to. I used to be a sports fanatic and I used to be able to run for miles and miles, running around the bays and then do it a second time. I can't even walk for</p> |
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|              |   | long anymore because I get a headache from the sun". (TBI039)   |
| <b>Trust</b> | <p>People don't always have my best interests at heart.</p> <p>I have to care for myself because no one else will</p> | <p>"I never really did a brain check to see if my brain is damaged or not but at that point it might have some effect. I never know, we don't ever know, it's just happened, but I think I've just been trustworthy to my friends at that time whereas this is what has led me to prison". (TBI004)</p> <p>"...since everything I like to have control so I can be in control of things because it was scary not knowing that.. I could have died and all of that...".(TBI036)</p> <p>"...when you get moved from prison to prison you're not in control. I become very anxious and very nervous with those things, but I manage it because there's nothing really I can do about it so I have to just work</p> |

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|                         |  | <p>through those emotions and let it be. It's not so nice, but it is what it is..".(TBI036)</p> <p>"...It's made me very cautious around people, very cagey. What I mean by that is I'm very standoffish. I'm not very approachable because of the sight I have in my eyes, people think I'm staring at them or eyeballing them and they think I'm trying to stare them down; and it's just trying to focus on them, trying to get the picture of them and they take me the wrong way because I can look quite aggressive but not meaning to. It's happened just by doing that". (TBI038)</p> |
| <p><b>Headaches</b></p> | <p>Impact on my mood</p> <p>Light sensitivity</p> <p>Migraines</p> | <p>"...I was aggressive, I went around looking for trouble. I knew it was wrong, but it was just the environment, my whole environment, fighting, waking up with headaches because of fighting too much...". (TBI 005)</p>  |

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|  |  | <p>"...I used to get bad headaches. Even now, even now today I still have a sensitivity to light... I was on strong medications. I used to have real bad headaches, used to be easily angered.". (TBI036)</p>  |
| <p><b>Influence of drugs and alcohol</b></p> | <p>Self-medication</p> <p>Led me to prison</p> <p>Helped me cope with my new world</p> | <p>"I didn't know how to cope properly with it so I just drank and drank and drank...I was too kind of shy to go and ask them [ACC]. I went to the bottle instead." (TBI007)</p> <p>"The drinking brought me into prison because I just drank and drank and drank and then I just got angry with someone and dealt with them, where I should have went the other way you know". (TBI007)</p> <p>"...I think that's made me somewhat take drugs, abuse alcohol, less focus, paranoid". (TBI021)</p> <p>"...I turned to marijuana,</p> |

but then that causes a whole lot of problems in itself and it doesn't exactly resolve things not for me. It just made me less motivated. Then I turned to alcohol and I dabbled in other substances. I know for me those things ain't good for me... I'm that person that if I'm inebriated or if I'm under the influence of methamphetamine or any other psychedelic drugs, once I get a thought I'll act on it... irrational. I'll never travel down that road again". (TBI036)

"I wouldn't say the head injuries contributed to me coming to prison; it was my way of thinking because I'm kind of a vigilante that - I got on drugs trying to escape what happened to me when I was younger and I wasn't against drugs, but I used to hear voices which I thought everybody heard. I thought that was natural but I didn't find out until later that I was

actually hearing voices that weren't there. It was very confusing because at one stage I'm getting headaches and that because I'm feeling dizzy, next thing I'm hearing voices...But to contribute to me being here today, that's basically because I hear voices. They're all telling me to attack those people, to take their drugs away from them because these people I attacked were...kids...".(TBI039)

[In relation to the contribution of TBI to coming to prison]"... I guess I wasn't really all there on what I was doing and what I did to turn up in here. I didn't really think about the consequences or anything else; all I saw was what I did. Now I'm sitting here thinking about it.. as soon as I had knocks to my head and I had headaches and stuff, I started smoking weed hard out, smoking weed on the outside. That pretty much

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|                            |   | took the headaches away but it just made me extremely more tired and lazy". (TBI040)  |
| <b>The journey to jail</b> | <p>Being lost</p> <p>Violence as a norm</p> <p>Impulse dys-control</p> <p>Gangs as a sense of belonging</p> | <p>"There's been times I'm just fighting too much and I've ended up in jail. I must say a few times I have been hit a bit hard and I've felt it for a day or two. I suppose that has led to me doing some pretty serious things like robberies and stuff like that, but again I think it comes down to my choice. I think I can't really blame it on head injuries, it's choice and stability, not enough stability to be able to... things that I've needed in my life I've gone and taken them because I haven't been stable enough to realise that there's needs and wants and half of the things that I was taking were wants, not needs".(TBI005)</p> <p>[impact of TBI on relationships]... "There was always this monkey on my</p> |

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|  |  | <p>shoulder, it's hard to explain, even just to put it in words". (TBI015)</p> <p>"...[I'm] Easily distracted, easily influenced. I fall into... I slip into... if I'm working on one thing and something else over there, you know, ... I've never done that before, let's do it, I'm keen ... but it's a slow process. It's a slow process. It builds up to oh fuck, I'm actually doing it, shit. So a fair share of weakness too. I didn't want to say no. I wanted to but my pride, my ego, reputation, all that carry on...".(TBI015)</p> <p>"...when I was younger I got hit in the head with a baseball bat, about 15...split my head, scar, scarred and knocked out unconscious for about 30 minutes...I felt my head and there was heaps of blood, dried blood on the back of my neck. I felt a gash and it was a pretty deep wound on my head".</p> <p>"...I think that's made me</p> |
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|  |  | <p>somewhat take drugs, abuse alcohol, less focus, paranoid". "...I reckon, I'm not sure, I mean I think it did contribute to me coming to prison...I have a lack of consequential thinking, whereas I sort of don't really think before I act". (TBI021)</p> <p>"After the injury...My personality changed. I was having mood swings, I was getting angry fast, frustrated. It just made me angry...after the injury I had to learn how to count again, how to spell and all that. It took me about four months before I could talk properly and start remembering things... like when I think, I can think what I want to say but it's hard to put in words"... Even today, now and again, sometimes when I'm thinking about things I know what I want to say but it's hard to get up". (TBI039)</p> |
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|  |  | <p>“My head injury was from when I was a bit younger. I went to a party and I got blind shot with a bottle... didn’t know it was coming... stabbed my [02.13] and got a main artery... I lost consciousness but I pretty much woke up straight away, ... Then I just went to the A&amp;E because it was severe and I tore my main artery in here, in my eye”. (TBI40)</p> <p>“I was 25...I was drunk and it was in the city...I was too drunk, I looked the opposite way instead of looking where the cars are coming so I looked that way and I walked out and got hit and then I just took a big fall to my head. I was unconscious there too. Ever since that happened I started getting migraines just in the one spot to the point.. , I didn’t go to hospital. I was out and then all I could hear was my mates telling me, bro you all right, you all right? I just got up. At</p> |
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|                                   |                               | <p>the time I was dizzy but all I could feel was my leg more than my head, but then later on the next day I felt it all". (TBI040)</p>   |
| <p><b>Prison environments</b></p> | <p>Negative places</p>        | <p>"...I lived by this name Speedy Two Guns and I lived up to it. I had to. Everything was on the line...my two hands. All those scars...I was always cocked and I was ready to pull any time... " (TBI013)</p> <p>"I feel much stronger, mentally, physically [in prison]. Mentally I'm able to say no. I'm careful now... it sucks that coming to prison I had to learn all this and this is from myself because I identified my offending, I identified where I was going wrong out there. So I've done a lot of homework on myself and I've devoted this time to myself. I've devoted this time". (TBO015)</p> <p>"...It was very hard for the first couple of years because you're fresh bait and they try and test</p> |
|                                   | <p>Violence</p>               |  |
|                                   | <p>A blessing in disguise</p> |  |
|                                   | <p>A time for me</p>          |  |

you...I'd lash out because that's the way I was brought up was to lash out, get them first before they get you...It's fine, me coming to jail, but it's tough because I don't know how to defend myself so I've got to try and be humbled by someone I'd normally have stood up to, take advantage of me and be cheeky to me and not lash out... I don't like violence but I don't like people who use kids as pawns for their drug money. I'd do it again, I'd do it again. If I can save one kid from becoming addicted to drugs or sold to the streets for drugs, I'd do it again". (TBI038)

[The TBI]"... It was before I came in and I've been inside for four and a half years. To be honest, I'm a lot safer in here ...".(TBI039)

"...there's no life in here [in prison]...I'm just slowly moving away from this. I

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|                       |   | <p>guess this four years is long enough for me to actually think". (TBI040)</p> <p>"...Seeing them [other prisoners] excited to see me again and I don't want that, I don't want anyone to be excited to see me back in here. I want them to come up to me and go, what are you doing here, man? You're too good for this, you should be out there... They're giving you that little push that maybe you didn't get earlier in your life, like the support that you needed and stuff like that. All it takes is somebody just to give you a nudge in the right direction".(TBI040)</p> |
| <b>Family history</b> | <p>Violence as a norm</p> <p>Boys are risk takers</p> | <p>"When I was a youngster like I used to I guess try and do the Harry Houdini kind of stuff (laugh) on a much, much smaller scale. I fell out of trees. I had a scooter and fell off that but I didn't find myself unconscious if you know what I mean, more of the</p>   |

