Current Processes for Identifying and Managing Traumatic Brain Injury (TBI) in the Justice Sector.

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Abstract

Traumatic brain injury (TBI) is a significant health concern, with one in three people in the general population experiencing at least one TBI before age 25. The prevalence is even higher in people within the justice sector. Considering TBI can cause chronic disability, with high social and socioeconomical costs, access to healthcare after an injury in the justice sector is essential even after a mild injury. This study aimed to establish what currently happens when a person involved in the justice sector sustains a TBI, the strengths of current processes and improvements that could be made to facilitate access to healthcare following TBI. Semi-structured interviews with nine staff members of Ara Poutama Aotearoa (Department of Corrections) were conducted and qualitative descriptive analysis was used to capture their perspectives. There were two overarching themes identified; 1) recognition of TBI; and 2) working with individuals affected by TBI. With regards to recognition, processes for those who required hospital evaluation for moderate and severe injuries were in place, however improvements in access to services for those with milder injuries were needed. The second theme illustrated that staff perceived that processes were needed beyond initial identification, and should extend to supporting the person when working with them in everyday situations. Streamlining pathways to health practitioners within the justice sector and facilitating how corrections staff work with people who are affected by TBI may help reduce behavioural infractions and risk of reoffending. Suggestions for improving quality of care following TBI are presented as a summary at the conclusion of this thesis.

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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 (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

13/03/2023

Signature

Date

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Ethics Approval

Ethics Application: 21/431 How are mild brain injuries identified and managed within the justice sector?

The evidence provided, satisfied the points raised by the Auckland University of Technology Ethics Committee (AUTEC) and the ethics application has been approved for three years until 23 February 2025 (see Appendix A).

Chapter 1: Introduction

This thesis presents a qualitative research study to determine the processes around traumatic brain injury identification and management within the New Zealand justice system. This chapter provides background information and context for the importance of such a research topic. At the conclusion of this chapter, an overview of the thesis structure will be presented.

1.1 Traumatic Brain Injury

Traumatic brain injury (TBI) is known to be a major public health concern across the world. It has been estimated that globally around 69 million people suffer from a TBI each year, of which, many injuries go unreported or untreated (Dewan et al., 2018; Powell et al., 2010). TBI is therefore often considered to be a 'silent epidemic' (Rusnak, 2013). Indeed, a New Zealand (NZ) general population incidence study revealed that approximately 36% of injuries did not present to medical services following an acute injury (Feigin et al., 2013).

TBI is defined by the World Health Organisation as an acute injury to the brain as a result of mechanical energy from an external physical force (Carroll et al., 2004). TBI therefore does not include injuries caused by internal factors such as illness, stroke, oxygen deprivation or toxicity (Khuu et al., 2017). The severity of the TBI can range from mild to severe. Even following a mild TBI (mTBI), many patients can go on to experience long term disability that often impact on the survivor, their family, friends, and society (Selassie et al., 2008).

1.1.1 Physical presentation of TBI

The physical presentation of a TBI can be remarkably heterogeneous in the nature and severity of brain damage and brain disfunction (Rosenbaum & Lipton, 2012). The physical and therefore behavioural consequences of the injury can depend on a range of factors such as if the injury is focal or diffuse, if it is primary or secondary, the location of the injury, and the degree of damage (Rosenbaum & Lipton, 2012).

TBI can be classified using the terms focal brain injury and diffuse brain injury. Focal brain injuries are injuries which damage a localised area of the brain, whereas diffuse brain injuries damage a larger, more generalised anatomical area (Andriessen et al., 2010). The distinction is usually made based on the presence or absence of focal lesions. While injuries can be considered predominantly focal or diffuse, most injuries usually involve both focal and diffuse components (Mckee & Daneshvar, 2015)

TBI injuries can also be classified as being either primary or secondary. Primary injuries occur as a result of the initial, mechanical, external impact to the brain, where the neural, glial, and vascular tissue is sheared and compressed, and normal brain function is disrupted (Moppett, 2007). These injuries can be caused by a range of mechanisms including acceleration and deceleration forces, rotational forces, blunt impact, blast winds, and penetration (Mckee & Daneshvar, 2015). As a result of these forces, direct damage to the physical structure of the brain can occur, causing a focal or diffuse injury pattern. This pattern can then result in further alterations within the brain, setting off a dynamic cascade of events leading to longer-term difficulties (Mckee & Daneshvar, 2015). While the neural damage that occurs from this primary impact is not well understood, the brain can adapt and build new neural connections following an injury (Kleim, 2011). Secondary injuries occur as a result of the normal, physiological response to the primary injury, such as infection or increased intracranial pressure, causing further brain damage (Mckee & Daneshvar, 2015). Secondary injuries can further increase the risk of brain dysfunction or morbidity, highlighting the importance of ensuring medical attention is sought to prevent this potential cascading of events (Ghajar, 2000; Mckee & Daneshvar, 2015).

The dysfunction caused by TBI can be also dependent on the location and diffuseness of the injury. The cerebral cortex receives and analyses sensory information and is responsible for high level functions for example planning, learning, and decision making. Within the cerebral cortex, different regions have different functions; the occipital lobe processes information related to vision; the temporal lobe processes hearing and speech information, as well as facial and object recognition; the parietal lobe is involved in sensory responses; and the frontal lobe has implications for motor control, executive functioning, and matters related to personality (Pass & Dean, 2010).

Due to the heterogeneous nature of TBI, it is difficult for researchers to accurately relate damage to specific dysfunction, particularly if the injury is diffuse. An objective measure of the presence and severity of the injury, using diagnostic biomarkers, is still yet to be developed (McCrory et al., 2017) and the impact of injury can only be determined through subjective report of symptoms. When treating individuals with TBI, awareness of how the dysfunction is related to the pathology may help to provide more relevant interventions. For example, if there is knowledge of frontal lobe damage, the rehabilitation strategy may ensure executive dysfunction is addressed (Stuss, 2011) or conversely, if change to social behaviour is noted, consideration of frontal lobe damage may be considered (Pass & Dean, 2010).

1.1.2 Severity of TBI

Despite it being well established there is a large amount of heterogeneity between injuries, there is consensus that the severity of traumatic brain injury ranges from mild to severe. While the proportions of people falling into each category can vary in the literature, a recent meta-analysis estimated severe TBI patients, which require the most intensive medical care, make up around 8% of injuries (Dewan et al., 2018). Around 11% of injuries are defined as moderate, where patients experience difficulties which can persist for the rest of their life (Dewan et al., 2018). The highest incidence of cases (around 81%) are classified as mTBI (Dewan et al., 2018). The proportion of mTBI is likely to be higher than this as a substantial number of these injuries are underreported (Laker, 2011; Meaney et al., 2014).

However, accurately classifying TBI severity can be challenging. Usually the severity of the injury is classified using clinical signs immediately following the event, such as loss of consciousness (LOC; O'Neil et al., 2013). Self-report of the injury is usually heavily relied on when assessing the clinical signs of the injury (Pitman et al., 2015). However, if there is no witness to the accident, loss of consciousness is difficult to determine. Additionally, the trauma of witnessing the accident can change an observer's sense of time where seconds can feel more like minutes, so accurately reporting time of LOC can be challenging (Corrigan et al., 2018). However, despite these limitations, injuries with a LOC have been found to have poorer outcomes than injuries sustained where no LOC occurs (Kelly, 2001).

On presentation to hospital, clinicians will often use the Glasgow Coma Scale (GCS) to determine the severity of the injury. This is the most commonly used classification system for TBI, and measures eye, verbal and motor responses (Teasdale & Jennett, 1974). This scale has been well established and remains a good predictor of outcomes among people who have sustained a TBI, while also being a mechanism for clinicians to quickly and easily evaluate the severity of the person's presentation (Basak et al., 2022; McNett, 2007).

Post traumatic amnesia (PTA) is also considered when clinicians assess severity of the TBI. Clinicians utilise the Westmead Post-Traumatic Amnesia Scale (WPTAS; Geffen et al., 1994). Alongside questions relating to the patient's orientation, the WPTAS measures the ability of people who have sustained a TBI to create new memories over a 24 hour period and is clinically useful for predicting patient outcomes following an injury (Briggs et al., 2022; Shores et al., 2008). For patients who have sustained more mild injuries, an abbreviated version of the scale can be used shortly after the injury has occurred to reliably assess a patient's ability to establish new memories over shorter time periods (i.e., hourly rather than daily; Ponsford et al., 2004).

Assessing the extent of the injury for mild injuries largely relies on self-report. This can be a challenge as often these injuries can be downplayed or misunderstood, especially if there is motivation to return to work or sport quickly. Disability in the acute phase of the brain injury appears to correlate well with long-term impact, however self-report of disability after the event may be disproportionate and may be inversely correlated to severity (Rees, 2003).

Another way TBI is assessed is through computerized tomography (CT) scans. When the TBI is more severe, the incidence of abnormalities observed on a CT scan increases (Moppett, 2007). This proves difficult however in the assessment of mTBI as biomarkers and CT scans are not detailed enough to show mTBI abnormalities observed in more expensive scanning techniques such as diffusion tensor imaging (DTI) which are not publicly funded (McCrory et al., 2017). Therefore, CT scans are most appropriate for more severe injuries and are only recommended for those at high risk of a skull fracture or brain bleed e.g. ≥65 years, ≥two episodes or vomiting or loss of consciousness, amnesia or witnessed disorientation after the injury (Rogan et al., 2022).

As mTBIs represent the majority of injuries experienced (up to 80% of TBIs are classified as mild), the spectrum of mTBIs can include people whose symptoms resolve naturally within a few hours/days to those people who experience persistent symptoms which can affect their ability to engage in everyday activities (McCrory & Berkovic, 2001; Sussman et al., 2018; Voss et al., 2015). Attempts have been made to try and sub-divide these injuries into "low-risk mild head injury," "medium risk mild head injury," or "high-risk mild head injury" (Servadei et al., 2001), however there is no classification system that has been able to effectively sub-categorise across the mild range in a meaningful way (Theadom et al., 2018).

Further confusion regarding how mTBIs are classified is that mTBIs are often referred to as concussion, particularly within the sports context. However, this distinction does not, from current research, reflect any underlying pathophysiologic differences (Lumba-Brown et al., 2018; McCrory et al., 2017). In the academic field, concussions are considered to be a milder form of mTBI, however, the use of the two terms can be confusing for those affected, their families, and healthcare professionals (DeMatteo et al., 2010). The term ‘concussion’ was originally suggested for use with clients and caregivers as it was believed to suggest a more transient condition, by avoiding stigma associated with the terms “brain damage” or “brain injury” (Management of Concussion/mTBI Working Group, 2009). The term concussion has been proposed as not being a useful distinction and can result in some people not taking their injury seriously (Sharp & Jenkins, 2015). Given there are no

pathological differences between concussive and mTBI injuries and that the term concussion is rarely used outside of the sports context, the term mTBI will be used throughout this thesis to encompass all causes of injury in this severity classification that a person may experience over their lifetime.

The findings discussed above help to formulate the definition of mTBI proposed by the World Health Organisation task force (Carroll et al., 2004, p. 115):

> *"MTBI is an acute brain injury resulting from mechanical energy to the head from external physical forces. Operational criteria for clinical identification include: (i) 1 or more of the following: confusion or disorientation, loss of consciousness for 30 minutes or less, post-traumatic amnesia for less than 24 hours, and/or other transient neurological abnormalities such as focal signs, seizure, and intracranial lesion not requiring surgery; (ii) Glasgow Coma Scale score of 13–15 after 30 minutes post-injury or later upon presentation for healthcare."*

Further definitions proposed utilise neuroimaging findings, stratifying mTBI into complicated and normal mTBI, however this can be impractical for many clinical practitioners due to resources required (Bigler & Maxwell, 2012; Williams et al., 1990). The considerable heterogeneity in the nature of mTBI, including the time and nature of loss of consciousness, the location, and the force of the blow, all contribute to a different injury profile for sufferers of mTBI (Sussman et al., 2018). Provided complications are not missed during treatment, people who experience mTBI have a low mortality rate and a good prognosis, as compared to sufferers of moderate to severe injuries (Moppett, 2007).

1.2 Epidemiology of TBI

It is difficult to ascertain the prevalence of TBI with certainty due to issues with defining and recording injuries but a recent meta-analysis has found around 12% of the general adult population have experienced a TBI with loss of consciousness in their lifetime (Block et al., 2014; Frost et al., 2013). Of these, males are 2.2 times more likely to have sustained a TBI with LOC in their lifetime, suggesting the male gender appears to be a risk factor for TBI. In NZ, it has been estimated that around 527,000 people have experienced at least one TBI in their lifetime (Te Ao et al., 2015).

A study in the United Kingdom (UK) found the rate of head injuries was 453 per 100,000 emergency department presentations (Yates et al., 2006). They also found males are at higher risk of head injuries than females; especially males of an adolescent or adult age where they may be at more risk of injury because of the activities they participate in. Yates and colleagues (2006) also found that living in urban areas was also a risk factor for head injuries, and their research supported the idea that social deprivation may cause barriers to accessing healthcare which is potentially one of the complex causes of the

increase in child mortality for those with lower socioeconomical status (SES; Tennant, 2005; Yates et al., 2006).

TBIs often occur early in life. Within NZ, it has been estimated that around 30% of individuals have sustained a TBI before the age of 25 (McKinlay et al., 2008). This information was obtained using medical records and self-reported medical attendance for a head injury, so there is the potential some injuries were not included in this figure. The high incidence of these injuries at any early age can lead to risk of lifelong burden as it can have an impact on brain development. Magnetic resonance imaging (MRI) studies have indicated that adolescence is a key period of brain development as substantial developmental and structural changes occur at this stage, particularly in the frontal lobe (e.g., Ahmed et al., 2015; Giedd et al., 1999; Shaw et al., 2008). Injuries during this developmental period can result in difficulties with impulse control, planning, emotional and behavioural control, at a time where the individual may be more likely to experience difficulties with substance use and impulse control disorders (Anderson & Catroppa, 2005; Dumontheil, 2015). Difficulties resulting from TBI also may not become apparent until after the brain has fully developed. For example, angry and aggressive behaviour may not present itself until many years after the young individual sustains a TBI which makes linking this behaviour to the injury difficult. In some cases, there may not be an awareness by individuals, family or wider society that some behaviours can be partially explained by previous TBI (Linden et al., 2020).

There is also very little known about the prevalence of injury sequalae. Again, this uncertainty is due to difficulty of assessment because of the heterogeneity of injuries, and the lives of the injured. In the United States of America (USA) the prevalence of individuals living with significant TBI sequalae is thought to be around 1.1% of the population, or around 3.2 million (Zaloshnja et al., 2008). A study from Denmark estimates around 0.32% of the general population have sequalae resulting from TBI which prevents all professional activity (Engberg, 1995).

Especially concerning, in NZ, indigenous peoples are overrepresented in the prevalence statistics of TBI (Elder, 2013). The incidence of TBI in Māori is significantly higher than in non-Māori, up to three times higher in some data (Barker-Collo et al., 2009; Bentley et al., 2022; Feigin et al., 2013). While prevalence of TBI is higher in Māori, there is less access to appropriate rehabilitation (Graham & Masters-Awatere, 2020) which highlights a strong need in NZ for the provision of culturally responsive healthcare (Elder, 2013; Graham & Masters-Awatere, 2020).

Ensuring a culturally appropriate understanding of TBI and the people who experience it is important in identifying suitable prevention strategies and optimising post-TBI

outcomes in NZ (Elder, 2013; Lambie et al., 2022). Culturally safe practice needs to be considered in both a research and practise context. For example, when conducting research with Māori, it is vital to be mindful of the previous experiences of Māori with researchers, where information has previously been taken without reciprocity or the recognition of Māori ownership of the information taken (Elder, 2013; Smith, 2003). Conduct of TBI research, as well as the assessment and treatment of TBI, should aim to uphold the principals of Te Tiriti o Waitangi (participation, partnership, protection) and utilise a tikanga Māori approach (e.g., whakawhanaungatanga) to provide effective and culturally appropriate care following TBI (Lambie et al., 2022).

One important cultural consideration, known as the wairua theory of TBI, was established in previous research by Elder (2013). In Māori culture, wairua is understood as "a profound sense of connectivity between Māori and all aspects of the universe" (Elder, 2013, p. 410). Clinical services still have work to do in developing the understanding or skills required to respond to the wairua aspect of mokopuna TBI (Elder, 2013). This may be done by using Kaupapa Māori and Pasifika-based approaches to understanding trauma and recovery (Lambie et al., 2022).

TBI can also have a profound impact on whānau. As discussed by Elder (2013), fundamentally, whānau are most important when responding to the wairua injury, so it is important they are involved in the healing process. However, a lack of understanding of whānau members present challenges with supporting an individual who has sustained a TBI including emotional distress and changes to family functioning (Ergh et al., 2002; Jumisko et al., 2007). There can therefore be increased social isolation due to breakdown in relationships which can cause barriers in social reintegration (Lefebvre et al., 2008). One of the key challenges for families living with an individual who may have sustained a TBI is the individual can often be more reactive or aggressive which alongside difficulties with social integration, may result in increased antisocial behaviour (Hesdorffer et al., 2009).

1.3 TBI and offending behaviour

Many studies have identified a relationship between TBI and criminal behaviour. The relationship between TBI and criminality appears to be complex in nature, with many pre-cursors and effects co-occurring to make establishing causality difficult (Williams et al., 2015). The effects of TBI can include impulsivity, poor emotional regulation, and executive functioning difficulties (Hesdorffer et al., 2009; Williams et al., 2018). Many of the effects of TBI, especially in combination, are likely to increase rule breaking and antisocial behaviour which can lead to offending (Williams et al., 2015).

TBI appears to be associated with poor criminogenic outcomes such as earlier age of incarceration, increased risk of violence, and number of convictions (Williams et al., 2018). Many offenders commonly present with neurological abnormalities which are often linked to violence, infractions in prison, poorer treatment gains, and reconviction (Williams et al., 2018). Lifetime history of abuse, neglect, trauma, drug and alcohol problems all seem to be higher in individuals with history of TBI as compared to those without. TBI has also been linked to specific offending behaviour, including being correlated with sexual offending (Simpson et al., 1999), intimate partner violence (Godfrey et al., 2020; Portnoy et al., 2022), increased infractions while incarcerated (Shiroma et al., 2010), as well as a higher risk of re-offending once released (Williams et al., 2010). However, in contrast, Schofield and colleagues (2019) recently found in an Australian cohort, there was no association between violent offending and history of TBI which may mean there is still much to be understood around the connection between TBI and offending behaviours.

TBI has been found to be correlated with involvement with the justice system, with the prevalence of TBI in offending populations higher than the general population. Many studies in the USA and UK have shown the prevalence of TBI in offending populations is higher than non-offending populations (e.g., Allely, 2016; Davies et al., 2012; Farrer & Hedges, 2011; Horn & Lutz, 2016; Shiroma et al., 2010; Williams et al., 2010). However, there is large variability in prevalence rates between studies; findings have varied between 46% (Williams et al., 2010) and 72% (Allely, 2016; Davies et al., 2012). TBIs also tend to occur proximally to first offence (The Disabilities Trust Foundation, 2016) with a NZ study suggesting that TBI is associated with criminality regardless of age at first injury or injury severity (McKinlay et al., 2014).

Injuries which occur in younger individuals can cause disruptions to the development and maturation of the brain, including to the ‘social brain network’ which may result in behavioural regulation difficulties, and thus problems with social integration (Williams et al., 2015). Following a TBI, younger individuals have been found to be more likely to experience interpersonal conflict which can be compounded by poor emotional control and reduced language skills resulting in increased probability of use of violence or aggression (Baguley et al., 2006; Williams et al., 2015). Geographical and socio-economical factors may increase the probability the individual will sustain a TBI due to increased likelihood of involvement in assaults, road accidents, as well as drug and alcohol use (Perron & Howard, 2008; Williams et al., 2010). Injury to the frontal lobe has also been found to have an adverse effect on impulse control, judgement, and reasoning which are all factors that can lead to an increase in criminal behaviour. Damage to the frontal lobe can also lead to a reduced ability or inclination to avoid risk taking behaviours (Patrick et al., 2008).

When considering the relationship between criminal behaviour and TBI, it is important to consider individuals currently in a prison setting. There is large variability in findings of prevalence in prison cohorts with an Australian study finding 82% of prisoners have had a history of TBI, including 65% with a history of TBI with loss of consciousness (Schofield et al., 2006). Using predominantly studies conducted in the USA, a more recent systematic review found the mean prevalence of 46% of prisoners had a history of TBI (Durand et al., 2017). In NZ, it has recently been found that the prevalence of lifetime TBI in prisons was higher, with 63.7% of male prisoners or more than four times the prevalence in the general population in NZ (14.3%; Farrer & Hedges, 2011; Mitchell et al., 2017). The rate of TBI in community sentenced offenders is also high at 40%, meaning the correlation between TBI history and involvement in the justice systems extends past prison populations in NZ (Horspool et al., 2017)

Many studies which explore the prevalence of TBI in prisoners are limited by sample selection which causes much variability in the findings (Mitchell et al., 2017). In addition, studies investigating TBI prevalence use a variety of screening tools, including medical notes review and self-report screens. These different tools used can result in variability in findings. For example, in a meta-analysis, Shiroma and colleagues (2010) found a reduced prevalence (50.1% versus 60.25%) when loss of consciousness, of any duration, was taken into account. Durand and colleagues (2017) found when reviewing the prevalence literature in prison that most studies were classified as descriptive, cross-sectional studies, with low levels of scientific rigour and only four studies included control subjects. Some researchers have even found it not possible to provide a mean prevalence of TBI in prisoners due to the heterogeneity of the data (O'Rourke et al., 2016; Williams et al., 2015).

Further to this, there is limited information regarding the aetiologies of TBI in people involved in the justice sector. Durand and colleagues (2017) found that the two most common causes of TBI in prisoners was reported to be road accidents and interpersonal violence. Another study found around 37% of reported TBIs in prisoners were due to assault, compared to around 10% in the general population (Moore et al., 2014). In contrast, in NZ it has been found 19.9% of injuries were caused as a result of assault in individuals aged between 15-25 years of age (McKinlay et al., 2008) however there does not appear to be data available regarding the comparable figure for prison populations. When considering aetiologies of TBI, it is important to note the injury does not need to be severe to cause damage, including long-lasting damage. Repeated low level injuries to the head can have a cumulative effect on functioning and may often not be identified by the individual or by medical professionals (Piccolino & Solberg, 2014).

The directionality of the relationship between TBI and offending behaviour may be bi-directional. Young males with lower SES are at highest risk of sustaining a TBI (Yates et al., 2006). Concerningly, the dysfunctions commonly caused by TBI, such as impulsivity, poor emotional regulation and a lack of consequential thinking, in young males with low SES, may be attributed to a more general delinquency rather than consideration being given to the possibility of damage to the brain (Williams et al., 2010). This population may be more likely, after sustaining a TBI to misuse substances from a young age and be generally described as more impulsive and fearless (Fishbein et al., 2016; Perron & Howard, 2008).

Conversely, an antisocial trajectory of an individual may result in them being more at risk of sustaining a TBI. A study has found men from lower SES backgrounds under 30 in the UK are more likely than others to sustain a TBI, and are also more likely to be involved in criminal behaviour (Yates et al., 2006). A further study in Canada has found a history of problematic substance use often pre-dates first TBI in the majority of prisoners and can increase the likelihood of receiving a TBI (Colantonio et al., 2014; Corrigan et al., 2012). Further, injuries that are sustained as a result of criminal behaviour are also less likely to be brought to the attention of a medical professional which can further increase adverse effects of the injury (Allely, 2016; Diamond et al., 2007; Horn & Lutz, 2016; Schofield et al., 2011).

As seen, the factors which can be either a cause or a consequence of TBI are deeply inter-related (Schofield et al., 2019). Individuals who are involved in antisocial and criminal activities are likely to experience a TBI through engagement in at-risk behaviour and may lead them to be less likely to seek appropriate treatment (Horn & Lutz, 2016). The occurrence of TBI in populations already experiencing inequalities and deficits can exasperate the known issues experienced with a TBI and result in difficulties with coping responses and social networks (Farrer et al., 2013). It has also been found that some people still hold the incorrect assumption that TBI is essentially inevitable in the lives of risk-takers who have a pre-disposition towards crime (Williams et al., 2015).

People involved in the justice system also are more likely to already exhibit traits which are related to the symptoms of TBI, including difficulties with concentration and memory, irritability, impulsivity, and aggression (Bannon et al., 2015; Dixon et al., 2005; Perron & Howard, 2008; Williams et al., 2010). Therefore, these symptoms may often go unnoticed by staff and fellow prisoners, and the prisoner themselves may also not recognise the subsequent deficits being related to a sustained TBI (Pitman et al., 2015).

Due to a number of factors, the needs of an individual with TBI can be complex. The lack of appropriate treatment can further lead to an exacerbation of the impact of the injury, especially if the brain is still developing (Horn & Lutz, 2016; Lambie, 2020). For individuals

involved in the justice sector, often treatment of TBI can be of high cost to prison facilities, and Williams and colleagues (2018) suggest some facilities are not well placed to address these needs. The difficulties described above can often lead to aggressive, unpredictable behaviours in prisoners, and can result in challenging behaviour while in prison such as higher rates of rule infractions and increased rates of re-offending following release (e.g., (e.g., Horn & Lutz, 2016; Piccolino & Solberg, 2014). In NZ, whānau and wairua are important factors to consider when treating Māori clients with TBI, however prison facilities may not have the appropriate resources to be able to accommodate this (Elder, 2013).

Alongside rule infractions, individuals with difficulties as a result of TBI may cause issues with requirements within the prison, such as participation in treatment programmes. Treatment programmes within the prison are usually designed to target criminal behaviour, such as impulsivity, and aggression, however other deficits caused by TBI, such as irritability and difficulties concentrating, may result in difficulties participating in these programmes (Ramos et al., 2018). Prisoners with TBI, diagnosed or undiagnosed, are likely to struggle with remembering course content, disregard consequences of their actions which may result in acts of frustration, verbal outbursts, and irritability (Budd, 2020). Early and appropriate management of prisoners with TBI is essential in improved outcomes, and the need to establish evidence-based guidelines for identification and management of TBI is key to this (Moppett, 2007).