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|  |  | <p>feeling like I was gonna go unconscious when I fell on limbs or shoulders or stuff".(TBI012)</p> <p>"I was 13...I was just abused...I lost consciousness, passed out, when I come too I was still in the same place where I was knocked...That was pretty much my first serious one and there was the last, but after that it was just being bullied, yep... So I took up boxing. That was from a background of family violence and bullying. I thought I could turn things around by taking up the sport of boxing and [took] all my frustration and anger into the sport of boxing and in many ways it helped me overcome a lot of things... my object was to go into the ring without my head being hit but it just happens instead, that's what it's there for". (TBI015)</p> <p>"...I'm gonna say hand-in-hand with maybe my</p> |
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|  |  | <p>upbringing then because I had quite an angry upbringing, where sport was my escape to release my anger without being punished and being red carded or sent off". (TBI021)</p> <p>...[My mother]" She noticed her son from being a normal child to changing from 14 and being a lot more... having a lot more impulsivities in my life and just being, going through life with reckless abandonment. I was a misguided missile on a road to chaos and destruction..."(TBI036)</p> <p>"...I grew up with my uncles and my aunties and older cousins. I'm the eldest grandchild in my family so all my friends and bros growing up were all older than me, uncles and aunties, so I tended to get quite thrown around...hence why I'm in a place like this". (TBI018)</p> <p>"...I was bashed when I</p> |
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was a kid. Those will be the ones that really hit the [36.38] because dad used to crack me or mum used to crack me, crack me so hard I was flung against the wall and hit my head. Dad was never there, it was a step dad.. He used to hang me outside of our two-storey house window by my feet or on a piece of rope to teach me how to stay focused. How's that meant to help any kid? So to open up to someone is very hard... maybe they'll find more people open up about how you got your head injury because why you got your head injury is just a little bit different to how you got your head injury".(TBI038)

"Most of us men don't want to talk about what happened in our youth. Dad was never there, mum used to crack me, I've never had any role models, so the mean streets are where you turn to. You go from term to

term and you get bashed because you're hanging out with the big boys, you think it's cool to get bashed so you keep going back for more, bash, bash, bash. I was saying before, 16 I'd been knocked out six times. Six times and those are the ones I can remember. There have been many times I've woken up in places that I don't know how I've got there..". (TBI038)

"I used to be a boxer. I was brought up in the mean streets of Otara, South Auckland. Fighting was always happening, but I got into situations where there were softball bats and monkey wrenches. I've got scarring around the back of my head from where I've been cracked how many times. It was mean streets. I've been knocked unconscious about six or seven times... I've even been bleeding from the ear. I lost hearing in this ear..." My sight in my left eye is

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|  |  | <p>worse than my right eye. I normally wear glasses...". (TBI039)</p> <p>"...I used to get beatings just for not anything really, just basic stuff, not doing the dishes and stuff like that, used to get beatings and stuff...I guess from then, I guess I lost my way of who I really was. I was too scared to do anything or be around home or be anywhere near my father, so I kind of isolated myself with all my friends and they're all negative vibes, like bad associates, but at the time I felt comfortable in that zone. I felt like I was safe there instead of being at home and getting a growling or get a hiding for something small...I hung out with them and I felt like I could do whatever I want without having to look over my shoulder or having to flinch. I started doing what they were doing because I actually thought it was something good and they</p> |
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|                                   |  | were making money off it...Back then I had nothing to keep me focused on what my life was really about, like to motivate me to make changes and stuff until I met my partner that I've been with for eight years now. She's been helping me through everything...". (TBI040)  |
| <b>Facilitation of the course</b> | More than anger<br><br>Longer is better<br><br>Oral and visual<br><br>Flicked a switch<br><br>I am not alone<br><br>Out of my comfort zone | "I prefer this programme can extend longer so people can... for people like us that need help to have more understanding, more deep understanding of mindfulness". (TBI004)<br><br>"...Everything will do will be what I've learned... mindfulness is something you do with every activity. So even being mindful of my actions, that's a big thing, knowing when you're going down the wrong path rather than just walking it. You can be walking down the wrong path and not even know what you're doing, just to be mindful of everything, everything in life is good, |

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|  |  | <p>prison, non-judgemental, that's one, and awareness". (TBI006)</p> <p>"Just probably standing up and telling everybody what I've learnt...I didn't want to stand up but I know that I've got to break out of my comfort zone and it's going to happen one day and I'm gonna have to get up and say something to somebody so yeah. That was the only thing I didn't want to do, is get up and talk to people. I'd rather listen".(TBI005)</p> <p>"The main thing for me was anger, snapping and since doing the programme I've learnt to notice my anger when it's coming, just deal with things differently, that's the most important thing from the course. They explained to me that, I think it's your frontal lobe, it's a muscle and you've got to just keep practicing something and it will get</p> |
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|  |  | <p>stronger and stronger and then when situations arise one day I'll just be able to just not even feel anger about these sorts of things or let it just pass straight through me". (TBI006)</p> <p>"Sometimes challenges, people would open up a lot in the course and they would talk to the psychologist and bring up situations and they would just listen and they'd go okay and how did that feel for you and they'd ask some things, but then there would be no feedback, there would be nothing coming back. So I started questioning and said I notice you're always asking and listening and stuff like that, but everyone here is reaching out to you. They're asking you by telling you their story, what's the correct way to deal with it and there's nothing coming back sometimes".(TBI006)</p> <p>"I found it excellent. It</p> |
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|  |  | <p>was insightful and very helpful. It gave me skills that I otherwise wouldn't have learnt as well as being able to identify my own personal traits that were where I was not alone. It was comforting to know that there were other people in my shoes as well that suffered from the same kind of stuff. But at the same time it was comforting to see that I wasn't uncomfortable enough to be able to share, I felt I shared a lot in that programme, whereas before I was quite a reserved person. So yeah my confidence has picked up". (TBI009).</p> <p>"...I found it to be positive. I did learn things from it and just how to stop myself from kind of getting into the rage kind of thing and not let it... hopefully stop it before it gets to that point where I lose control....I can describe what's happening to myself, talk through with myself trying to stop</p> |
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it before it gets too out of control...One of the skills that I seem to use is stop what I'm doing, maybe remove myself from the situation, think about it, observe it and then participate. Just things like that, you know, anything to kind of stop me from getting to that point where it just gets overwhelming and then I end up losing control and hurting myself or possibly hurting someone else... ".(TBI011)

"Mindfulness is always a big point of any study I think. They should always bring that into, you know, to each everybody about. I think that's a pretty important thing. If more people probably know about mindfulness and about working in your wise mind and all of that kind of stuff, they would probably be less likely to go out and offend, or just make their lives a bit easier, you know, just kind of what I'm thinking...They

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|  |  | <p>should teach it more in schools to people that are growing up, you know, who knows what kind of lives they'll have".(TBI011)</p> <p>"Yeah it could be longer. The breaks could be... I reckon there should be two breaks". (TBI021)</p> <p>"...Being in that group therapy they highlighted some stuff to do about anger and stuff. I've got to know those barriers...What bothers me is that I am here and the head injury was part of that reason why I'm here. These are sort of the questions I was hoping to get answered in there. The focus that was brought was based around anger and that was good for 90 per cent of the guys, 99 per cent of the guys, but the course didn't quite answer what I was looking for". (TBI021)</p> <p>"Yeah it could be longer. The breaks could be... I reckon there should be</p> |
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|  |  | <p>two breaks” (TBI021)</p> <p>“...I reckon people should discuss what kind of brain injury they’ve had with the group to see if anyone can relate to... they can all relate to you because they’ve had brain injuries, but some brain injuries may be different to other people’s brain injuries”. (TBI021)</p> <p>[The intervention psychologist]“...He’s very artistic and straightaway that drew me straightaway, that caught my attention straightaway and I told him, look I’m an artist, that’s what I do. When I saw his diagrams and his word maps and all word associated and all his brainstorming, I’m captivated by that. Not only that, most of the guys in our class were and so that’s what got us in and what kept us within the content and why I came away with so much content. I think they’ve done a very good job and</p> |
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|  |  | <p>what they shared, it helped me to understand so I believe that if it helped me it would help the other guys too. I wouldn't change anything or how it was". (TBI036)</p> <p>"...I believe that that's a very valuable programme for guys in here. There's a lot of guys that I believe that have suffered a lot of TBIs. Like me, they would have been in the dark about things. Now, I believe it's an important part of being able to help someone along their journey because it gives them a different view, hang on, this may have affected me, how can I look at that? When you become aware of that, it already showed me that I can't live my life with a reckless abandonment, especially when it comes to my brain... Giving them the understanding and the information about it and how it's affected them will open their eyes. It definitely opened my eyes.</p> |
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|  |  | <p>I believe that this is a very important part within this environment". (TBI036)</p> <p>"It was enlightening, but I don't think it focused on – like how you're talking to me now, I don't think it focused on how the head injury happened. It focused more around how to prevent it or how to recognise it, that's what I should say. I got not a lot of closure from it knowing that now I know I can really get seriously hurt next time, brain injury. I could end up a cabbage...I asked questions at least once or twice a day, am I ready for the outside world? It did have an affect on me, but it made me think twice about what my actions are going to be from when I do go out the gate. It gave me a clearer understanding about my injury. That's why it's easier to talk with you today about it". (TBI038)</p> <p>"We don't know we're not to blame for what's</p> |
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happened... We think we're to blame... They think they're wrong. That's like me when I was beaten up every day, most my life, I thought it was everybody done it and it was scary, but now to know that my next head injury could be my last, I'm very, very careful of what I do now. The TBI programme gave me a reason to start thinking clearer and thinking, okay it's time to open up because it's not what I've got when I go, it's what I gave. If I can get some knowledge, like I spoke to you about my mate [41.34] this morning about head injuries and my life story, [41.43]. He just went, woah. He thought he had it rough, but...".(TBI)

"...My main focus was, since I came to prison, I really said to myself I need to learn how to communicate better with my partner...That was my main focus because I

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|  |  | <p>knew that was my biggest problem. When I did that TBI course, everything just switched. It was like a light just turned on...".(TBI039)</p> <p>"...my upbringing and all of that and injuries, it just took me off the rails. I couldn't understand feeling the way I was or living the lifestyle that I was at the time. I think the programme just really helped, I didn't quite understand the majority of it, but I had the motivation to ask them to explain it a bit more so I could understand...Like if I get frustrated at my partner, like they did this Dear Man and it's something that you just describe your problem and then you just try and make things more understandable...like understand where they're coming from and not just bite their head off just because they didn't do this or they weren't here. The people that I did the class</p> |
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|  |  | <p>with, they had the same experience as well. They had similar issues, partners. It's really hard to be with someone when you're in jail, it's so stressful...". (TBI040)</p> <p>"I had no tools whatsoever... I didn't even know how to sort things out, I didn't know where to go, I didn't know who to talk to, but I guess – I saw that TBI programme on the kiosk and I applied for it because I knew it was about your brain injuries, but I only thought it was just anything to do with your brain [32.06] but I didn't know that you could be taught the tools to how you feel, your feelings, every single feeling that you have and how you can manage and deal with it. I didn't know any of that, I didn't know it was part of the course until I came in and pretty much got taught that as well. I was surprised. It blew me away because those actually made sense to</p> |
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|   |  | <p>me. The things I was looking for were right there and I just needed to grab a hold of it and that's what I did, and just to test it all out in here... I guess this is the test...I had nothing else to lose. Whatever I was doing wasn't working and...if there's a chance that they can help me then I'll go with it..". (TBI040)</p>   |
| <p><b>Having a better understanding of the impact of my TBI on my life following the intervention</b></p> | <p>I understand why I am angry</p> <p>I understand why I am the way I am</p> | <p>"After the injury...My personality changed. I was having mood swings, I was getting angry fast, frustrated. It just made me angry...after the injury I had to learn how to count again, how to spell and all that. It took me about four months before I could talk properly and start remembering things... like when I think, I can think what I want to say but it's hard to put in words"... Even today, now and again, sometimes when I'm thinking about things I know what I want to say but it's hard to get</p> |

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|  |  | <p>up". "I take full responsibility for coming to jail. I don't think it had anything to do with the head injury...[but] I've come into prison I think twice for male assault female, but I think that was due to the head injury because I wasn't able to recognise back then that it was my brain injury that was causing me to be angry". (TBI039)</p> <p>[in relation to symptoms]"... the dizziness, the finding it hard to concentrate, the lack of motivation, the constant headaches [09.13]. Tiredness like my brain just feels like shutting down like when I'm just sitting there, if I sit there long enough, like in science, I'll just get tired and I just want to lie down and go to sleep... I get frustrated when I try to think so hard about what I want to do with myself when I get out. But not only that, it's just the constant headaches and</p> |
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|  |  | <p>just the tiredness. It really just pretty much ruins my days". (TBI040)</p> <p>"I guess it was hard to remember stuff, like I'd usually get told by my parents to do something and I'll go to a place to go get it and I'll forget what I was going to get and then I'll have to go all the way back home and get a list of what to get". (TBI040)</p> <p>"...I just <b>hate</b> not being able to work out or being motivated or sometimes I just can't think at all. It frustrates me. Even when I talk to my own whānau on the phone and stuff I have to think before I speak. You know how some people are like, when they have conversations the thought's already there. Like she would say something and you're already thinking and you automatically respond and it just goes back and forth, back and forth; but for me it's like, she'll say</p> |
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|  |  | <p>something and I'm like, oh yeah, and then I'll try and think of what she just said [21.17] what did you say, I couldn't quite hear you". (TBI040)</p> <p>"When I was younger I didn't really think about it. I didn't even actually think that A and B may equal C. I didn't really think about it until I got a bit older and even after doing the TBI course I've sort of come to the realisation of a few things. I know my personality changed and I was a lot more... I didn't really think about it, but reflecting back now and because of the way I was brought up and the physical violence and all of the other things that I suffered throughout that, I had trust issues. When I got run over by a truck, now I've realised I had bigger trust issues because I didn't trust being with them". (TBI036)</p> <p>"When you're brought up</p> |
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|  |  | <p>in Otara, the streets of Otara, mean streets, and you reach out to get help, anyone sees you as a weakness, preys on you. If anyone found out that I was getting treatment – this is my way of thinking before I went to TBI – I would never let that be seen. Having it be done [the TBI programme] in here opened my eyes that there is help out there but I didn't recognise going to ACC to claim against this or claim against that because although I ended up in hospital when my ear was bleeding, I needed to get out of there because I was afraid. I didn't want to stay in there. I can't actually remember what I'd done but I remember ending up at home... the worst thing about it was how I got from the hospital to home. I can't remember how I got there. I don't know how I got there and that's scary because that happens quite a lot now... It's like a black out but I'm</p> |
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still conscious. It's hard to describe". (TBI039)

" ... My case is quite serious. I'm up for murder, and some people came to my friend's house with a firearm and they threatened to shoot us. They let a shot from the air but I didn't know they were shooting in the air and I started firing back straightaway and I hit two of them and I killed one and injured another one and I think that maybe, without the head injury, learning about the fight or flight path and stuff like that, that things may have been different. I may not have even shot at them, you know, because I was that scared and maybe I would have fired in the air too to try and scare them away and I think about that, if that is still with my head injury, because I would have handled things differently before and that's where a jury sees it as not self-defence because they think of the

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|  |  | <p>way that they would have reacted". I thought that was a normal reaction, what I did, and when I got found guilty of murder I couldn't understand it. If you were in my shoes you would do the exact same thing. But no that's not the truth, some people wouldn't do that. I put that down to my brain injury". (TBI006)</p> <p>"It [the TBI] has had an impact on my relationship with my wife, my temper. I have pretty uncontrollable bursts of temper where I'd either take it out on like a wall or myself or doors. I'd be yelling and I'd trash the house and break phones and break stuff. It could be pretty uncontrollable". (TBI011)</p> <p>[In relation to impact of head injuries]..." I haven't known it any other way if you know what I mean. It's only in more recent times that I've started to think about it and was just</p> |
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|  |  | <p>like oh hang on a minute, that stuff has happened to me".(TBI013)</p> <p>"It's just being able to understand that for me that those things contributed to the way I was and from 14 right up until about 20 something, and even after that, those affected the way I had an outlook on my life, the way I behaved. Because I never knew, I didn't really understand all that then and I just put it down... I made choices and it has been the wrong choices and I used a lot of other excuses. It was everyone else's fault, but it wasn't mine. As much as those may have been mitigating factors and they may have contributed, ultimately it was down to me. I made choices that were maladaptive. They weren't right. It is what it is but it did have a significant effect on my life. That was a major... not only that, all these other head injuries...If I could change</p> |
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|   |                                     | <p>it I would change it, but we can't...I've been able to sort of manage it and I've gotten better. I've had more help...It's the first time I've had a TBI to really look at that and it's helped. It helped me, as much as I knew a lot, I didn't really reflect back and think that that may have been contributing factors through to my TBI. I didn't even give it a thought". (TBI036)</p> <p>"I understand a lot better now. I understand that my upbringing has a lot to do with me being here in jail, it was the mean streets. But my injuries caused me to be aggressive, to be... instead of ask questions to attack straightaway because I don't know what's going to happen on my next knock out...It's scary".(TBI038)</p> |
| <p><b>Choosing an alternative pathway</b></p> | <p>Taking time and I deserve it</p> | <p>"...I feel more relaxed. More easily handle my emotions and things like that and basically sometimes it's hard to</p>  |

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|  | <p>Breathe</p> <p>Slowing down before acting</p> | <p>control my emotions when I talk to my family and now I know actually let me think about my emotions before expressing to them, and it actually has improved my relationship with my family in one way or another".(TBI004)</p> <p>"...I try to keep myself calm. I breathe, breathe and I just walk away first before coming back to the situation or incident that happened and then try and sort it out later because I know I'm not in the right mind and I need to calm myself and think it through". (TBI004)</p> <p>"Now that I actually I know that I can do that [not fight] I will do that more often, rather than just oh yeah, sweet, let's go in the toilet. That would have been the old version, the old me, sweet, toilet, let's go. But rather than thinking like that I just straight on the spot, bro we talked about it, let him see it from my side as well</p> |
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|  |  | <p>as his own side and it worked out pretty well". (TBI009)</p> <p>"One of the other things I do is breathe, focus for a minute on my breathing or something like that, trying to distract the mind a bit and then come back to a situation". (TBI011)</p> <p>"...I found it to be positive. I did learn things from it and just how to stop myself from kind of getting into the rage kind of thing and not let it... hopefully stop it before it gets to that point where I lose control....I can describe what's happening to myself, talk through with myself trying to stop it before it gets too out of control...One of the skills that I seem to use is stop what I'm doing, maybe remove myself from the situation, think about it, observe it and then participate. Just things like that, you know, anything to kind of stop me from getting to that point where</p> |
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it just gets overwhelming and then I end up losing control and hurting myself or possibly hurting someone else... ".(TBI011)

[Prior to the TBI programme]" I'd probably smash in on the door or I'd go hit a wall, damage myself. So doing these courses have given me other things to do instead of doing that and it has given me goals, things that I want to work towards".(TBI011)