1.4 Summary and purpose

TBI has been coined a ‘silent epidemic’ due to it often not being identified in a healthcare setting (Buck, 2011; Ray & Richardson, 2017). The biggest proportion of TBIs are classified as mild injuries and often do not result in medical treatment, especially in prison populations (Schofield et al., 2011). There is a high prevalence of TBI in people involved in the justice system, and a well-established link to criminality, increased risk of rule infractions in prison, and re-offending after release (Piccolino & Solberg, 2014; Williams et al., 2010). Therefore, TBI in prisoners needs to be addressed for appropriate management of these individuals while they are still under the care of the justice sector and in preparation for independence in the community.

There is also a need to establish the state of the current literature around assessing and managing individuals with TBI and considering what healthcare processes are successful and what improvements have been identified. While there has been much research looking at the relationship between TBI and criminality, there seems to be less research concerned with how to ensure individuals with TBI involved in the justice sector are accessing the healthcare and treatment that will address the impact the relationship between

TBI and criminality has. Improving access to healthcare in offending populations, may improve the outcomes for the individual and their whānau, and may also reduce risk of reoffending by providing the individual with an improved understanding of their difficulties are how to manage them (Williams et al., 2018).

1.5 Overview of thesis structure

This thesis utilises a qualitative methodology to explore the perspectives and experiences of staff members working in the justice sector around the identification and management of TBI in individuals in their care. Chapter 2 of this thesis will explore the literature, focusing on how healthcare is accessed in the justice sector, and how mTBI is currently identified and managed in justice sectors, and other sectors globally. Chapter 3 will describe the methodology and methods utilised in this research before the presentation of the analysis (Chapter 4) and discussion of the results (Chapter 5).

Chapter 2: Literature review

As outlined in Chapter One, there is a high prevalence and incidence of TBI within the offending population and potential for longer term difficulties. The aim of this review is to critically review the literature related specifically to access to healthcare in the justice sector (prison and community probation services). First, there will be exploration of access to general healthcare, followed by a review of the current ways TBI can be assessed, before concluding with the challenges faced with assessing healthcare and managing TBI within the justice sector. It is acknowledged that due to a lack of research looking at community services around access to healthcare and TBI, this literature review will largely focus on the research around prison populations.

To begin looking at how people involved in the justice sector access healthcare after a TBI, it first needs to be considered who is entitled to this healthcare. The World Health Organisation notes that internationally, prisoners are entitled to the same level of healthcare as would be provided to individuals in the community (Gatherer, 2007). In NZ, people involved in the justice sector in both community and prison settings are entitled to healthcare treatment and services. Additionally, healthcare practitioners have a collective obligation to aim to improve healthcare for vulnerable populations, such as prisoners (Waisel, 2013), meaning improving access to healthcare is an important consideration for staff working within the justice sector.

However, despite this right to healthcare, prisoners have been found to experience unfair and avoidable health differences to individuals in the community (Charles & Draper, 2012). Prison conditions, such as overcrowding and architectural design, can lead to additional health risks, creating increased demand on often limited resources (Charles & Draper, 2012). Additionally clinicians have reported feeling conflicted by their obligation to the organisation in distributing resources whilst ensuring optimal care of their patient in prison (Pont et al., 2012). It is also of note that clinicians are often in a position of authority over the prisoner as prisoners do not have the option to change their healthcare clinician or their provider – their supports are usually entirely determined by the prison (Pont et al., 2012). Some suggest to reduce this dual loyalty, prisoners should be receiving healthcare which is independent from the prison administration (Waisel, 2013).

Evidence suggests that prisoners generally believe their healthcare provision while in prison is poor. A study of a USA women's jail (Hatton et al., 2006) conducted focus groups to find out how female prisoners perceived their healthcare problems were being taken care of within the prison. A range of physical and mental health problems were discussed by the women, and notably the women reported that it was more difficult to establish contact with

health professionals for their mental health problems (Hatton et al., 2006). Similarly, a study in Greece which conducted semi-structured surveys through interviews with female prisoners found around 63.4% of respondents reported that their health had worsened while they were imprisoned and 49.5% of respondents described the quality of healthcare services provided in prison to be poor and did not meet their needs (Geitona & Milioni, 2016).

Other studies have looked into the perspectives of both male and female prisoners in relation to the use of specific treatments. Hassan and colleagues (2013) investigated the perspectives of prisoners and staff on the use of psychotropic medications in England. It was identified prisoners did not view this treatment as addressing the cause, but rather as a way to help them manage their symptoms (Hassan et al., 2013). Issues were raised by prisoners that they had been taken off their medication against their wishes, and the impact this made on their symptom management (Hassan et al., 2013). This study also identified prisoners viewed their mental health problems as an ongoing personal struggle, one prisoner touched on how he viewed the aim of healthcare while in prison to be management of symptoms, rather than addressing the cause of their problem (Hassan et al., 2013). Hassan and colleagues (2013) noted the potential mediating effect of the patients selected by staff to participate, with the possibility the more compliant, positive prisoners were selected. It is also of note however that the participants involved in the study were those receiving treatment in the first place, with little exploration around lack of access or delayed access to the treatment they required.

It has also been established that there is a range of barriers to accessing healthcare while in prison. Hatton and colleagues (2006) looked at barriers that were identified by prisoners. One barrier discussed by prisoners was the long waiting time taken to have an appointment with a healthcare professional, with a range of wait times reported such as 45 days to see a doctor for an ear ache, or a month to receive results for a pregnancy test (Hatton et al., 2006). One of the reasons for the delay was with staff decision making around if the woman's request to see a healthcare provider was appropriate. When an attempt was made to reduce the time for an appointment, through bypassing this invasive approval, there was confusion around the new system and the wait time did not seem to decrease (Hatton et al., 2006). Findings from this research emphasise the complicated administration structures within prison systems and the need for changes to the healthcare system within prison to be done with a comprehensive debriefing of staff and changes to be made with staff collaboration.

Similarly, to prison populations, people involved in justice settings in the community, such as on parole, have also been found to experience barriers in accessing healthcare.

One study of men in a residential treatment facility who were on parole in the USA found participants reported three main barriers to healthcare access: financial (including being uninsured and being poor), administrative (including bureaucratic and procedural obstacles, excessive wait times, and administrative failures such as lost medical records), and uncaring professional demeanour (including feeling like clinicians lacked empathy and care in their approach (Marlow et al., 2010). In comparison, participants noted caring professional staff demeanours (such as taking the time to listen to the individuals concerns at the start of the interaction) and a reduction in structural barriers (such as services being offered at the shelters where they resided), were key facilitators to participants being able to access healthcare in the community (Marlow et al., 2010). Valuable information about the social and structural barriers and facilitators to healthcare access were identified in this study however, it is of note that participation in this study required two 90 minute long interviews with people who experienced chronic physical or mental illnesses. This criterion likely excluded a portion of the population who did not have the time to participate, or who felt reluctant to even ask for health care services for a health concern.

People involved in the justice sector also have different needs based on different characteristics such as gender, age, and ethnicity (Harris et al., 2007). Literature between 1994 and 2005 shows greater or more specific healthcare needs for women, young prisoners, older prisoners, and those from minority healthcare groups (Harris et al., 2007). In Switzerland, interviews with older prisoners aged 51-75 years identified three key themes; psychological obstacles, negative consequences of healthcare utilisation and environmental obstacles (Heidari et al., 2017). Some prisoners reported the psychological barriers (such as lack of trust in prison medical services and practitioners) resulted in prisoners sometimes opting to postpone their medical requirements until after they were released (Heidari et al., 2017). Prisoners also reported the fear of being seen as faking their medical needs and the potential repercussions of being accused of faking. Even being believed was reported to have negative repercussions, such as loss of income due to deemed too sick to work, or isolation from other inmates and activities (Heidari et al., 2017). Staff perspectives on these points would add value to this research as there is a clear need from the prisoner's perspective for a collaborative, consistent approach from staff in how their healthcare needs are managed.

In another qualitative study from the UK, Edge and colleagues (2020), interviewed prisoners on their experience with secondary healthcare access. It was highlighted that a main concern for prisoners was the uncertainty regarding when the appointment would occur (Edge et al., 2020). They also expressed concerns with embarrassment with their treatment, including one quotation: "I felt like a zoo bear that is usually walking with a chain in the

nose…" (Edge et al., 2020). These perspectives were also expressed by older prisoners who acknowledged these concerns could be psychological or provoked by the experiences of other prisoners (Edge et al., 2020; Heidari et al., 2017). In services where the therapeutic alliance is critical in achieving positive outcomes, experiences like these can result in damage to this relationship before it has started (Hoke, 2015). Interestingly in this research it was also found there was rarely discussion with prisoners about appropriate use of restraints in a healthcare setting, highlighting the difficult balance that must be struck between healthcare access and security requirements (Heidari et al., 2017). Of note however is the recruitment strategy of some of these studies (e.g., Edge et al., 2020; Heidari et al., 2017), where initial recruitment of participants was by information passed on by staff or people who the prisoners had an already established relationship with. This may imply that the concerns reported in these studies are mediated by an established trust in the staff which could be dampening the severity of concerns raised.

It is also important to consider the viewpoints of healthcare practitioners. One study (Powell et al., 2010), looked at the views and experiences of healthcare staff working in England prisons. Discussions with professionals in a variety of healthcare roles, including managers and nurses, were held in individual interview and focus group format. Healthcare staff viewed their role as identifying and addressing the healthcare needs of prisoners, however several challenges to this were identified (Powell et al., 2010). The nurses highlighted the importance of being able to make healthcare decisions for the prisoner as if a doctor was required for these decisions, delays would occur. Similarly, staff members found the referral process to an outside specialist was time consuming and frustrating, with many appointments to secondary care requiring cancelation due to lack of prison officers to escort the prisoner. It was highlighted that there was a difficulty in balancing security requirements and healthcare needs within the prison. Interestingly, the nurses reported emergency care referrals were the most straightforward as they were treated with a much higher priority than referrals to secondary healthcare services (Powell et al., 2010).

Recently, research by Rippon and colleagues (2021) has focussed on the challenges of mental healthcare delivery for prisoners as reported by healthcare staff. There were three major themes which emerged from this research including: location of mental healthcare delivery; communication with stakeholders; and prison policies, procedures and legislation. The prison environment was again identified as being poor for therapeutic intervention, such as the building being aesthetically unappealing due to the void of natural light (Rippon et al., 2021). Other issues included concern by both staff and prisoners as to the lack of privacy. Other staff members cited a lack of access to information in an integrated information technology (IT) system, stating the time spent chasing information can be stressful and

result in delayed services. Healthcare staff in this study were also concerned about the disconnect between prison officers and healthcare workers. Prison officers are primarily concerned with security protocol, have more contact with prisoners than healthcare staff, so a collaboration between these two teams is thought to be important for the delivery of successful mental healthcare within prison (Jordan, 2011; Rippon et al., 2021).

In NZ, statistics show there are health inequalities between the prison population and the general population that need to be addressed (Monasterio et al., 2020). In 2016, a study of 13 prisons across NZ found that around 91% of prisoners have had a mental health or substance use disorder diagnosed in their lifetime and 62% of these were diagnosed in the 12 months prior to the research being conducted (Indig et al., 2016). In comparison, although around 86% of people in a study of the general population of NZ met the criteria for at least one mental health disorder by age 45, most (59%) of participants were diagnosed before the age of 18 (Caspi et al., 2020). For TBI, health inequalities seem to be especially notable, with an estimated 13% of the NZ population having experienced at least one TBI event at some time in their lives (Te Ao et al., 2015) as compared to 63.7% of male prisoners (Mitchell et al., 2017). Unfortunately, there seems to be a lack of research in NZ looking at how these inequalities and prisoner needs are being addressed.

The NZ correctional system utilises the Risk Need, Responsivity model in managing people in their care (Bonta & Andrews, 2007). The model underpins assessments of risk of reoffending (such as the Dynamic Risk Assessment for Offender Re-entry; DRAOR; Muirhead, 2016; Serin, 2007) by identifying the presence of factors which evidence has shown to be predictive of reoffending. This model forms the basis for identifying support needs within the correctional context as well as informing psychological reports. However, what this model does not directly take into account are individual's health needs which could also contribute to a person's risk of reoffending. For example, Muirhead and colleagues (2016), have argued that factors such as impaired impulse control, problem solving abilities, and mood, may need to be taken into account when considering risk. This suggests that an individual's psychological and healthcare needs may need to be considered when evaluating a person's risk of reoffending. For example, rather than focusing purely on the person's behaviour, there may be benefits in considering the cause of the behaviour, such as a possible acute or historic head injury, and considering whether the person is in need of further healthcare, such as rehabilitation, to meet their needs and potentially reduce risk of reoffending.

This is supported by research which has found in prison, undiagnosed TBI is related to the prisoner being more likely to engage in a higher rate of problematic behaviour and/or

rule infractions (Budd, 2020; Piccolino & Solberg, 2014; Williams et al., 2010). Upon release, when a TBI is not identified, evidence suggests adult offenders will be more likely to return to prison due to further offending or increased supervision infractions (Piccolino & Solberg, 2014; Williams et al., 2010).