"...It was like how am I feeling, you know, you just kind of... like before I hadn't really thought about how I was feeling other than I feel okay today... So just I guess that identification of where I'm at with my feelings. I can see that that's quite useful too because if you're gonna get angry or when you feel yourself building up to a point of view and knowing how you're feeling at a critical moment and being able to

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|  |  | <p>give it a rating is an important skill because then you can manage it". (TBI013)</p> <p>"...you can choose to, I guess, take a different path to diffuse it and I guess that's where cognitive behavioural therapy stuff, process the thoughts, feelings, actions, kind of process model I guess, is useful because you know that if you cut out one of them it changes the downward flow of what comes out. I guess that's a good thing, to be okay, why am I feeling like this? How do I manage this? Do I need to remove myself from the situation? It's a good thing.(TBI013)</p> <p>"...it felt like time was only short for me and I had to somehow, some way, turn my life around and give back. There are things that money can buy and there are things that money can't buy. You learn only the things that money can't buy and if I</p> |
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|  |  | <p>go with a genuine heart, anything that I do, if I go in it with a genuine heart, that's gonna get me somewhere". (TBI015)</p> <p>"The frustration is still gonna be there when you're angry, so for myself I just taught myself to just, okay, backward from that, okay, just what happened to why I'm getting angry, what could make me angry, bring myself back to the now, focus on the good of the now, think of my wife and my children, think of the end picture instead of the picture right in front of me and my end picture, which is my loved ones is a better pathway to get to where...there's no use getting angry about it, it's not going to make it happen right now. So just back away and go and enjoy the day, enjoy the sun, the birds are flying, there's a little bit of laughter over there, go towards that laughter. Find little things that help</p> |
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you instead of trying to just make yourself more frustrated which ends up being on good because you end up being in the pound with no TV, no phone, no outside communication, no one to talk to". (TBI021)

"...I've been incarcerated for 21 years...I've learned a lot of things. You know sitting back and with this, it taught me something else. It taught me something that all these other courses didn't really take into consideration. They took into consideration behavioural factors, proximal factors, just all of these kind of things. Looking at my schema, all these other things". (TBI036)

"That's why all the officers are amazed because [16.37] they've been working for the prison for at least 10 years, all the older guys, and they always come up to me, far you're different, you used

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|  |  | <p>to be this little rat that used to just run around and cause havoc and not listen. Now I'm on time for lock ups, I respect them, I respect them because I know they'll do the same back. You give them that and they'll give it back to you, like you don't expect it all to be one way, like they respect you and you just give them shit because you won't get anything...".(TBI040)</p> <p>"I believe I've become a lot more adept and calm in being able to step back from things now... It was good because it also strengthened other areas that I'd worked through and just put a lot more of the puzzles together, pieces of the puzzle together". (TBI036)</p> <p>"...mindfulness, that's one of the biggest things from the group that I've learned. It's being mindful, but not only of me but how actually things work</p> |
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and especially with the way I process it, the way I look at it and how I'm going to act with it. Being mindful of other's feelings and just the environment around me...". (TBI036)

"Sometimes I have a tendency to go from here to straight over here and alienate the people in between and still get what I want, but then next time around because I've alienated everyone it makes it harder for them to want to help me in the future. Now I've been able to sit back and just be accepting of things...I don't always have to just jump in head first and be lost in what I call a lot of noise and confusion around you...Sit with those feelings and then go away, how are we going to do this and plan it here".(TBI036)

It was good to learn more about just visualising your problems because I had a lot of issues and to just

visualise it...It's given me a stronger perspective on how to deal with my problems. Before that I'd just lose it, I'd get frustrated and I'd be angry and feel all sorts of emotions, but as soon as I did that programme... I guess that's what's helped me to humble myself even more and to give me that motivation to move forward with my life instead of going backwards". (TBI040)

"Before I was never able to speak up and offer them advice and just to see them go through the issues, like, hey that's exactly what I've been through. We both do the same programme and then I come back the following week and I'm like, I did that thing and it actually works, I didn't actually explode. I actually thought and it just relieved the stress and I just went, okay sweet as. As I was explaining myself about how it worked and

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|                                  |  | <p>how it was helping, I guess they found the motivation to do it too and then they came the following week and they're like, actually it works". (TBI040)</p>   |
| <p><b>Knowledge is power</b></p> | <p>Knowledge around symptoms</p> <p>Problem solving</p> <p>Sharing learnings</p> <p>I wanted to know more about why I was this way</p> | <p>"If you'd asked me a year ago, yeah. Like just dealt with it. You know how jail is, just violence. My problem solving wasn't that good. The only way we knew how to solve our problems was just having fights...That's how jail is and that's how you deal with issues in jail, just have a fight and that's it. But now that I've done that TBI course, I've learned good problem-solving techniques that I put into practice every day. Since I've done that course, everything I learned off that course I put into practice all the time. I'm grateful for that course".(TBI039)</p> <p>"I think the biggest challenge for me was my partner because when I</p> |

was doing the course I was telling her what I was learning...[but my] partner's not learning it it makes it like a sort of a barrier. That was happening because I'll tell her, oh this is what they said, and then she would tell me, that don't work... it's only going to work if you want it to work. That's what I was telling her and slowly she came around to it...[initially] she didn't have any faith in it...". (TBI039)

"...a few years back I was run over by a truck...It was a rubbish truck and back in those days you stood on the side of the truck and not at the back of the truck...The stand broke, I fell off and went under the truck... I was in and out of conscious... I was there, I was gone, I don't know how I remember these things because sometimes I can't even remember what happened yesterday, you know, but I do remember that specific

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|                             |  | <p>day quite well, maybe it's the traumatic-ness of it. I remember exactly falling and I remember seeing exactly how the tyres, the feeling, yeah...". "...I still don't think I've recovered from it. Hence why I opted to participate in this TBI, trying to understand more about it and how I could better cope". (TBI018)</p>   |
| <p><b>Being present</b></p> | <p>Self confidence</p> <p>Understanding alternative perspectives</p> <p>Having courage</p> | <p>"I think I'd be a much better person out there. I won't be thinking like people making fun of me when I can't answer their questions or just taking time out from the kids if they get annoyed with me, just take time out and breathe instead of going straight to the bottle. I could probably talk more positively to my kids, my partner and everyone, not always being negative from thinking too much. I could apply the triggers, thinking of the consequences of drinking too much before I do anything, maybe have one</p> |

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|  |  | <p>beer or something with dinner or something or when I finish work instead of glugging it all down".(TBI007)</p> <p>"...I think I will be able apply it very easily yeah... managing conflict on the outside, that's an important thing, managing yourself, that's really important. Understanding how you're feeling at a certain time, I think it's very applicable...There's no doubt that the biggest battle is yourself, there's no doubt about it". (TBI013)</p> <p>"I'm a lot more mindful, a lot more mindfulness. A lot of empathy for people with brain injuries". (TBI021)</p> <p>"...There was this mindfulness exercise we did as a group that helped us to appreciate things and my communication. My communication has improved big time. Food for instance, you just eat the whole thing and that's</p> |
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|  |  | <p>it, but if you eat slowly and taste it, yeah..." (TBI021)</p> <p>[in relation to interaction with other prisoners]"...my tone is a bit different. I try and see from their point too". (TBI021)</p> <p>"I just believe I've found a lot more understanding of what mindfulness truly is and it's not just about me, it's about others too...But within that whole thing at any time you can change direction and go any which way". (TBI036)</p> <p>"...I know if it's helped me I believe it will help others...it made me stop and look, stop and look. I'm very fortunate that I actually made it onto that group..."(TBI036)</p> <p>"...You become humbled to who you are. I've got a lot of respect from where I am...People are so standoffish from me because of the way I look because it looks like I'm</p> |
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|  |  | <p>staring them [23.40] a lot of them just want to come up after I've spoken to them, they just want to come up and say, kia ora bro [23.26]. I'm like, chur bro chur. It's cool. I'm glad I stood back from what I learned in TBI to use that as a tool to meet people...". (TBI038)</p>  |
| <p><b>Being able to express feelings</b></p> | <p>Trying new ways of engaging</p> <p>Having courage</p> <p>Using prison as an experiment site</p> | <p>"After I finished my programme I think about it and I should have a really good conversation with my brother and I talked to him on the phone and I tell him to come and visit me and then I explain to him, please don't talk about it anymore. That's the reason you keep telling me I think about my past. I learn my lesson. I don't need you to remind me again and I just want to have a good conversation with you. What's in the past leave in the past, we all look towards our future and then he stopped talking</p> |

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|  |  | <p>about it and we're having... actually we're having a pretty good relation now, because I don't really talk to my brother much, but now I care for them and he can feel it". (TBI004)</p> <p>"Yeah, just this morning. I haven't been able to sleep properly ... I was able to open up to my old cellmate who's now my housemate, open up to him about some of my injuries. He was so taken back. He said, you shouldn't be here because I've been stabbed, I've been softball batted, I've been run down, I've been shot at. I've been beaten up so many times it's not funny. People I thought were my mates used to beat me up, I used to go back to them and get another hiding just because I didn't have a dad....It's hard to explain it but this morning, talking with my mate... gave me the options to test stuff what I'd learned from TBI,</p> |
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|  |  | <p>to be able to explain to him that I don't mean to look like I'm a big aggressive; I just come across like that...". (TBI038)</p> <p>"...I am testing myself now. To be honest, I'm kind of liking where I'm at with what I've learned and all the tools I have gained from that programme. I really believe in myself. I never used to have faith in myself. I had no hope whatsoever whether if I will change or make a better lifestyle for myself and just make my family proud. Now I do, now I want to. I am fully focused on what I want. I know that it takes me a bit longer to figure out stuff, like put things into place, but I eventually get there. [34.19] the only thing I can do is keep pushing and I'll eventually get there. I really think I will do good in the community". (TBI040)</p> <p>"I guess I was at a stage</p> |
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where I felt like I was on a small thing of ice and I was about to sink and probably not come back up, so I was pretty much at my breaking point in my life. I knew that I needed the help and if that was it I was going to take it. So I took it because at the end of the day there was nothing else for me, no one else was helping me. I had family support and stuff, but that's pretty much just lectures on how you should change your life and stuff like that, but it's not really the help that you need. You need the help you need from specialists, from people that know their stuff. That TBI, it definitely changed me after that". (TBI040)

"When I talked to my partner when I was doing the programme [40.21] I was casually just talking to my family about the course and they went, it sounds really good. It is, I'm learning a whole lot.