2.1 Healthcare access for TBI in prison

One of the initial challenges in provision of effective health care for TBI is identification of need. Misconceptions about TBI can lead to barriers of identification and treatment of TBI (O'Rourke et al., 2018). For example some believe that you need to have lost consciousness to have experienced a TBI or experience a direct hit to the head (O'Rourke et al., 2018). Additionally, as TBI are invisible injuries and symptoms can emerge several hours or days after injury, many people often do not realise that they experienced an injury, or be fully aware of the injuries effect, and need to seek help (O'Rourke et al., 2018). A further challenge in TBI identification and management is confidence of health practitioners in identifying and managing these injuries especially when presented alongside other healthcare concerns (Budisin et al., 2016; Kushner, 2015). In one study, around 33% of individuals admitted to acute Spinal Cord Injury (SCI) rehabilitation had also sustained a TBI (Bombardier et al., 2016).

Formal staff training around TBI may also be a barrier to people involved in the justice system receiving support. Research with probation officers in Northern Ireland has identified 92.3% of surveyed participants reported not having received any formal training around TBI (O'Rourke et al., 2018). Those who recalled where they had received training noted it was through their university degree, charity organisation, or personal interest (O'Rourke et al., 2018). This implies formal training was not supplied through their employment as a staff member in the justice system. In this study however it was not noted the level of formalised education that staff received around other prisoner healthcare concerns which may highlight a wider problem with staff training within this setting.

Another barrier to people involved in the justice sector receiving healthcare following a TBI may be the lack of standardised screening measures. Similar to places like the UK (Budd, 2020), there appears to be no standardised screening process in place for TBI within NZ prisons. Consequently, TBIs may not be being recorded accurately and a proportion of prisoners may be experiencing neuropsychological impairments or other difficulties due to their injuries and not currently receiving health care support and rehabilitation.

Budd (2019) recently conducted a review to investigate the published literature in relation to routine screening of offenders with TBI. Currently, there seems to be a lack of agreement around the best suited screening tool to implement for a wide scale screening

approach (Budd, 2020). There are many screening tools that are currently used to assess TBI, largely utilising self-report and interview methods (Shiroma et al., 2010). Self-report methods are used as it often takes a lot of time to gather official medical information and it may not be complete as the individual may not have sought medical treatment following their injury due to lack of awareness, resources, or fear of repercussions (Setnik & Bazarian, 2007). Some of the most commonly utilised screens with satisfactory psychometric properties within the justice sector, identified in a review by Allely (2016) include the Brain Injury Screening Index (BISI; Ramos et al., 2020), the Ohio State University TBI identification method (OSU-TBI-ID; Bogner & Corrigan, 2009; Corrigan & Bogner, 2007), and the Traumatic Brain Injury Questionnaire (TBIQ; Diamond et al., 2007). These screens are described in more detail below.

Most TBI screening tools seek to assess history of TBI. The BISI is a self-report tool, administered in interview format, to identify a history of TBI and also gives an indication of the severity of the injury (Ramos et al., 2020). As an initial screen for identifying individuals who need support, the BISI has been found to have acceptable reliability and validity (Ramos et al., 2020). McGinley (2017) found when looking into the construct validity of the BISI in a prison population in Scotland there was no association between the TBI Index (number of head injuries multiplied by duration of longest head injury) and disability and impairment, likely due to a difference from the internationally agreed definition of head injury (Carroll et al., 2004). It has been shown however, with use of the OSU-TBI-ID, as TBI severity increased, the impaired processing speed, mental health difficulties, and disability, also increased (McGinley, 2017). The creators of the OSU-TBI-ID tool, Corrigan and Bogner (2007), consider the gold standard of examining lifetime history of TBI to be an extensive, in-depth interview by a trained psychological professional. The OSU-TBI-ID method was designed for use in interview format to produce a ‘more complete and accurate history of TBI than simple medical record abstraction or self-administered questionnaire’. The authors of this method recognise that, despite research supporting its reliability and validity, this method is still susceptible to recall bias, and note that it is inherent in all methods of assessing TBI, the difficulty in defining the injury, especially in less severe, and retrospective cases (Bogner & Corrigan, 2009; Corrigan & Bogner, 2007).

The TBIQ is also an interviewer administered tool to assess history of TBI. This tool has two parts, and can take between 5 and 30 minutes to complete – a much greater variability than the time taken to complete the BISI and OSU-TBI-ID (between around 4 minutes and 9 minutes; between around 6 minutes and 13 minutes, respectively; McGinley, 2017). Although initial findings suggested promising reliability and validity of this measure, the quality of this tool is difficult to determine due to limited research (Allely, 2016). Diamond

and colleagues (2007) measured validity of the TBIQ against a number of psychological, behavioural, and cognitive symptoms and impairments known to be associated with TBI. This research supported the criterion validity of the TBIQ (Diamond et al., 2007). However, the time taken to complete the TBIQ is a key barrier to routine implementation.

Both the BISI and OSU-TBI-ID tools have high sensitivity meaning they often accurately captured individuals who were impaired or disabled due to TBI, and they also both have low specificity, meaning use of the tools likely results in high level of triaging of individuals who are not impaired or disabled (McGinley, 2017). It doesn't appear the sensitivity or specificity of the TBIQ tool has been evaluated.

In the development of the OSU-TBI-ID, Corrigan and Bogner (2007) identified there were still challenges with TBI screens such as how symptoms of TBI can be distinguished from other causes. The BISI attempts to address this by focussing on early sequalae of TBI, rather than symptoms that occur later, and in other conditions (Ramos et al., 2020). Further, Corrigan and Bogner (2007) queried how multiple mTBIs can be addressed and treated – the BISI aims to also combat this by summing the total incidents into a factor contributing to the BISI total score. This factor has been found to be associated with injury severity (gradient of LOC) and offending history (number of times in prison; (Ramos et al., 2020). Again, these solutions are still heavily reliant on accurate self-report of the injuries.

One limitation of existing tools are they focus on the identification of historic TBI. Consequently, these tools do not assess TBI in the acute phase if a prisoner experiences an injury within the prison. People can experience new injuries within the prison environment, such as through fights, vocational accidents, or sports and recreation. The Brain Injury Screening Tool (BIST) is a tool developed in NZ that assesses and triages acute injuries in the general community population, and may be an option for correctional facilities to consider (Theadom et al., 2021).

2.2 Treatment of TBI in prison

While it is well established the challenges faced by healthcare professionals and the difficulties with screening for TBI, it is important to establish what is known about the assessment and treatment of TBI within a prison setting. The exact mechanisms which maintain the relationship between TBI and offending are still unknown, however, it is suggested the behavioural and cognitive consequences of TBI may play a leading role (Pitman et al., 2015). Evidence from randomised controlled trials and opinions of experts suggest rehabilitation for TBI can improve functional outcomes in individuals, beyond what is expected from spontaneous recovery (Wiegers et al., 2021). However for this to occur, initial recognition of the TBI is necessary. The probability of receiving rehabilitation is also

associated with patients' environment. In prison, due to resource constraints, it may be challenging for the system to facilitate access to a multidisciplinary process which encapsulates the varying needs of the prisoner (Wiegers et al., 2021).

Despite the challenges, the benefits of providing healthcare for people who have a suspected TBI involved in the justice system means finding an effective identification, screening, and treatment pathway. While studies on TBI history are important in establishing the current, cumulative issues the offender may be experiencing in the prison context, research shows that early identification and intervention can benefit the offender (Lambie, 2020; Mitchell et al., 2017). For example, a recent systematic review has found Third Wave Therapies including Acceptance and Commitment Therapy, Compassion Focused Therapy and Mindfulness-Based Cognitive Therapy resulted in improvements in psychological difficulties such as depression, anxiety and emotional and cognitive functions after the occurrence of a TBI (Foreman, 2020). Similarly, another systematic review has found specialist treatment should be considered for people who have sustained a mTBI as they are likely to experience benefits from this approach such as the utilisation of interdisciplinary team rehabilitation (Möller et al., 2021). In NZ, the Accident Compensation Corporation (ACC) provides access to specialist services for those experiencing ongoing difficulties from mTBI based on the interdisciplinary approaches found to be effective. However, at the time of conducting this thesis, these services anecdotally report few referrals made for people within prison.

Although it is well known that early interventions for TBI care are beneficial, there currently appears to be a lack of research examining what happens when a new TBI occurs in prison and how these injuries can be identified and managed most efficiently and equitably. In NZ there has only been one study that has explored the screening of TBI injuries that occur within the prison context, but this approach has not yet been implemented into routine practice in other services such as the community-based probation environment (Mitchell, 2019). This suggests that there may be barriers to implementation that need to be explored. For example, there has been no research looking at the opinions of healthcare professionals on the value and improvements which can be made to the existing system. Previous implementation science studies have highlighted that a lack of staff support and expertise, and insufficient guidelines are often barriers to adoption of evidence-based interventions into practice for different populations (Bach-Mortensen et al., 2018).

Consequently, the purpose of this research was to discuss the issue of TBI identification and management with staff members within the justice system with the aim to

clarify i) how TBI is currently identified and managed and; ii) what would be helpful to improve access to healthcare services for individuals in their care who have sustained a TBI.

Chapter 3: Methods

The following chapter outlines the methodology and methods used to look into the research question: “How is traumatic brain injury identified and managed within the justice sector?” Exploring this research question was done with the following aims:

- To describe the perspectives of staff working in the justice sector and how the current processes for the identification and management of TBI is working for people in their care.
- To identify what staff would find helpful to improve access to care for those who experience a TBI while involved in the justice sector.

3.1 Methodology

Qualitative descriptive data was collected to describe the perspectives of healthcare staff working within the justice sector. Qualitative data is known to be a useful method to use to understand the subjective experiences of healthcare professionals without utilising predetermined categories to restrict the data collected (Fossey et al., 2002). Qualitative methods aim to develop new frameworks or theories by systematically reviewing qualitative data, making this method useful for establishing and clarifying unknown research variables (Fossey et al., 2002).

The current study utilised an interpretive descriptive approach. Described in 1997 by Thorne and colleagues, the interpretive descriptive methodology was originally informally used by many healthcare researchers who were utilising a mix of established methods derived from other disciplines. Interpretive description is used to recognise that experienced-based knowledge is complex, and commonalities and contextual components are valuable to consider when conducting qualitative research (Thorne et al., 1997). The interpretive descriptive approach was therefore established to provide health-care researchers with a valid research approach which could provide clinicians with relevant findings with direct applications (Thorne et al., 1997).

The processes of interest are deeply interconnected with the system and the people who are involved in the system so the naturalistic enquiry afforded by an interpretive descriptive design was necessary (Thorne, 2008). A holistic approach through recruitment and conversation led by the participant was most valuable in ensuring the meaning behind the experience was collected in the data and clinically relevant and useful information could be collected and formalised (Thorne et al., 2004). This design also allowed for an inductive approach to be used to establish the initial framework with the initial semi-structured

interviews before the review of the internal reliability and further adaptation to the framework following subsequent interviews. The ideas and experiences raised by the initial participants were also able to be further explored during interviews with other participants as the researcher gained further insights into their experiences and therefore could further enquire about the key themes previously identified.

Interpretive description was also considered an appropriate methodology for the purpose of this study given the lack of evidence describing staff experiences around mTBI in the justice sector. The design of this research was important in ensuring the findings could be presented in a way to enhance the knowledge in this field and provide direct, applicable insights into how clinical practice can be improved. For this reason an interpretive description approach was chosen to ensure the utility of this research and relevance to practice (Thorne, 2008).

3.1.1 Recruitment strategy

Staff working within the justice sector were recruited through convenience sampling, utilising established professional relationships within Ara Poutama via email and newsletters for dissemination of the research advertisement (Appendix B). Some of the participants had a prior relationship established with the research team prior to study commencement based on professional connections. Other participants were recruited through circulation of the study advertisement along with snowball sampling, as participants were encouraged by the interviewer (Lara Wilson) to share the study information with their colleagues. Participants all knew the research goals of the researcher through discussion over the phone prior to the interview and/or through review of the participant information sheet provided to each participant (Appendix C).

If interested in taking part in the study after seeing the advertisement, participants were able to contact the interviewer through the email or phone number listed on the advertisement. The interviewer checked their eligibility against the inclusion/exclusion criteria The eligibility criteria were: i) currently work within the justice sector and ii) provide clinical care or oversight to people with TBI or a suspected TBI.

A total of nine participants responded to the advertisement and nine interviews were conducted, one with each participant. Authors (Hill et al., 2005; Hill et al., 1997) recommend using 8-15 interview participants and note that less participants are required where the participant group is largely homogenous. Given the roles of participants were diverse, and one interview was collected per participant, the research team attempted to recruit more participants to the study to account for the different experiences for differing roles of staff working in the justice sector. Therefore, recruitment was conducted over many months,

however due to restrictions such as Covid-19 and staff shortages, recruitment of more than nine participants was not possible.

As per (Fawcett & Garity, 2008), the sample size was finalised when enough data was obtained to sufficiently answer the research question, by identifying participants who have knowledge in the area of question. The goal of the sample size was to capture a breadth of experience of individuals in different roles who also have an interest in the area so as to ensure engagement in the interviews and a range of perspectives.