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|   |                         | <p>They're like, oh is that why you're not yelling on the phone and stuff like that? Is that why you're laughing more often and how you're going about things in the right way instead of being all negative and stuff? Nah, that course doesn't need anything to be changed. I reckon a five weeks programme is good. It just depends on how everyone approaches the programme itself and if they're ready. If they're ready to move on then the programme's there". (TBI040)</p> <p>"...People just need to put their foot in the door. That's all it is. People need to just see how it is. Five weeks, it's not long enough. Maybe some people might need longer. Some people are different". (TBI040)</p> |
| <p><b>Having alternatives to violence and</b></p> | <p>I can choose now</p> | <p>"The main thing for me was anger, snapping and since doing the</p>  |

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| <p><b>aggression</b></p> | <p>Win-win</p> | <p>programme I've learnt to notice my anger when it's coming, just deal with things differently, that's the most important thing from the course. They explained to me that, I think it's your frontal lobe, it's a muscle and you've got to just keep practicing something and it will get stronger and stronger and then when situations arise one day I'll just be able to just not even feel anger about these sorts of things or let it just pass straight through me".(TBI006)</p> <p>"... my cell got raided just the other day. I had a very important special visit with my family and I was in the shower getting ready for my visit. It was about 10 minutes before my visit started, and three staff just opened my door while I was in the shower. I said what do you want? They said you're being raided. I said can you wait until I've finished my shower because I've got a real important special visit</p> |
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|  |  | <p>coming up with my family. They said sorry we can't wait for you. You've just got to turn the shower off. I went no, I need to get ready. Oh well you've just got to come out of your cell. "I started getting angry straightaway and then I used mindfulness, which I learned from the course, to feel what was actually happening inside me. I felt the anger there but yeah what that did was it opened up a door for me to, for ways to react about it. By noticing the anger and noticing that that was happening to me, I chose to not react in a way that I normally would". (TBI006)</p> <p>"I think I've always had those skills, but the programme has actually... I suppose like I've said helped me have the confidence to be able to utilise those thoughts and use them. I knew I had those skills before, but I didn't know how to use them properly but now</p> |
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|  |  | <p>that I've been shown how to use them, how to take the time to actually think about it and say well is this gonna be harmful or helpful? Whereas before just I don't care if it's harmful, straight in, hit first. But now it's I'm gonna compromise here that we both feel we're in a win situation". (TBI009)</p> <p>"...I spent a majority of my time in maximum security, but angry at the world and just blaming everyone else for everything instead of being responsible for my own actions and my own choices and that. There's a dramatic change in who I am. Not only do I see it but I have guys and people commenting that know me from – you know you're different and that. That difference is only noticeable if you work at it and maintain it... I believe that I've changed dramatically in the way I am". (TBI036)</p> <p>[On the outside]" It will be</p> |
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|  |  | <p>more fulfilling and rewarding...I have children and I've never been there. I've done things just for me. The world revolved around me because I knew no different. Now, I'm able to become a part of that world and share all those things with the most important people that mean something to me and such as them. I'll just leave you with this: if one day when I'm old and I'm looking back on my death bed and I'm sitting there, I want to measure my life as success and how it's going to be different". (TBI036)</p> <p>"...A lot of people, they stare at you. Sometimes you're just hallucinating, you think they're staring at you but they're just looking around. Most of the time they're like, what are you looking at? I've had a lot of people do that around me and stuff and I've had that once or twice in the unit. Instead of me going and punching them</p> |
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or going, what did you just say, should we go and sort it out and settle that? That's what it used to be, but I'm just like, hey man sorry if it seemed like I was looking at you but I wasn't, I was looking around and you just happened to be there, it's nothing personal. He goes, oh yeah sweet as... they actually took it well rather than I thought because during it all I can think of is all the times that they didn't... But as I was speaking to them, as I respected him in a way that he felt respected and how I approached him, I guess he felt comfortable and just went, oh yeah sweet as bro. I didn't give him a reason to jump back and be all defensive and stuff". (TBI040)

"It used to be hard, it used to be hard with the guards because when I first started coming to prison it was really hard to get things done... When I did realise that it was the

way I approached them that was not getting me anywhere, and that was because of TBI, and I approached them in a way - I tried - I approached them, I just asked them, hey mister do you reckon you can approve my number? I've been waiting two weeks but I was just wondering if you can because I need to talk to my family urgently. He's like, yeah sure sweet as, and he writes it in his notebook and it's the first time I've ever seen an officer write it in a notebook and that's when I knew... then I just clicked on from then. They're all shocked because I've changed, I've changed just like that. All the demanding and asking and making sure they get the job done, making the job hard and stuff, that's all thrown out, that's all gone. They're shocked to see that I'm different". (TBI040)

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| <p><b>Improved relationships</b></p> | <p>Feeling better about myself</p> <p>More awareness of others</p> <p>Family noticing a change</p> <p>Connection is important</p> | <p>“I think it changed my attitude. I used to beat myself up from time to time thinking that I wasn’t adequate because of this TBI that I had, well at the same time without blowing my own trumpet I feel like I am actually more intelligent than I allow myself to believe. I don’t think I find it hard to take compliments but I suppose I’m always looking for the negative but also walking on the positive side of things as well”. (TBI009)</p> <p>“It actually teach me how to think of other people, be in their shoes, think why they’d be emotion, why they’re talking to me like this. I think about it and say maybe why they’re angry, what I have done and what I have said, and actually help me to see I should try and change also because maybe the way I am or the way I behave is actually bad to people”.(TBI004)</p> |
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|  |  | <p>“...they taught me, like we had an incident about the microwave, how people were just pushing in all the time and that happens a lot in here. So I was thinking about what they taught me, to be mindful that they might need to go somewhere and get their one done first, so they’re in a rush or something. I’ve used that one, to be mindful and mindful of others. Or someone is busting to do a number two in the toilet and I just want to go number one, I let them go first, but then, you know, I have to wait a little while to go. Just being mindful of yourself and other people”.(TBI007)</p> <p>“...like talking on the phone to my girlfriend about the kids, I don’t snap at her any more like I used to. She’d tell me something was wrong and I’d just start... because I can’t do anything. I can’t control what’s going on out there. What they</p> |
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|  |   | <p>taught me is that... to control my emotions, not to let anger get in the way of your thinking". (TBI007)</p> <p>[Before the programme]" I wasn't thinking... like for example, I would just snap at people, that was it. They ask me to do something, do it yourself, but now I just think about maybe they can't do it, just that mindful and also like they taught me how to sit back, relax and just take time out for yourself, like when I'm angry or something. I just sit there by myself and breathe in and do exercises that they taught me". (TBI007)</p> |
| <p><b>Increased self-awareness</b></p> | <p>Breaking out of my comfort zone</p> <p>Understanding my triggers</p> | <p>"...I wasn't just getting angry and then just flipping, there was a gap there for me to choose whether to react rather than just react". (TBI006)</p> <p>"...Everything will do will be what I've learned...</p>  |

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|  | <p>Its ok to make mistakes</p> | <p>mindfulness is something you do with every activity. So even being mindful of my actions, that's a big thing, knowing when you're going down the wrong path rather than just walking it. You can be walking down the wrong path and not even know what you're doing, just to be mindful of everything, everything in life is good, prison, non-judgemental, that's one, and awareness". (TBI006)</p> <p>"...It's just having to just re-evaluate the situation – this is getting a bit too out of hand, I'm getting angry, I'll apologise for what I said earlier, I shouldn't have said it the way I said it, but it was nothing directed to him, it was directed to other men... I'm not perfect. There are still a lot of things I need to work on...that if things aren't going the way that they're supposed to you've got to take some time off for yourself, pull yourself</p> |
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away from that...all it takes is I just pull myself away from it... it's really got me hooked, these four-leaf clovers. I think anything I do that doesn't feel right to me I'll just pull myself away from it, I literally pull myself away from it...". (TBI013)

"...It's just having to just re-evaluate the situation – this is getting a bit too out of hand, I'm getting angry, I'll apologise for what I said earlier, I shouldn't have said it the way I said it, but it was nothing directed to him, it was directed to other men... I'm not perfect. There are still a lot of things I need to work on...that if things aren't going the way that they're supposed to you've got to take some time off for yourself, pull yourself away from that...all it takes is I just pull myself away from it... it's really got me hooked, these four-leaf clovers. I think anything I do that doesn't feel right to me I'll just

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|   |  | pull myself away from it, I literally pull myself away from it...".(TBI015)   |
| <b>Becoming aware of other people's perspective</b> | Empathy<br><br>Increasing helping behaviours | <p>"I'm a lot more mindful, a lot more mindfulness. A lot of empathy for people with brain injuries". [in relation to interaction with other prisoners]"...my tone is a bit different. I try and see from their point too". (TBI021)</p> <p>"I don't know if it's because of the brain injury, but basically the thing what we learnt from TBI was mindfulness. Mindful of what we're doing and mindful of what other people are doing and how we should do or say, consider what other people think or other people should say that we can't affect our emotions".(TBI004)</p> |