Consideration was made as to the data saturation level, or the level where no new information emerges from study participants during data collection (Coyne, 1997). Given the diversity of participant's roles, data saturation was unlikely to occur as each new potential participant would have unique experiences and perceptions of the process in their role and at their location. Therefore as data saturation would likely never have truly been reached, an attempt was made to recruit as many participants as time would allow (Bradshaw et al., 2017).

3.1.2 Data collection

Once eligibility to participate in the study was established (as outlined in 3.1.1), participants were then sent the Participant Information Sheet (Appendix C) and Consent Form (Appendix D) to review. The participants were also asked in this contact if they would like to set an interview time and date or if they would like time to review the documents that would be sent to them prior to booking a time. Once a time was agreed to, the interviewer sent through confirmation of the meeting details.

Participants were asked to set aside an hour for the interview including an additional 5 minutes for consent and demographic questions. Interviews lasted between 30 minutes and 1 hour and 14 minutes with the interviewer confirming if the participant was happy to continue if the interview appeared to exceed the hour initially indicated.

The participants were interviewed in a space and time that was convenient to them, either at their workplace or at their home. Participants were asked to identify a private place for the interview to take place and the participant and interviewer were the only people present for the interview to ensure participant confidentiality and anonymity and to promote participant safety and open communication during the interviews.

Semi-structured interviews over video technology (Zoom) were conducted to enable the researcher to engage in purposeful conversation with the participant without constraints of questions needing to be asked in a specific order or with specific wording (Hofisi et al., 2014). Semi-structured interviews can be particularly useful in providing flexibility during data

collection to enable the interviewer to adapt their questions based on the participant's responses (Hofisi et al., 2014; Robson, 2002). Although phone interviews were offered to participants, interviews through video conferencing were preferred by participants as they allowed the interviewer and participant to actively engage in non-verbal interactions to allow for a smooth flow of conversation (McIntosh & Morse, 2015). Interviews were conducted over Zoom to ensure participants could participate regardless of their location within NZ. However, interviews over Zoom relied on the participant having access to a reliable internet connection which at times caused minor disturbances to the flow of conversation. Use of Zoom also resulted in a reduction in access to non-verbal communication due to just the visibility of the interviewer and participant's faces during the interview. All interviews were conducted by the student researcher.

It was noted that to conduct successful semi-structured interviews, interviewers need to have skills such as a good memory and an ability to interpret comments made by interviewees correctly without imposing meanings (Hofisi et al., 2014). Initial interview questions were developed and trialled with lay mock research subjects. The questions were then submitted alongside the ethics application for ethical review. The interviewer had previous experience with the justice sector population through completion of her honours research in this area. Following ethical approval, the full interview schedule (Appendix E) was trialled further on three mock research participants, two with lay 'participants' and a final trial with a member of the supervision team (Chua). These trials were used to help support the interviewer's understanding of appropriate probing questions that may be required and to refine the interview questions. Probing questions used were open ended and specific to the participant's comments.

Interviews commenced by the interviewer greeting the participant and providing an overview of the structure of the interview before turning on the audio recorder. Once recording, the researcher confirmed with the participant that the study aims and activities were understood and participant consent was gathered (Appendix D). Demographic questions were then asked. The researcher then provided a brief scope of the interview (see Appendix E), prior to starting on the interview questions. Participants were often also asked at the start of the interview to describe their role to establish a context for their responses.

All participants were asked a minimum of a version of the questions listed in Appendix E. Additional questions were also asked that depended on the context of the information provided. These were often open ended clarification questions about a comment they had made to the researcher, such as "what would be your next step?" (Hsieh &

Shannon, 2005). The conversations were fundamentally grounded in the hui process described by (Lacey et al.).

Upon completion of each interview, recordings were uploaded to a secure AUT Teams folder for transcription. Interviews were transcribed verbatim by the interviewer, before being loaded into Nvivo for analysis. Transcription employed an intelligent verbatim approach where fillers such as ‘um’ were not included if they were not conveying meaning. Verbal nods such as ‘okay’ and ‘yeah’ were included in the transcriptions and non-verbal audible cues such as laugher and interview interruptions were also noted in the transcriptions to reflect the flow of the conversation, regardless of if they conveyed important meaning (McMullin, 2021).

3.2 Data analysis

The aim of analysis was to build categories and overarching theories which describe the experiences of participants in accessing TBI healthcare for the people in their care and to collate practical reflections of the value or possible improvements that can be further made to the system. Due to the nature of these aims, to achieve this, interpretive description was used to analyse the data. Interpretive description allows for the analysis to be data-driven and explore the research question through an inductive approach which is what was required given the scant research and formal understandings in the area (Thorne, 2008).

Data collection and data analysis were completed simultaneously with the first six transcripts analysed as recruitment and interviews were conducted for the final three interviews. This allowed for the analysis of the initial transcripts to help inform the following interviews (Thorne, 2008). Data analysis was completed independently by two researchers (Lara Wilson and Jason Chua). The key critical components that were utilised to ensure the researchers stayed close to the data, with an interactive process are described below.

3.2.1 Data familiarisation and relation to study purpose

To begin to analyse the data, the first step was to comprehend the phenomenon under study (Thorne, 2000). This was done by transcribing the interviews verbatim and reading the transcripts multiple times. Reference to field notes and discussion with the research team were made during this time to serve as initial building blocks for potential codes and categories.

3.2.2 Coding

Open coding was used to identify initial aspects of the processes around TBI healthcare in the justice sector. Codes were largely identified at the semantic level to ensure the analysis remained close to the data, however codes were identified at the latent level where there was a need for interpretation of underlying meanings of what was said were required. Codes were collated in NVivo to provide a cohesive list of data for the continuation of the analysis process.

3.2.3 Categorisation

Once identified, codes were sorted into a conceptual framework of categories based on the relationships and linkages between the participants' experiences. Category definitions were identified based on the codes in the category and refined as further codes were added or removed from the category. Categories were then organised into meaningful clusters of ideas, or subthemes (Coffey & Atkinson, 1996; Patton, 2002). Subthemes were further organised into two main themes. This process was dynamic, with categories, subthemes, and themes being explored, altered and removed as needed, as supported by Thorne (2008). A sample of this process is noted in Appendix F. Consideration during this phase was also made to the relevance the analysed data was to the research question and initial purpose of the study. Based on this evaluation, data was further reviewed and re-coded as needed.

3.2.4 Review

For the final three interview transcripts, a deductive analysis approach was utilised to establish internal consistency. This analysis approach involved the lead researcher reviewing the transcripts alongside the developed coding framework and codes were assigned to the data as appropriate. Codes were identified as needed, and further refinements to category, subtheme and theme definitions occurred as a result of new ideas being identified in the further three transcripts. Minor revisions were made as a result of reviewing the final three transcripts as analysis of the initial six interviews was found to have identified many of the main points discussed by participants. During the review phase, illustrative quotes were also identified to support the identified categories.

3.3 Trustworthiness

Strategies described by Morse (2015) were utilised to demonstrate validity of this study including prolonged engagement, negative case analysis and peer review and debrief. Firstly, an hour of participant's time was requested to allow for the researcher to have more time to establish trust and obtain richer data due to prolonged engagement with the participant. There was also variation in the scope of the findings resulting in findings that

were not predetermined, suggesting the data collected provided adequate information around the processes for identifying and managing TBI with appropriate variation and depth (Morse, 2015). Secondly, during data analysis, there were situations where different understandings of the process were identified by participants. This information was utilised to review the descriptions of identified categories to ensure these differences were highlighted and compared, rather than discounted. Thirdly, throughout the analysis process, peer review and debriefing with supervisory team occurred. There were no areas of notable difference between analyses, so work was combined and further refined to create a final coding framework, any differences were resolved through discussion and consensus. As a result of this consultation, categories, subthemes and themes were actively refined by the research team prior to agreement around the final definitions. The research team were also continuously in discussion to ensure the assumptions of the primary researcher were not causing bias in the interpretation of the transcripts.

3.4 Ethical approval

Ethical approval was sought and obtained through the Auckland University of Technology Ethics Committee approved on 23 February 2022 (AUTEC Reference number 21/431; see Appendix A). Ethical approval was also obtained through Ara Poutama's Research and Evaluation Steering Committee (RESC), approved on 20 May 2021, with a final amendment to the initial application approved by the RESC on 16 June 2022. Data collection and analysis was conducted after approval was granted.

Chapter 4: Results

In this chapter, participant characteristics will first be described, followed by an outline of the themes identified in the data. Each subtheme identified will then be described in detail.

4.1 Participant demographics

A total of nine participants were interviewed who worked in a variety of roles across the justice sector, across NZ. Participant characteristics are presented in Table 1. Participants ranged in age from 31 to 60 years old, with an average of 51.1 years at the time of the interview (±11.4). The majority of participants were female (66.7%) and identified as being of NZ European ethnicity. The level of education ranged from lower secondary education to doctoral level, with the majority of participants (*n* = 6) having completed a Bachelors degree or higher (Table 1).

The sample included a range of clinical and non-clinical roles. Participants had on average 8.1 (±7.0) years experience (range 6 months to 22 years) in their current role. Years working in the Justice Sector ranged from 2 to 24 years, with an average of 13.6 (±8.2) years.

Table 1. Demographics of study participants.

		N (%)
Age (mean±SD years)		51.1±11.4
Gender	Male	3 (33.3)
	Female	6 (66.7)
Ethnicity	NZ European	5 (55.6)
	Māori	2 (22.2)
	Other	2 (2.2)
Occupation	Clinical manager	2 (22.2)
	Probation Officer	2 (22.2)
	Psychologist	2 (22.2)
	Mental health clinician (nurse)	1 (11.1)
	Non-clinical program manager/coordinator	2 (22.2)
Education	Lower Secondary School	1 (11.1)
	Upper Secondary School	2 (22.2)
	Bachelors	1 (11.1)
	Postgraduate qualification	5 (55.6)
Years experience in current role (mean±SD years)		8.1±7.0
Years experience in the justice sector (mean±SD years)		13.6±8.2

*SD = Standard Deviation, N = Number

4.2 Understanding TBI in the justice sector

It became clear from the data that the identification and management of mTBI in the justice sector is a complex and multifactorial issue with diverse opinions and understandings of the processes seen across differing roles. Although participants were asked at the start of the interview to try and focus on acute mTBIs in the justice sector, all participants also highlighted concerns with regards to identification of historical injuries experienced by the people in their care (referred to from here on as 'individuals'). Overall, it was that clear participants, even ones who were not sure they would have much to offer to the discussion, had a range of important views on the topic and how it had an impact on their role on a day-to-day basis.

There was a clear distinction in responses to the two parts of the research question relating to: 1) the initial recognition of TBI and; 2) working with people affected by TBI in the justice sector. Within these two overarching themes there were a number of subthemes identified, as outlined below.

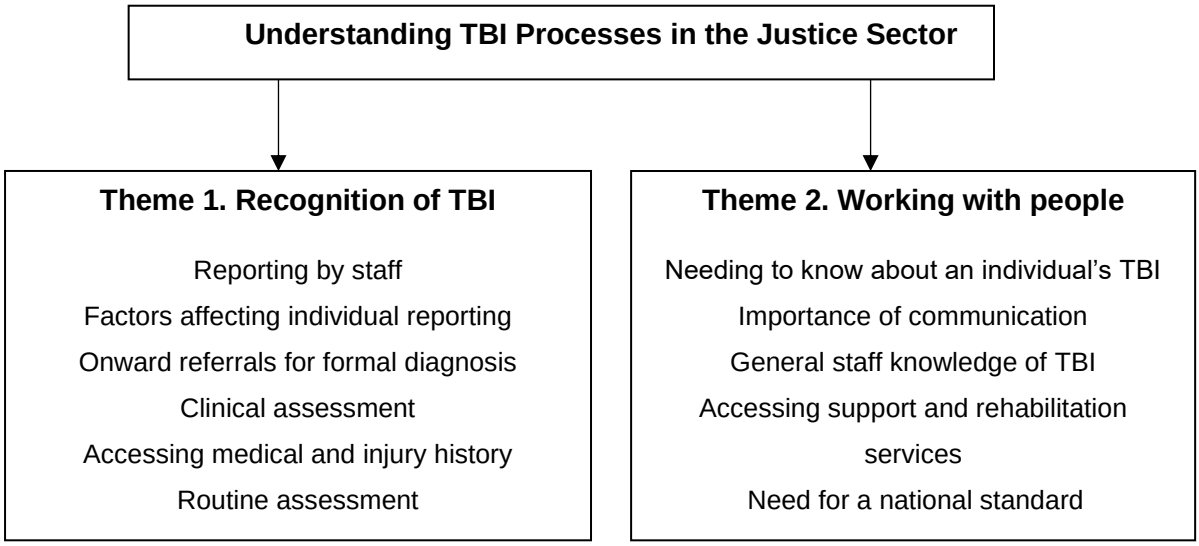

Figure 1. Themes and subthemes illustrating the main factors that describe the processes around TBI in the justice sector.

4.3 Theme 1: Recognition of TBI

Participants identified there are a number of ways that suspected TBIs were identified and assessed within the justice sector. This theme contains 6 subthemes including; 1) Reporting by justice sector staff; 2) Factors affecting individual (or whānau) in the reporting of suspected TBI; 3) Need for onward referral for formal diagnosis; 4) Clinical

assessment of suspected TBI; 5) Accessing medical and injury history; and 6) Routine assessment processes.

4.3.1 Reporting by justice sector staff

Inter-staff communication was noted by participants to be important in identifying TBIs. Specifically, nurses relied on custodial staff to notice if a possible injury has occurred and communicate their concerns. This was felt to be an important part of the process as nurses were often not in close proximity to the prisoners, unless seeing them for medication rounds or for scheduled check-ups. Clinical participants working in the prison setting noted they felt the system of communication between the nursing and custodial staff was well established.

> *Custodial staff are extremely good at notifying Health if they have any concerns about the wellbeing of the people that they're looking after. And they are that first point of contact as far as response. (P2)*

To communicate prisoner health concerns, clinical and non-clinical staff can record concerns in a shared offender management system. One participant noted they often received information about their clients having had an injury through daily incident briefs. Urgent communication between nurses and custodial staff was noted to be through radio.

> *Nurses go in and out of a unit according what they need to do, but they're not actually based in the units… but the custody officers are based in there so we take a lot of direction and we, you know, they'll radio us if there's an emergency and then the nurses start running. (P1)*

While the communication between nurses and custodial staff was noted to be strong, other participants expressed uncertainty around what staff roles were in the case of a suspected TBI. Some participants suggested they thought it was the duty of the custody staff to report injuries that occur while the individual was in prison but were not familiar with the exact roles of their colleagues.

> *The custody staff might have a protocol where if somebody did get, like, hit in the head they would have to go, but I'm not really sure. (P6)*

4.3.2 Factors affecting individual (or whānau) in the reporting of suspected TBI

The reporting of suspected TBI by staff worked well when an incident was witnessed or there were obvious signs of injury such as bruising. However, concern was noted about reliance on this approach in unwitnessed events.

> *...these guys can get hit in the head and not let us know. It would have to be upon them to report it to us for us to actually take any action… (P6)*

Consequently, participants also talked about having a reliance on the individual or their whānau, to tell them about a possible injury. However, participants expressed concern

that individuals and whānau may not feel comfortable approaching staff and that establishing a rapport and proactively asking about possible injuries was important.

> *…to frame it in a way so that they feel like they're willing to share that information with you. (P1)*

> *They don't know what a head injury is. That's why, [you need to ask] were you in a fight lately? Oh, did you get hit in the head? …you need to build a good rapport with them to be asking some of these questions. (P6)*

Participants were concerned that fear may prevent some people from coming forward with a suspected injury. For example, those sustaining a possible injury due to a fight may become fearful of further assault.

> *Some people may, may be very scared. And they may openly say they're scared and they need to be moved to a different unit, maybe where there's more supervision… but other people may not speak up. (P7)*

Another participant added the culture of the prison also played a role in fear experiences.

> *I'm a firm believer that you create a, you create a safe space no matter we you are, whether it be on this program, in prison. A little bit difficult when it's, when you're in prison, creating a space, but because if you don't, we don't have that safe space, then, you know, you're not gonna find out very much. (P8)*

The fear participants felt individuals experienced was also linked in with the infrastructure of the prison. For example, the density of living arrangements with other prisoners, and potential for conflict.

> *The environment, sometimes the cells, are double bunked, people are, attempting to be brave and staunch, and not always honest with what is occurring with the symptoms. In that environment. It's not an environment where people are encouraged to show signs of weakness, or vulnerability. So that isn't always necessarily shared with the health team or the custodial team if there is a problem. And obviously, that's varying. I'm speaking quite generically, but it is you need to be cognizant of that environment. (P2)*

Participants also noted that ease of communicating information about an injury was also factor in the individual's reporting behaviour. It was easier for individuals to report the injury if they didn't believe the staff's response would be punitive and felt safe to disclose the information to staff.

> *it's a lot harder to tell correctional staff, oh, I got in a fight with Joe. And he knocked me out. But when you have a good record with them, and they know that it's not going to be punitive, that actually the services and support are going to be there to actually treat the brain injury, not the criminal offending, which I think they should see in the STU [Special Treatment Unit] more than the prisons then yeah, they're going to be more open to telling you I got my head knocked in. (P6)*

Participants also mentioned that reporting of suspected injuries was dependent on the individual's knowledge around TBI, ability to recognise a possible injury in themselves and awareness of the need to seek care to prevent longer term consequences.

> *So sometimes younger people would be picked up a little bit more, I guess, than the older generation. And the older generation is the harder one, because they're the old oh she'll be right, mate, like just had a few knocks to the head, it's all good. (P5)*

In terms of historical injuries, whānau were also noted as being important to identify injuries and impacts.

> *It's not until we get the family together. And you mentioned it, "Oh, yeah, I remember that. he got smacked around the head, jeez he changed after that." (P8)*

> *certainly, the more significant TBI people have noticed, pre and post injury, you know, whānau report changes and their mood states and all sorts of different things like that. (P4)*

Some participants noted individuals can, and do, decline assessments following an injury. Some staff members had strategies for if individuals declined assessments such as conducting passive observations of the individual to ensure their condition is not worsening.

> *Quite often, some of the people in our care are reluctant to be assessed. And decline to be assessed, post head injury acutely and post normally when it's from violence. And so our advice to our registered nurses at that time is, if the patient's not consenting for observations, or an assessment then please record, how they are engaging, what they look like, what their gait and movement is like, and also speech. So that there is still a form of assessment occurring to determine how, or what plan we might need to put in place for that person. (P2)*

4.3.3 Need for onward referral for formal diagnosis

Participants all described that following recognition of a suspected TBI, individuals were referred to a clinician (such as a nurse or GP) for an assessment and diagnosis. The nature of the on-referral depended on the environment the injury took place (e.g., prison vs community) in and the type of injury identified (i.e., acute or historical).

If an injury occurred in prison, custodial staff referred the individual to the health care team who typically undertake an initial assessment. Nurses will then in turn on-refer to a General Practitioner (GP) or other health services such as the Emergency Department, depending on the needs of the individual. If considered to be a minor injury, participants noted nurses create a care plan for injuries that occur in the prison. If an injury occurred in a special treatment unit, participants reported that the individual would be sent straight through to the Emergency Department. If a possible historical injury was reported by individuals to non-clinical staff while in the special treatment unit, they discuss their observations with the individual's psychologist to establish a plan forward. Probation officers noted they would encourage the individual to make, and attend, an appointment with their GP for a medical

review. Probation officers mentioned that if they were uncertain about a suspected injury or with what was going on for the individual in their care, they would refer them to the community mental health team.

> *…if we felt something was a little bit off, we'd get the mental health clinicians involved because obviously…we have no ability to fully assess somebody or you know, suss out is this a brain injury or is this mental health? (P3)*

> *So having them [mental health clinicians] around has been a real asset, because we're, we're just not trained for that. (P3)*

In contrast to this, the mental health clinician participant who worked in the prison setting, noted they do not receive specific referrals for TBI. They noted their team does not have the specialised skills or abilities to assess an individual with a TBI so will refer them to a GP or a neuropsychologist for further assessment.

> *… a referral will never be made specifically for brain injury ...But then there's some head injuries in there [referrals they do receive] … we will refer on, either to the GP or, or to the forensic team, which has a psychiatrist and sometimes the psychologist that that could, could possibly help. If it's somebody that, that had a known injury, and there was an ACC claim, then we can go back to ACC. (P7)*

4.3.4 Clinical assessment of suspected TBI

When clinical staff members become aware of an individual that they suspect has experienced a TBI, they described a medical assessment that they would follow.

> *Normally, it [clinical assessment] would involve, obviously the Glasgow Coma Scale, assessing gait assessing BP, pulse, respirate, and also assessing for any bruising, bleeding lacerations, trauma, as well, and any fluid from nasal or ears etcetera. (P2)*

Participants also noted that they were able to utilise legislation in order to enforce compulsory 24 hour video observations of an individual by moving them into a specialised cell while in prison, however this was a rare occurrence and had not been applied in the context of a TBI.

> *..we have the ability to put them on what we call section 60, which has medical oversight…And that means that we can keep a closer eye on you if need be...making sure that you're not deteriorating overnight duty when there's, you know, on night watch when there's no, you know, nurses on site... we haven't had a section 60 for a TBI in the last six months that I'm taking this role. (P1)*

Neuropsychological assessments would be utilised by psychologists to explore the individual's functioning following an acute injury and to identify if their responsivity to their treatment programme would be impacted on by their current functioning.

> *In my current role have we suspected a brain injury we would do neuro psychological screens. (P4)*

> *And then if they're interested, again, it's all voluntary, if they're interested, and they're concerned about the symptoms from a head injury. We'll do psychometric neuropsychological testing. (P6)*

Other participants noted that clinical assessments need to be culturally responsive. One participant believed there was a wider issue with the system which stemmed from the marginalisation and disenfranchisement of Māori in in Aotearoa and is evidenced by the higher proportion of Māori within the justice sector which needed to be considered in TBI identification and management.

> *…I imagine there's a numerous ways that Māori can be disadvantaged in terms of results from risk assessments, and, again, risk assessments are really based on you know, your violence, and for Māori, they've, they have more violent cultures, just because of the marginalization and disenfranchisement of Māori in this country. And so that, therefore, they, they have to survive differently than others. (P6)*

4.3.5 Accessing medical and injury history

Participants, both clinical and non-clinical, found value in being aware of an individual's health and injury history to identify prior or current TBIs. Non-clinical staff utilised this information to identify if the individual required further support in the community, such as needing support from a GP. Participants identified this information in two main ways; by querying individuals on their health history and by reviewing information stored on file.

Individuals were asked in formal and informal ways regarding their health history. One psychologist reported utilising questions from the Ohio State University TBI Screen to ask information relating to prior injuries, however other staff noted that information on TBI history was currently not routinely collected.

> *…just the basic head injury question. Have you ever had a head injury or loss of consciousness? Those questions that really were around the same types of questions and the Ohio State TBI screen, we just brush over those just to get the ideology of any head injuries. (P4)*

> *And so it's a history of brain injury that put me down a pathway of looking at screening and assessment tools. And currently within NZ, that is not completed routinely across people coming into prison or the justice sector. (P2)*

Participants noted however, that knowledge of an unrecovered historical injury often did not play a role in the assessment of acute injuries however one participant noted it should play a role in the development of a treatment plan for both Health and Custodial teams.

> *…we would be treating the acute… we will have a history hopefully if they've given us permission... so hopefully we would have had information on our systems to say that that person has had a previous TBI. So that goes into the whole management plan of how we treat, you know, a second, acute on top of a historic one. (P1)*

> *…the effect of compounding injuries is just it's just that whole area where it's not it's not something front of mind… just even with that thing that you're referring to, which is the effect that that can compound with previous injuries is not known to the general staff and population at all. They wouldn't think, they wouldn't think in that manner. (P4)*

Some participants found it challenging how an individual's health and corrections data were often not shared, limiting participants' ability to review information about TBI history. A participant felt that until information systems were linked, understanding an individual's health history would not help to inform their care options. Participants understood though this would need some consideration as information sharing was linked in with privacy concerns for the individual so can be complex. Participants working with individuals in the community also reported difficulties as an individual's health history often does not follow them across settings and accessing this information is challenging for staff.

> *But it's nine times out of ten when these guys come into this program we're the ambulance at the bottom of the cliff, and we're the ones that have to start climbing back up onto the cliff, to keep these guys to where we need them to get. Whereas if we knew about it, we could have the process put in place before they come to the program. (P9)*

Most participants discussed or alluded to how individuals within the justice sector often have a complex health history and healthcare needs which made it difficult to separate TBI needs, both historical and current, from other needs such as mental health and substance use. Difficulties identifying TBI due to complex healthcare needs was exacerbated by incomplete medical history, often as a result of the transient lives these individuals can lead outside of prison. Participants noted these individuals often did not have a consistent GP and could often rely on the individual's recall and consent for data on health history to be accessed.

> *our people are very transient, you know, and they'll live here for a period of time, and then they'll live there. And, and a lot of them don't access frequent referrals or healthcare or anything like that, because people just ask too many questions, you know, and it's just somebody being nosy in your business. And so it's easier just to move on and start fresh somewhere else. (P5)*

Participants also noted difficulties with the linkage of this health history information between the justice sector and community services. For example, it was noted to be difficult to know if an individual had a prior ACC claim, or when a request is made on their behalf, what the outcome of this request was.

> *And I'm aware that if a person on the community presented to the GP with an injury they get a letter back from ACC, saying that your claim has been accepted or declined. But for some reason, we don't seem to have that process occurring. (P2)*

4.3.6 Routine assessment processes

When asked about if there was a specific process that is currently used in their service to identify head injuries, such as specific questions or tests, no consistent process was reported by participants. One participant had introduced a new process at a previous prison they were working at, however at their current workplace in the current environment, they didn't have capacity to introduce a new process to identify TBI.

Participants were concerned that TBI was being missed in some individuals involved in the justice sector. One participant noted there were multiple opportunities to screen for TBI across the justice sector. Clear screening measures were wanted by participants, and they felt that they may need to be introduced at a higher level, such as the national office, to ensure this issue is addressed across the sector. One participant expressed there could be more certainty around the quality of care that was being delivered if there was a way for this to be reviewed and monitored.