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| <p><b>New skills acquisition</b></p> | <p>Knowledge is power</p> <p>Being vulnerable and asking for help</p> <p>Alternative thoughts and pathways</p> | <p>“So that invitation to become aware of what you’re feeling and encouragement to develop a vocabulary to describe what you’re feeling, that was positive?...Yes definitely”. (TBI012)</p> <p>“...you can choose to, I guess, take a different path to diffuse it and I guess that’s where cognitive behavioural therapy stuff, process the thoughts, feelings, actions, kind of process model I guess, is useful because you know that if you cut out one of them it changes the downward flow of what comes out. I guess that’s a good thing, to be okay, why am I feeling like this? How do I manage this? Do I need to remove myself from the situation? It’s a good thing”. (TBI012)</p> <p>“...You stick to the formula and if it works you can’t go wrong...There might be some times out there where as long as I keep occupied, as long as I</p> |
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|  |  | <p>keep the seven attitude factors in my heart, my factors in my heart, striving, not getting ahead of myself, not judgemental, judging others, patience, trust acceptance and letting go. These seven factors, they work. Let go of my past, just let go. I have and that's what I've done, trusting, not only trusting others but trusting myself". (TBI015)</p> <p>[on the impact of TBI programme on skill acquisition]... to be able to talk to you, to be able to speak with my sister about things so there's not stress on my shoulders because I would get headaches and then when I get stressed I get migraines...".(TBI038)</p> <p>"What I've learned from TBI is it's not all about me; it's about we and my family...". (TBI038)</p> <p>"...Mindful thinking is like a big thing...just being</p> |
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|                             |  | mindful of what's happening in your brain or being mindful of how other people are thinking. It's just amazing what I learned on there...".(TBI039)  |
| <b>Future focussed hope</b> | <p>Reduction in recidivism (I am not coming back here)</p> <p>I deserve better</p> <p>I will take the skills with me</p> <p>Wanting better for my family</p> | <p>"I mean lot of people said the same thing to me – you're a totally different person. Before you were just all out, it didn't matter. You're not a gang member but you didn't care who it was that had a problem with you, if they wanted to go fisty cuffs, you know. At the end of the day you've got to mature, I'm not a young man any more. I'm not saying that I'm scared to do that stuff anymore but it's just like you don't have to work harder, you can work smarter. If I keep doing what I've always done I'm only going to get the same old result and that's prison life and I don't want prison life any more. I deserve better". (TBI009)</p> |

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|  |  | <p>“...I know there’s always going to be challenges in life, so I suppose for me the way I look at it now is patience, persistence and tolerance. I’m not always gonna be first in line, but I suppose being patient to wait in line because sometimes you just have to wait patiently”. (TBI 009)</p> <p>“It’s gonna stop me from I suppose acting on my old impulses. It’s gonna stop me from being an opportunist criminal because that’s the way I used to do things...but now I can look at both sides of the coin for what it really is and like I said, I want better and I want to work to achieve that better for myself rather than cheating others of their hard work”. (TBI009)</p> <p>“...I’m not coming back. I’ve never been away from my kids and wife more than a day. I’ve been</p> |
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|  |  | <p>away for them for nearly... it will be thousand days and I've had six grandchildren been born in this time. I've never seen them. I've got photos of them and it breaks my heart to be here. So every day I'm trying to upskill myself". (TBI018)</p> <p>"[If I was able to work on]...keeping my anger and my frustration in check, I don't think I would have come here. Had I gone through all these different scenarios and thought about my family as my end goal to help keep myself in check, it would have been my end goal to not do what I did...I'm not coming back. I've never been away from my kids and wife more than a day. I've been away for them for nearly... it will be thousand days and I've had six grandchildren been born in this time. I've never seen them. I've got photos of them and it breaks my heart to be here. So every</p> |
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|  |  | <p>day I'm trying to upskill myself". (TBI021)</p> <p>"...What you can give back is better than what you take when you're gone...because there's so many kids out there who would love to know that they can turn their life around without doing drugs and alcohol...I finally found my niche in life that gives me a purpose, but what's going to really drive me now is to be there for my daughter. That's what's going to keep me out of places like this...".(TBI038)</p> <p>"...I think I was meant to come to prison to wake up, ...Because I was doing some dumb shit out there...here I learned that TBI and it's just made me think what's important now and it's my kids and I don't want to come back to prison and I want to have a better relationship with my partner...".(TBI039)</p> |
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|  |  | <p>“That’s what’s motivating me more, is just to teach my kids to have good communication. I’m trying to let them know that they can trust me, to talk to me about things instead of shutting down because when I look at my own life, when I grew up and I realised this, that’s how we grew up. We did something wrong, got a growling, got a little bit of a hiding. That was normal back when I was young”. “All my life, even all my brothers – I’ve got eight brothers and sisters – we’ve never had that relationship with our parents to be able to talk about what’s happening. When I did that TBI course and I realised all of that, I was like, fuck I don’t want that for my kids. I want my kids to be able to tell me what’s wrong”. (TBI039)</p> <p>“...My goal is not to come back to prison, to have a better relationship with my partner, to teach my kids</p> |
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|  |  | <p>to be open and not come to prison. It will be just to focus on myself, not worry about what other people think... my partner used to say to me it's like walking on egg shells...She's been telling me on the phone she sees the changes, but she said can I do it when I get out? When she first started saying that it used to piss me off but then I thought about it and I said, actually that's good that she's saying it because it puts that in my mind so I'm aware of it, so if I'm aware of it then I know I can..."(TBI039)</p> |
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## Prevalence of Traumatic Brain Injury in a Male Adult Prison Population and Its Association with the Offence Type

Tracey Mitchell<sup>a</sup> Alice Theadom<sup>b, c</sup> Elizabeth du Preez<sup>c</sup><sup>a</sup>Serco New Zealand Limited, Level 4, KPMG Centre, <sup>b</sup>National Institute for Stroke and Applied Neurosciences, School of Public Health and Psychosocial Studies, and <sup>c</sup>Discipline of Psychology, School of Public Health and Psychosocial Studies, Auckland University of Technology, Auckland, New Zealand**Keywords**

Brain injury · Prevalence · Prison · Offender · Criminal

**Abstract**

**Background:** The prevalence of traumatic brain injury (TBI) in prison populations has been found to vary considerably. This study aimed to determine the prevalence of TBI in a prison population in New Zealand and to identify whether age, ethnicity, offence type, security classification and sentence length were linked to TBI prevalence. **Methods:** All offenders admitted to a new Corrections Facility over a 6-month period (May–November 2015) were screened to understand their history of TBI. Data was merged with demographic information, details of the offence type, sentence length and security classification from the prison database. Binary logistic regression was used to identify the contribution of predictors on TBI history. **Results:** Of the 1,061 eligible male prisoners, 1,054 (99.3%) completed a TBI history screen. Out of the 672 (63.7%) who had sustained at least one TBI in their lifetime, 343 (32.5%) had experienced multiple injuries. One in 5 participants experienced their first TBI injury before the age of 15 years. A regression model was able to correctly classify 66.9% of cases and revealed that belonging to Māori ethnicity or being imprisoned for violent, sexual or burglary offences

were independently predictive of TBI ( $\chi^2 = 9.86, p = 0.28$ ). **Conclusions:** The high prevalence of TBI within male prisoners and a high proportion of injuries sustained in childhood suggest the need for routine screening for TBI to identify prisoners at risk of persistent difficulties. Interventions to support those experiencing persistent difficulties post-TBI are needed to optimise functioning and prevent reoffending.

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**Introduction**

Traumatic brain injury (TBI) is defined as an injury to the brain resulting from an external physical force [1]. In the general population, it is projected that 13.0% have experienced at least one TBI in their lifetime [2]. Prevalence is slightly higher (14.3%) among New Zealand (NZ) males aged 35–39 years [2]. Following a TBI, people can experience long-term cognitive and emotional difficulties that affect every day functioning, decision making, social relationships and employment [3–6]. Additionally, there is evidence of a relationship between TBI and increased dysregulated behaviours such as impulsivity and aggression, mood disturbances and substance abuse and psychiatric conditions and [7] a link between a history of TBI

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and engagement in antisocial or criminal behaviour has been proposed [8, 9].

Adults who experienced a TBI in their childhood have been found to have a 1.7 fold increased risk of incarceration when compared to their uninjured siblings [8]. Evidence also suggests that a history of TBI is linked to poor behaviour within the prison. For example, inmates experiencing at least one TBI in their lifetime were less able to follow rules and experienced more in-prison violent infractions than those prisoners who had not experienced a TBI [10]. Additionally, a history of TBI has been linked with reoffending especially following release into the community [6]. Elbogen et al. [11] revealed that the relationship between the history of TBI and criminal activity is likely to be complex. For example, demographic factors such as the age of the person when the injury was sustained and pre-injury behaviour are highly likely to influence the relationship between TBI and criminal behaviour [11]. It may also be the case that the TBI may be linked to some offences (such as exhibiting violence towards others) but not others (such a fraud); however, these links remain unclear.