> *there's a whole group of people at national office that you know, you know, if we, if we got the processes in place, so that the monitoring could be done. At national office, for example, you know, like, so they could run data to say, you know, How many people have got, you know, mild concussion or significant TBI's? And what have we put in place to help support them? But we need, it's IT support, you know, to help the data go in on the floor. (P1)*

Participants also noted that historical injuries could also be assessed at an earlier point in the individual's journey in the justice sector. This would allow for the system to put the support, resources and expertise in place as soon as possible for the individual, rather than relying on the knowledge and understanding of individuals and staff later on in this journey.

> *What would be extremely helpful is that when people come into contact with the justice sector, at the first point of contact, that there is a assessment of their level of function including foetal alcohol, brain injury, mental health, addiction, in that cohort of conditions could then determine a treatment pathway for the individual rather than a criminal pathway. (P2)*

4.4 Theme 2. Working with individuals affected by TBI

Identifying TBI was felt to be an important first step in being able to work effectively with individuals who have sustained a TBI. All participants keenly discussed their experiences and perspectives around manging individuals with TBI in the justice sector. This theme contains 5 subthemes including; 1) Needing to know about an individual's TBI; 2) Importance of communication; 3) General staff knowledge of TBI; 4) Accessing support and rehabilitation services; and 5) Need for a national TBI care standard.

4.4.1 Needing to know about an individual's TBI

Participants were aware that TBI was an important factor for managing individuals effectively within their care and noted it was likely a common difficulty experienced by individuals involved in the justice sector.

> *…a lot of problems, you know, a lot of behavioural problems that they're labelled with, being antisocial and being criminals are often problems that are actually masquerading head injury problems. (P6)*

Participants noted that they are trained primarily to manage risk levels of the individual in their care and to do this they often assess their behaviour. Participants noted that staff understanding of how an individual's history of TBI may influence their behaviour could have implications for how a person is treated. For example, an uncooperative person is more likely to have access to health care if custody understands that their behaviour is due to a TBI, rather than from purely anti-social origins.

> *You know, like, you might think somebody's been non-compliant. But they're not, their brain's fried, or scrambled, and not through drug use, or anything like that, but they're suffering from a brain injury that you haven't identified or are not aware of before. They can't keep their appointments, you know, they constantly forgetting things they forget to ring you and tell you, they can't come in and report. So it can have a really negative effect on their compliance level. If you don't understand what you're dealing with, you know, like, if you knew they had a brain injury, you'd be more tolerant, you'd try and find ways to do things differently suggest things, you know maybe a notebook or I'll text you or, you know, a lot of other things to help them and to support them to get to where they need to be, versus you're just being ignorant, noncompliant, I'm just gonna breach them. (P5)*

4.4.2 Importance of communication

Participants noted that communication of an individual's TBI history was useful in allowing staff to support the individual. Once a TBI had been identified, in some cases there appeared to be effective processes for sharing knowledge of the TBI, such as with custodial staff by healthcare teams.

> *So for example, if you've got somebody that's got residual brain damage from a TBI, you know, that is information that health services will share with our custodial colleagues, because that impacts on the way that they manage that person in the unit, if they know that they've got some residual brain damage. That should be useful to them. In treating that person, with more respect, than, if they thought that person was just being belligerent. (P1)*

Participants referenced the need for effective internal and external communication to enable them to manage individuals in their care who had sustained a TBI. Nurses and custodial staff were felt to play a key role in managing individuals with TBI in prison. For example, internally, nurses would communicate to custodial staff information regarding monitoring of the individual while they are in the unit, and when they required support to

assist with transfers to and from appointments. Nurses also provided information to their custodial colleagues to help support their management plan of the individual.

> *We can the nurses write an advice note of prisoner health status form which is a form that they can write. They use regularly about anything that they want to share with custody of the unit that a woman is residing in. So for a TBI, they would write a whole lot of information about signs and symptoms for custody to look out for. And, and at what point to notify anybody in health services should they deteriorate. (P1)*

Participants noted they found it useful when they were aware of what services or supports an individual had accessed previously, including before they entered the justice system. Participants noted they would make an effort to re-engage them with these services when they noticed they required further support. Building trust and rapport was advocated as an important part of obtaining this information from individuals as them communicating this to staff was a main way they would find out.

> *…they've had previous, previous supports in the future from, you know, a Brain Injury Association, or a social worker or something like that, you know, that we can sort of re-tap into. (P5)*

Participants described that communication was also two-way, with external providers sometimes needing to communicate with Ara Poutama staff to liaise around an individual in their care.

> *But a lot of the time, they've already got social workers assigned to them that are working with them. So the social worker will most often just reach out to us and say, Hey, I'm working with such and such, I understand they're being released to you. Or we find out through the people in our care, they're getting medication, or their social worker's, picking them up and bringing them into appointments or, you know, that sort of thing. So that's sort of how we access it. (P5)*

4.4.3 General staff knowledge of TBI

Workforce knowledge (for example, the prison health team, custodial and probation staff) around TBI was seen as important in effectively managing individuals in their care with TBI. Participants wanted education for themselves and their colleagues about TBI such as the prevalence, signs of an injury, and the impact a history of TBI can have on current functioning and behaviour. Participants also noted their colleagues had low knowledge about available TBI services and would like information for how to navigate the health system, such as via their staff intranet. Other suggested strategies to improve workforce knowledge around TBI including training to identify a possible TBI, training to discern between TBI and other conditions (e.g., mental health), and training to support a person with TBI.

> *…now and then we have a psychologist will attend various sort of trainings on traumatic brain injury. People have done some study into the area and present the findings, but that's just part of your profession as opposed to the actual job itself, and*

I think it needs to be sort of like formal, you know, formal, formal training, I think formal understandings, of systems and process to deal with that. (P4)

Some participants were taking this upskilling into their own hands. One participant noted their team were currently in discussions about care pathways for individuals in their care who may have TBI.

…we're currently discussing that, as a team, a pathway to, to support people, we suspect might have a brain injury. (P7)

Participants noted they would find access to TBI resources useful. For example posters and pamphlets. Participants also wanted access to interventions to help the individuals in their care with thinking problems. One participant noted they thought they could access this information through a mental health agency which they work alongside (Emerge Aotearoa).

…we do have some but no doubt, we need a lot more, pamphlets, posters, information around head injury, head trauma, injuries and we could possibly get that through Emerge Aotearoa. (P8)

Even be useful, having that information, in say, the lounge where these guys can pick a pamphlet or whatever up and have a look at it. They might go, oh, hell, I got that that and that, but I didn't know I had it. (P9)

Workforce capacity and motivation to learn also has an impact on the care an individual involved in the justice sector receives following a TBI. One participant noted that implementing process change challenging due to clinical staff already operating at capacity and having to deal with other priorities such as their Covid-19 response. It was suggested that the appointment of an appropriate change champion, or specialised staff would help facilitate process change.

So if you can get a really good nurse to be the subject matter expert, to get those processes in place to make sure that there's no gaps in the process. And that then they can let, not do everything, but make sure that everything gets done by their colleagues and support their colleagues as they're learning the new process. (P1)

I'd like to see appropriate facilities developed like a rehab, brain injury type facilities with people who have the training and expertise to work with those individuals to get the best outcomes for them. (P2)

…would benefit from having specialized people on TBI on as part of the health team. (P4)

Some participants struggled to answer questions relating to inequity of care as they felt it was too hard to tell because equity of access was not well defined in the justice system. In regard to TBI more specifically, participants noted that individuals from all cultures and ages could be affected, and staff members understanding this was important in appropriately assessing and managing individuals.

…it's also understanding that those sorts of things like brain injuries, then, you know, it doesn't discriminate between age, your culture or ethnicity or anything, you know, brain injury can happen to anybody (P3)

4.4.4 Accessing support and rehabilitation services

Within the prison environment, participants were divided with respect to both if and how culturally responsive care was being provided in relation to how individuals were able to access healthcare support following a TBI. Participants acknowledged the legal requirement for individuals who were within prison to be provided with healthcare that was equivalent to what they would be able to access outside of prison. One participant in particular noted they felt this was done well and that individuals often received better healthcare than they would if they were outside of prison. Similarly, some participants felt that cultural needs were being met due to the high prevalence of Māori and Pacifica in the justice system and their personal belief that the care they delivered was the same, irrespective of culture.

So you should never be disadvantaged by being in prison. In terms of your health care and in fact, the converse happens in fact, because they have, the general premise is that most prisoners, and this is a bit of a generalization, a lot of prisoners actually don't access health care in the community. (P1)

In contrast, other participants felt there was inequality around provision of care for Māori and Pacifica individuals.

I think obviously, Māori people here are really disadvantaged around that. And a lot of that sometimes is historic brain injuries that have gone undiagnosed for many years, and that person has learned to cope. (P5)

Regardless of culture, participants reported that accessing external healthcare providers and services, irrespective of their role and location, was difficult. Participants indicated they were uncertain of the specific services which were available for managing someone in their care who had sustained a TBI. Participants with knowledge of available supports noted they wanted better and more straightforward access to specialists such as neuropsychologists and ACC funded Concussion Services.

And I think if you looked at that there needs to be, obviously, more access to service. So people should also be able to access services without having to go through a convoluted referral process. (P2)

Well, neuropsychs could be, could be very beneficial. (P4)

Historical ACC claims was also noted by participants as being a useful strategy in helping the individual to access rehabilitation support. A participant noted during their interview that they would look to add a specific question about previous ACC claims to their initial intake questions as they saw significant value in asking for this information from the individual in their care. A process was established in one prison where any nurse could

submit through an ACC claim for an acute injury, however, getting an ACC claim approved was difficult for participants who they identified historical TBIs and there was no evidence to support a possible injury, for example childhood TBI.

> *…the people that have an ACC claim, that's easy that they have access to, to that service, and so that's quite good. But if that portion of people that we don't have a specific event. But there's a history, and it's not clear cut is, you know, what role does that play in the current presentation? And what how is that playing in the ongoing life problems? (P7)*

Participants advocated for health pathways to inform how individuals with TBI are managed, including how they are accessing support and rehabilitation. The current health pathways were described as being inadequate for individuals with TBI, especially historical TBI, which often resulted in absent care plans for individuals. Participants wanted easier access to the public health care system with appropriately funded care pathways, better tracking of referral outcomes (e.g., to ACC), shorter wait times (e.g., to GP, Concussion Services, physiotherapy), and better integration across the health sector and the justice sector.

> *My vision would be to see that we do have a service provision, pathway in line where we can offer the post head injury concussion, access to clinics access to treatment, but also access to neuro psychologists. And currently in NZ, that pathway is only funded through an ACC pathway. We have a high prevalence of people in our population who haven't presented to health providers when they've had head injuries. Therefore, it's difficult to then access for them some level of treatment strategies to help support them with the level of function. (P2)*

> *…we don't have access to a neuro psychologist or a formalised pathway for access to concussion clinics or brain injury NZ, to provide any additional support. We have informally around the country. Some sites access Brain Injury NZ on release and discharge for people when they're going into their home. But not always within the prison environment. (P2)*

Participants also wanted better access to culturally responsive health services. Participants felt the management of individuals in their care could be improved by offering services that aligned with the cultural needs of Māori or Pacifica peoples. One participant noted that accessing culturally responsive care was highly dependent on the local community's capability to fill this gap. Another questioned whether Kaupapa Māori health model was relevant to TBI and indicated they would find it useful if they received information from national office about how the work being completed in this area would be applied to their service. The desire for better communication from management in this area, was echoed by other participants, including how Hokai Rangi is being implemented by staff across the sector.

> *I think I think we run a good westernized health model. I know that there was work being done at national office to bring in a Kaupapa Māori health model. It's a little bit*

away yet. But it is something that is been worked on. And it will be coming into present health services, but I don't know what it's gonna look like. (P1)

I just think that the justice sector just needs to be more open and honest and transparent about it, the more information that they can gather and share it, to the people that need it, would be great. (P9)

Some participants also felt that some areas of internal service delivery could be better aligned with a Māori worldview. For example, one participant felt that evaluation criteria (assessments, outcomes, view of 'success') were not responsive to Māori and their view of successful outcomes. More interventions based on Māori principles and greater use of Te Reo Māori was offered as a strategy to offset this gap.

I think a bigger a bigger question is, does our westernized health model fit everybody's health needs. (P1)

So I think one way of, you know, filling that gap of inequality is decolonizing some of these interventions and actually, or sorry, the assessments and actually assessing Māori with tools that really do show valid results from Māori not just how they're comparing to people in the United States. And that just gives us a better picture again of the strengths and weaknesses. (P6)

Access to support was also dependent on the individual's environment. One participant who worked in the prison noted that often individuals were expected to recover from their injury in their own environment, which may not be conducive for their recovery; for example back in their cell. In contrast, participants who worked in the Special Treatment Unit, noted that if a TBI has been identified they try and adapt the individual's environment to support their recovery, for example by allowing them to wear sunglasses or take a break in a dark quiet room when needed.