A recent meta-analysis revealed that the prevalence of traumatic brain injuries in prison populations is far higher than that in the general population [12]. The review provides evidence that many studies exploring prevalence in prison populations have been limited by selected or random samples reducing representativeness of the findings. Only 4 studies routinely screened all male offenders who were admitted over a specified time period [6, 13–15]. Based on these 4 studies, prevalence of TBI in prison populations was found to vary considerably between 31% in France and 82% in Australia and the United States, with one study revealing a prevalence of 61% for repeated (2 or more) TBIs [16]. However, all of the aforementioned studies used different TBI screening tools, and this is an indication of the existence of challenges in drawing comparisons because of the varying definitions of TBI and screening protocols.

In NZ, only one study of TBI prevalence in prisoners has been conducted. It revealed that in 1998, NZ had the highest prevalence of TBI in offenders internationally, with 86% of male prisoners reporting experiencing at least one TBI in their lifetime. However, the study was based in a provincial prison, did not include high security prisoners and only recruited a selective sample of 118 prisoners (about one third of the potential sample pool), therefore reducing the representative nature of the sample. The study also used terminology that was not well defined, such as "light" TBI, making it difficult to translate the

findings. In this study, it was reported that there were significant ethnic disparities between Māori (the indigenous population of NZ) and Europeans; however, based on the lack of a representative sample, it is unclear if this increased prevalence was due to the sampling methods used or whether it reflects an actual increased lifetime risk of TBI [17]. Consequently, there is a need for a population-based prevalence study of TBI history in NZ prisoners.

Security classifications of prisoners are assessed dynamically and reflect the internal and external risks to safety and security. Based on evidence that prisoners with a history of TBI have more prison infractions [10], the relationships between security classification and sentence length therefore need to be determined to identify those who are most at risk of a positive TBI history. Consequently, this study aimed to understand the prevalence and characteristics of TBI in a NZ prison population and to identify whether age, ethnicity, offence type, security classification and sentence length are linked to the prevalence of TBI in this population.

## Methods

This study received ethical approval from the Auckland University of Technology Ethics Committee (15/41) and the internal ethics committee of the corrections facility.

### Participants

All adult (>18 years) male offenders admitted to the Auckland South Corrections Facility in NZ over a 6-month period (May 18 to November 18, 2015) were eligible for inclusion in the study. Offenders may have been newly sentenced or moved from another prison during this time.

### Measures

The TBI screening questions were extracted from a NZ general population incidence study of TBI to enable comparison [18]. These questions were developed to operationalise the World Health Organisation definition of brain injury [1], where the person was asked "have you ever been involved in an accident, where you hit your head and were left feeling dazed, confused or lost consciousness?" The total number of events was recorded, including details of the incident that happened, age at the time the injury was sustained, whether they lost consciousness and for how long and whether any symptoms experienced after the injury (for which more than one could be indicated).

As many mild TBIs often go unreported [16] and many TBIs are missed in medical records, particularly in cases of polytrauma [19], self-reported prevalence was utilised in preference to medical records. Self-reported TBI in offenders has been found to have high concordance against medical records of TBI, supporting the use of such an approach to determine prevalence [20]. The severity of the injury was categorised based on the period of loss of consciousness [21] with mild TBI (unconscious for less than 30 min),

moderate (unconscious for more than 30 min but less than 24 h) or severe (unconscious for more than 24 h). TBI screens were conducted between 2 and 21 days post-admission, in a private interview space within the prison.

#### Procedure

In conjunction with the opening of the new prison facility in NZ, the TBI screening tool was integrated into the routine electronic health screen conducted with all new inmates. As part of the consent procedure for the health screen, participants gave permission for anonymised information to be used for research purposes. It was made explicit that their confidentiality would be maintained and information may be used for research purposes and to support the development of services. Male prisoners were also informed that their results would have no influence on their care within the prison. All data was de-identified and study procedures had the oversight of the Ethics Committee(s). The lead investigator did not personally administer any TBI screens. If English was not the prisoner's primary language, they were given the needed support to complete the TBI screen through members of the healthcare team who could converse in the participant's primary language or via a telephone interpreting service.

Data from the TBI screens collected between May and November 2015 was used for this analysis. Demographic information on age and self-reported ethnicity was extracted from the prison databases. Any identifying information was removed to protect prisoner identity. Offence-related information was accessed from the Integrated Offender Management System, which is a nationwide Department of Corrections application. This provided details of the prisoner's unique identifier, the offence, sentence length and the most up-to-date security classification. In the case of multiple offences, the most serious offence was recorded for the purpose of this study. The database had protected access and information was entered only by 2 members of the healthcare team to ensure consistency. Random data entry checks were conducted to ensure integrity. Offence category and sentence classification were based on standardised definitions employed by the Department of Corrections.

#### Statistical Analysis

Data was entered into IBM SPSS version 24.0. Descriptive analysis was undertaken to determine the number of prisoners who experienced at least one TBI in their lifetime and the proportion experiencing multiple injuries. Differences between those who had experienced at least one TBI and those who had not were explored using t-tests or chi square tests. The links between the number of injuries sustained within the person's lifetime and age, ethnicity, sentence length, offence type and security classification level were analysed using binary logistic regression. Statistical significance was set at the  $p < 0.05$  level.

## Results

Of the 1,061 men who were admitted to the prison within the study timeframe, 1,054 (99.3%) consented to receive healthcare and as such participated in a TBI screen. Seven men declined. Another 8 men consented to the TBI screen, but during the course of the assessment became agitated and verbally aggressive, and a full TBI

history was not completed. Of the 672 male prisoners completing the health screen, 63.8% reported experiencing at least one TBI in their lifetime. Similar to the NZ general population, a vast majority of TBIs were classified as being mild in severity. Differences between those experiencing a TBI in their lifetime and those who did not are outlined in Table 1. Statistically significant differences were observed for ethnicity and offence type.

Binary logistic regression was applied to identify whether current age, ethnicity, offence category, security classification or sentence length was predictive of TBI history. The model showed overall good fit to the data with  $\chi^2 = 9.86$ ,  $p = 0.28$  and was able to correctly classify 66.9% of cases. As shown in Table 2, belonging to the Māori ethnicity, being imprisoned for violent, sexual or burglary offences were independently predictive of TBI history. While age, security classification and sentence length contributed to the regression model, they were not independently predictive of TBI history.

Of those experiencing a TBI in their lifetime, more than half ( $n = 343$ , 51.0%) had experienced multiple injuries. Details of TBI history are outlined in Table 3. Of the male prisoners who sustained a TBI, 22% had experienced their first TBI injury before the age of 15 years, with one in 5 of these caused by an assault. The mean time between the age of first injury and age at the time of the TBI screen was 14.35 years (SD 13.04). The most common mechanism of injury (as shown in Table 3) was related to assault. Assaults included being punched or kicked on the head, or hit with metal or wooden objects with the intention to cause harm. Injuries identified as "being hit by an object" were unintentional injuries, such as being hit by a knee on the head during a rugby game. The majority of injuries involving being hit by an object were sustained during a sports activity (19.2%). Motor vehicle accidents were most commonly attributed to accidents with unrestrained drivers (head vs. windscreen or steering wheel) with alcohol being a common factor. Falls were defined as a person tripping over and falling to the ground or falling off something such as a ladder or bike.

## Discussion

This study aimed to determine the prevalence of TBI in a NZ male prison and to identify whether age, ethnicity, offence type, security classification and sentence length were linked to prevalence of TBI. Prevalence was found to be more than 4 times higher (63.7%) than males of an equivalent age in the NZ general population (14.3%).

**Table 1.** Demographic and offence characteristics of adult males based on traumatic brain injury

|                                | Total,<br>(n = 1,054) | No TBI,<br>(n = 382) | TBI<br>(n = 672) | Test of difference                   |
|--------------------------------|-----------------------|----------------------|------------------|--------------------------------------|
| Age, years                     |                       |                      |                  |                                      |
| Age, mean (SD)                 | 36.74 (12.32)         | 36.34 (12.01)        | 37.44 (12.84)    | $t = 1.39, p = 0.16$                 |
| Ethnicity, n (%)               |                       |                      |                  |                                      |
| Māori                          | 431 (40.9)            | 125 (32.7)           | 306 (45.5)       | $\chi^2 = 48.44$<br>$p \leq 0.00001$ |
| European                       | 233 (22.1)            | 80 (20.9)            | 153 (22.8)       |                                      |
| Pasifika                       | 258 (24.5)            | 95 (24.9)            | 163 (24.3)       |                                      |
| Other                          | 132 (12.5)            | 82 (21.5)            | 50 (7.4)         |                                      |
| Offence category, n (%)        |                       |                      |                  |                                      |
| Violence                       | 289 (27.4)            | 102 (26.7)           | 187 (27.8)       | $\chi^2 = 25.27$<br>$p \leq 0.0001$  |
| Drugs                          | 220 (20.9)            | 110 (28.8)           | 110 (16.4)       |                                      |
| Sexual                         | 242 (23.0)            | 75 (19.6)            | 167 (24.9)       |                                      |
| Burglary                       | 238 (22.6)            | 71 (18.6)            | 167 (24.9)       |                                      |
| Other                          | 65 (6.2)              | 24 (6.3)             | 41 (6.1)         |                                      |
| Security classification, n (%) |                       |                      |                  |                                      |
| Minimum                        | 194 (18.4)            | 77 (20.2)            | 117 (17.4)       | $\chi^2 = 2.64$<br>$p = 0.45$        |
| Low                            | 180 (17.1)            | 66 (17.3)            | 114 (17.0)       |                                      |
| Medium                         | 293 (27.8)            | 110 (28.8)           | 183 (27.2)       |                                      |
| High                           | 387 (36.7)            | 129 (33.8)           | 258 (38.4)       |                                      |
| Prison sentence, years, n (%)  |                       |                      |                  |                                      |
| <5                             | 521 (49.4)            | 168 (44.0)           | 353 (52.5)       | $\chi^2 = 7.46$<br>$p = 0.59$        |
| 5–10                           | 299 (28.4)            | 119 (31.1)           | 180 (26.8)       |                                      |
| 10–15                          | 101 (9.6)             | 43 (11.3)            | 58 (8.6)         |                                      |
| >15                            | 133 (12.6)            | 52 (13.6)            | 81 (12.1)        |                                      |

**Table 2.** Independent predictors of logistic regression model of TBI history

|                         | Reference category                  | B     | SE   | Wald | Sig         | Exp (B) | 95% CI    |
|-------------------------|-------------------------------------|-------|------|------|-------------|---------|-----------|
| Constant                |                                     | 0.56  | 0.53 | 1.11 | 0.29        | 1.75    |           |
| Age, years              |                                     | -0.01 | 0.01 | 1.25 | 0.26        | 0.99    | 0.98–1.01 |
| Ethnicity               | Māori                               | 0.85  | 0.38 | 4.92 | <b>0.03</b> | 2.34    | 1.10–4.94 |
| Offence type            | Violent, burglary or sexual offence | -0.37 | 0.16 | 5.38 | <b>0.02</b> | 0.69    | 0.50–0.94 |
| Security classification | High                                | 0.19  | 0.19 | 0.98 | 0.32        | 1.21    | 0.83–1.77 |
| Prison sentence         | 1–5 years                           | 0.15  | 0.28 | 0.28 | 0.60        | 1.16    | 0.67–2.02 |

Bold values indicate variables that independently explained TBI history in the regression model.

Men who identified as being of Māori ethnicity or who were imprisoned for a burglary, violent or sexual offence were more likely to have sustained a TBI in their lifetime. Male prisoners identifying as being of “other” ethnicity (including Asian, Indian, South American, African and not specified) had a lower prevalence of TBI. While prison sentence length and security classification contributed to the overall explanation of variance in the regression model, they were not independent predictors of TBI history. The findings reveal the importance of routine TBI screening in prison facilities.

The prevalence of TBI in this sample was within the middle range of the (31–82%) prevalence reported internationally within prison populations. The rates of recurrent injury in the current sample were however much lower than previously reported (51% compared to 61%) [16]. One of the challenges in determining prevalence of TBI is that male prisoners may find it difficult to accurately recall injuries, particularly those that were relatively mild or sustained early on in life. Indeed, public awareness of mild injuries has previously been found to be low [22]. This study utilised questions to identify TBI to en-

able direct comparison of results to the NZ general population. Other screening tools such as the Brain Injury Screening Index [16] or TBI Questionnaire [23] were developed specifically for use with offenders but are subject to similar recall biases. Given the limited awareness or potential underreporting of prior TBIs, prevalence of TBI is likely to be an underestimate of the true scope of the burden. A systematic review [12] on screening for TBI in prison populations reported that there were many challenges in accurately screening for TBI and that comparisons between studies were difficult to make due to the wide diversity of screening tools used. Establishing a consensus on a TBI screening tool and definition of TBI will facilitate comparisons across international literature and between different populations, if applicable also as a tool for the general population.

The higher prevalence of TBI in Māori reflects an increased risk of TBI in Māori in comparison to New Zealand Europeans [19]. As ethnic minority groups have been found to be at increased risk of TBI internationally [24], those identified as being part of an ethnic minority group may also be at increased risk within the international prison population. In contrast to other findings, which reveals that falls are the main cause of TBI in the general population [19], assaults were identified as the main cause of TBI in this study. One in 5 of those experiencing a TBI reported that their first TBI occurred before the age of 15 years. This supports evidence of a link between early childhood trauma and risk of engagement in criminal activity in later life. Longitudinal studies are needed to determine if there are causal links between early injury and engagement in antisocial behaviour later on in life to inform youth crime prevention initiatives.

The increased prevalence of TBI in men detained for burglary, sexual or violent offences may suggest a link between emotional and behaviour regulation as well as decision making that can occur following a brain injury [7]. Indeed the findings support a previous study identifying that between 5 and 35% of sexual offenders were found to have some neurological damage [25]. Although suggested by current research literature, the relationships are likely to be more complex and could also be influenced by other factors such as mental health and substance abuse [26, 27]. The links between TBI history and the offence type identified in this study highlight the need for further exploration between these links.

While this study has highlighted those most at risk of having sustained a TBI in the prison population, the sample may not be representative of a more stable prison pop-

**Table 3.** Details of TBIs sustained

|  | Male prisoners who experienced a TBI (n = 672) |
|--|--|
| <b>Number of TBIs experienced in lifetime, n (%)</b>                                   |  |
| 1  | 329 (48.1)                                     |
| 2  | 164 (24.4)                                     |
| 3  | 95 (14.1)                                      |
| 4+   | 84 (12.5)                                      |
| <b>Age at time of first TBI, years, n (%)</b>  |  |
| 0–14   | 148 (22.0)                                     |
| 15–34  | 432 (64.3)                                     |
| 35–64  | 77 (11.5)                                      |
| 64+  | 2 (0.3)  |
| Unknown  | 13 (1.9)                                       |
| <b>Loss of consciousness, n (%)</b>  |  |
| Yes  | 403 (60.0)                                     |
| No   | 264 (39.3)                                     |
| Unknown  | 5 (1.2)  |
| <b>Mechanism of first injury, n (%)</b>  |  |
| Assault  | 269 (40.0)                                     |
| Hit by object  | 101 (15.0)                                     |
| Motor vehicle accident   | 179 (26.6)                                     |
| Fall   | 89 (13.2)                                      |
| Other or unknown   | 34 (5.1)                                       |
| <b>Severity of first injury sustained, n (%)</b>                                       |  |
| Mild   | 491 (73.1)                                     |
| Moderate   | 74 (11.0)                                      |
| Severe   | 32 (4.8)                                       |
| Unclear  | 75 (11.2)                                      |
| <b>Severity of last TBI sustained, n (%)</b>   |  |
| Mild   | 517 (76.9)                                     |
| Moderate   | 70 (10.4)                                      |
| Severe   | 30 (4.5)                                       |
| Unclear  | 55 (8.2)                                       |
| <b>Acute symptoms experienced after first injury (more than one could be reported)</b> |  |
| Seizures   | 22 (3.3)                                       |
| Vomiting/nausea  | 67 (10.0)                                      |
| Headache, n (%)  | 395 (58.8)                                     |
| Loss of balance, n (%)   | 313 (46.6)                                     |
| Visual disturbances, n (%)   | 228 (33.9)                                     |
| Memory difficulties, n (%)   | 150 (22.3)                                     |

ulation, as the study included prisoners who were transferred to a new prison in South Auckland. The prisoners were adjusting to different systems and processes and as such some of the male prisoners may not have had confidence or trust in the system to disclose TBI information. Despite reassurances, some of the men had verbally stated that they felt they would get into trouble if they had experienced a TBI, especially if there were any prison-related injuries. Trust has been identified as a longstanding issue

for prisoners, both from a prison/staff and prisoner to prisoner perspective [28]; however, this was managed through the development of relationships and reassurance of confidentiality, processes and how the information would be used. It should also be noted that the sample population were sentenced male prisoners (over the age of 18 years) predominantly from the Auckland region. Given the identified higher prevalence of TBI within the prison population and potential link to engagement in criminal behaviour and reoffending, it would be important to extend this work through screening young offenders, female prisoners and the inclusion of the remand prison population to determine if similar trends emerge.

A further limitation of this study is that it was not able to determine the proportion of male prisoners who may still be experiencing persistent difficulties following TBI. Given the fact that deficits have been found to persist for many years, even after mild TBI [29], assessments to determine prevalence of common deficits post TBI including post-concussion symptoms, level of cognitive functioning, sleep difficulties and social skills would be useful to identify the difficulties experienced within the prison population. Understanding potential areas where interventions could be targeted may assist in optimising quality of life and reduce reoffending.

As only restricted information was available from the prison service for study participants, limited data on pre-imprisonment psychiatric history, substance use, prior incarceration or neuropsychological profiles was available. However, these factors have been found to be predictive of persistent problems following TBI in both the

general population and in prison [30]. It would be important for future studies to explore these additional factors and the role they may play on the effects of TBI on a person's level of functioning and offending.

Based on the feasibility of the TBI screening process demonstrated in this study, the TBI screens now form a formal ongoing part of the standard health-screening procedure in this corrections facility alongside a measure of current post-concussion symptoms to inform the management and care of prisoners who may be experiencing persistent deficits following TBI. Knowledge of TBI history and current symptoms could be used to help identify potential difficulties male prisoners may be experiencing in prison, such as taking longer to process or remember information, fatigue or noise sensitivity. The management of prisoners within the corrections facility could be developed to include specific staff training around TBI and the establishment of TBI specific units with the aim of supporting the management of persistent TBI impairments.

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# Appendix G: Transcriptionist confidentiality agreement



## Confidentiality Agreement

**Project title:** Understanding and managing Traumatic Brain Injury (TBI) in a South Auckland Corrections Facility - a pilot randomised control trial to test the efficacy of a psychological intervention.

**Project Supervisor:** Alice Theadom and Elizabeth Du Preez

**Researcher:** Tracey Mitchell

- I understand that all the material I will be asked to type is confidential.
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- I will not keep any copies of the transcripts nor allow third parties access to them.

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Approved by the Auckland University of Technology Ethics Committee on 26 April 2017 AUTEK Reference number 17/120

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