…so they'll go into class and have a break so they might have 10, they have a 10-15 minute break so that person, or that individual may need to go and lie down. You know, those sorts of processes and all the room be darkened. (P8)

Participants in community based settings noted it was sometimes challenging to provide or facilitate healthcare when the individual was not motivated to receive this care. Some participants do not consent to care or do not wish to follow through with staff recommendations such as to see their GP. Participants also noted older individuals were harder to support as they found their perspectives were often more entrenched and injury symptoms were normalised in their lives.

They [younger individuals] don't really have that same staunchness to them, you know, you can see the vulnerabilities a little bit more. But the old ones, it's a very, very entrenched, especially the old gang members, it's a very entrenched stigma. And trying to get them support or help is a lot harder, they don't accept it. A younger person, you've got a little bit more of a window of opportunity to sort of help them see that you might have something wrong here and the older generation, is tough. (P5)

> *What we have found is the older, the older the client that's been through the system all these years, they, he takes someone, you know hitting 50, and had just had their brain injury recognized two years prior, and yet they're going through it all their life and they normalised it. (P8)*

Participants noted they found neuropsychological assessments to be particularly useful in providing them with tailored information around the individual that they could use to inform care and tailoring treatment programmes. However, the cost of accessing this services was prohibitive and so was difficult to access in most cases. One participant expressed they felt that the cost of this service should be borne by the health department rather than other departmental budgets. Neuropsychological assessments were usually only utilised where concerns were obvious.

> *…the main challenge I've experienced is when we want to get a neuropsychological assessment done in the past. People don't want to pay for it. (P4)*

Participants also noted that judicial decisions also played a role in the management of individuals with TBI. Participants felt that it was easier for the courts to access neuropsychological assessment for sentencing compared to those already in the justice system as they are used to help inform sentencing but are less often accessible to inform responsive healthcare.

> *The judge wants to formal specialized assessment therefore, there's money available for that, once it's through the court system, then it becomes very difficult. (P4)*

Despite this, one participant noted they believed the individuals health history could be better taken into account when they are sentenced to incorporate a more holistic view of an individual's ability to function and succeed in the sentence they are given. The participant felt that the justice system was setting people up to fail because they were sentencing without taking into account the individual's ability to fulfil the sentence.

> *Are we setting people up to fail from the beginning, from a justice perspective, from the courts perspective, if we actually don't know what that person's wholehearted capacity is, you know, like, if you murder somebody and they find you, insane, you know, you'll get lots of assessments done. But if you're doing lower level minor criminal things, but if you look at that as a whole, and you're looking at it through a different lens through a health lens, not just a justice lens, then you may start to see a pattern. (P5)*

In some cases where there were other health comorbidities, managing their TBI was not considered a priority. One participant felt that mental health oversight was routinely offered and prioritised over TBI, despite the comorbid effects between TBI and mental health. As compared to other conditions, participants expressed how they thought some TBIs were not addressed as TBI is an 'invisible' condition which was often not seen or considered by the staff or the system. The system was also set up to better support the

comorbidities the individual may be experiencing, for example with specific units dedicated to mental health or substance abuse.

> *So if you think of somebody with an addiction pathway, there were assessment tools to use when they're acutely unwell. This assessment tools to determine the level of withdrawal. There's assessment tools to determine the level of addiction and pathways of support. And then there's residential and funded treatment and health professionals with specific roles supporting their treatment for their addiction. And it doesn't seem to be that level of pathway for a person with brain injury, in NZ, and the brain injury NZ is mostly funded through charity. (P2)*

4.4.5 Need for a national TBI care standard

A common discussion point was that the processes for managing individuals with TBI in the justice sector could be improved by standardising and formalising the processes for all staff. Participants felt this could be achieved by the development and maintenance of a clear, national process for TBI care. The participants who were involved in this study felt compared with other issues such as Covid-19 and substance abuse, TBI care was a lower national priority.

> *…there hasn't been a focus on let's look at brain, traumatic brain injuries. We've never had of, there's no, specific focus in prison to look at that. And I do think that we, you know, we discussed it in our team, and we do think that there's a lot of work in this space to be done to identify these things. (P7)*

> *Corrections is a good company to work, for a good government department to work for, but they have got a lot of fine tuning that needs to deal with mental health and brain injury. (P9)*

> *Head injuries is totally different. Is it a field where corrections don't know a lot about it either? Is it, they don't know how to identify it as well? Do they have trained people within the prison system that know how to identify it? Do they need training as well? (P9)*

Participants felt that current TBI statistics were under-reported, which made it harder to advocate for change because there was no appropriate reference or baseline point. One participant noted that updating the current patient management system (MedTech) within a prison would require support from a national level due to the prohibitive cost of upgrading. Participants wanted better monitoring and surveillance using standardised outcome measures to monitor progress at an individual and service-level.

> *So we get some good data out, you know, so we know we're on the right track or whether do we need to tweak you know, the questions we're asking or the processes we're putting in place. (P1)*

Participants also described the system as being set up to allow for the problem to be passed on to other areas of the justice sector. They wanted the system to be set up in a way where history of TBI was screened as early as possible such as soon as the individual has contact with the police to ensure the support was in place for them through to when they

have completed their sentence and return to the community. As such, when individuals are entering the care of Ara Poutama, they shouldn’t be at the start of their journey with accessing support for historical TBIs.

> *So if you were looking at a health treatment pathway, the best place to intervene and provide support for that individual is at the front. Not when they're actually entering a corrections facility. (P2)*

Chapter 5: Discussion

The purpose of the current study was to determine how mTBI is currently being identified and managed within the justice sector. While there is previous research looking at the prevalence of TBI in this context, little is known about the current processes and policies involved in providing healthcare to individuals following TBI. This study revealed that when an incident of suspected TBI was witnessed, effective communication between custodial staff and the nursing team ensured that, in most cases, the person was assessed for acute physical complications. Further, participants reported finding it helpful when there was communication about an individual's TBI history as this enabled them to adapt how they worked with that person. However, there was a strong interest and need to learn more about TBI, the implications of TBI, and what can be done if there was a suspected unwitnessed TBI. Other areas for improvement identified include; the need to create an environment to facilitate injury reporting, assessing unwitnessed injuries, and consideration of rehabilitation needs in addition to the physical assessment following TBI. Further, results showed a need to create clarity of roles when a TBI was suspected, improve communication between different services as people are transferred, and a consistent clear national process to improve TBI identification and management.

The results showed that staff had a good awareness of the potential influence of TBI on the behaviour and functioning of people within their care, although some gaps in knowledge were evident. For example, participants wanted to know more about how people's lifetime TBI histories could affect current behaviour and things to look out for. This finding supports previous research that there is a need for more training for custodial staff around assessment, early management and long-term effects of TBI (McMillan, 2022) and extends this need in community based justice settings. The high level of awareness of TBI in the study participants indicates that staff frequently are exposed to individuals in their care who have experienced such an injury. This supports previous research in NZ which revealed a high frequency of TBI histories of individuals admitted to a men's prison facility (63.8% who had sustained at least one TBI in their lifetime, and 32.5% who had experienced multiple injuries; Mitchell et al., 2017). These results augment previous findings by highlighting that TBI is also an area where staff actively want to know more, feel it is part of their role and believe it would improve their skill for supporting people in their care more effectively.

Participants also discussed the need to improve the knowledge about TBI for individuals within their care. Increased knowledge amongst individuals involved in the justice sector was felt to be necessary to facilitate reporting on unwitnessed injuries to Ara Poutama staff and with individuals who have sustained a TBI accepting the care that is offered.

Previous research supports this as it has identified that probation staff largely rely on an offender's self-awareness of their injury in order to report it (O'Rourke et al., 2018). Some participants described that they had tried to provide psychoeducation to the individuals in their care which had had a positive effect, but this appeared to be done on an ad hoc basis.

Previous research has found a lack of communication with an individual who has sustained a TBI can lead to frustration and disengagement from seeking healthcare (Capon et al., 2020). Therefore, ongoing communication is a way staff can facilitate an improvement in knowledge around TBI for individuals in their care. In establishing effective communication strategies and processes, results from the current study indicate the development of rapport is important. Rapport included the development of trust and respect within and between staff and individuals in their care such as by being actively engaged in their work and the people they are working with. Safe processes to enable people within corrections to report concerns about TBI need to be established to facilitate identification of unwitnessed potential injuries.

Evidence has shown that symptoms and behavioural impacts of TBI can be exacerbated by a person's environment (Durand et al., 2017). For example, being in a noisy or bright environment can be triggering for people with sensory sensitivity following a TBI (Hoover et al., 2017; Shepherd et al., 2020). Additionally, if a person is experiencing cognitive difficulties following a TBI such as difficulties processing or remembering information, this may reduce their ability to function effectively within the prison environment and potentially their ability to meet the requirements of their sentence/probation (Norman et al., 2022; O'Rourke et al., 2018). Participants in the current study noted situations where they had seen benefits in adapting the individual's environment such as by allowing the use of sunglasses, or facilitating fatigue breaks when required, to optimise engagement. A more consistent implementation of environmental adaptions for those currently impacted by a TBI may be beneficial in engaging the individual in a way which is responsive to their needs following a TBI and reduce the risk of behavioural infractions.

5.1 Moving beyond a physical injury assessment

Participants described that following a suspected TBI, the nursing team would routinely complete a physical exam such as measuring blood pressure, pulse, and looking for physical signs of trauma such as fractures, bruising, or bleeding from the ear or nose. The processes described by participants did not appear to include assessments for altered consciousness beyond loss of consciousness (such as feeling dazed or confused) or self-reported symptom presentation. International guidelines for mTBI suggest that there is a need to determine a plausible cause of injury, complete a physical examination, assess symptom presentation and follow up to ensure the person has recovered or referred to

rehabilitation services if not (Marshall et al., 2012). Although the first two components of these recommendations were described as being routinely implemented within corrections, a symptom assessment, identification of rehabilitation need, and follow up to determine if recovery had been achieved, were not.

The need to determine if a person has recovered from a TBI has recently been highlighted as a key aspect of preventing prolonged impacts in the general population. For example, research in the general population has highlighted that up to 30% of people can go on to experience chronic cognitive, emotional and physical effects for many months after injury (Haarbauer-Krupa et al., 2021). There is also evidence that multidisciplinary rehabilitation services can significantly improve recovery and prevent risk of long-term problems (Möller et al., 2021). A review of current assessment procedures led by medical doctors is needed to ensure acute assessments fully meet people's needs, to implement national TBI guidelines, and to facilitate access to rehabilitation for people who need it. Further, this study revealed that in prison, access to medical staff is available when needed, with doctors often available onsite, however in community based justice services, processes to encourage access to medical review following a suspected TBI is needed.

5.2 Using tools to assess historical injuries

Recent or unrecovered TBI have been found to be consistent risk factors for longer term consequences from TBI or prolonged recovery (Greco et al., 2019; McCrea et al., 2009). Whilst this study initially aimed to focus on the response to exploring identification and management of TBIs that occurred while the individual was involved in the justice sector, most participants expressed concern about the potential impacts historical TBI had on current behaviour and risk of recidivism. Staff described when a TBI was noted in the participant record, this helped them to adapt how they worked with, and supported people with their sentence, which is supported by recent research conducted with probation staff (Norman et al., 2022).

Participants described that historical TBI was not routinely screened for or recorded in the medical record. In a NZ study, a protocol was developed to systematically screen individuals entering a new prison and was found to be feasible to implement (Mitchell et al., 2017). Findings from this study highlight that implementing a standard process to screen for potential current impacts of TBI history is needed. This would provide the opportunity for appropriate healthcare to be accessed for these historical injuries where there are persisting deficits (where possible, given constraints with historical claim acceptance through ACC), and would also provide valuable information for staff if a subsequent injury were to occur while the individual was in prison. It is important however that the screening measures

chosen are shown to be reliable and valid, such as the BISI, OSU-TBI-ID and TBIQ (as described in Chapter 2), and there is minimal administrative burden placed on clinicians (Belanger et al., 2009). This was felt to be a particular issue given that staff from a range of roles highlighted that they often had to manage with low staff levels and considerable competing demands on their time. Indeed, keeping up with numerous demands of the role has been found in ED healthcare staff and is suggested to be one factor contributing to some clinicians being unaware of the tools or services available to manage TBI (Belanger et al., 2009; Tavender et al., 2015).

5.3 Role clarification

One of the key findings of this study was how there was confusion around whose role and responsibility it was to investigate potential current impacts of historical or unwitnessed TBI. Probation officers noted they would refer to mental health clinicians to diagnose a TBI, however the mental health clinician noted they were not trained in this area. The confusion was felt to put individuals in the care of Ara Poutama at risk of being ‘passed around’ and the diagnosis being missed. Diagnosis by medical staff is needed to ensure a comprehensive review of medical history, a physical examination is undertaken, and to rule out other potential causes of presenting symptomology (Marshall et al., 2012). Therefore, the process for non-clinical staff who suspect a mTBI in someone in their care could be more clearly defined so they can bring any potential issues to the attention of clinical staff in a timely manner. This could be addressed by having consistent system level processes around mTBI identification and management in the justice sector.

As identified in the current study, probation officers, mental health clinicians in the community, prison staff, and special treatment unit staff all appear to be working across differing settings with differing processes and policies. It is suggested that one way to consolidate the communication around TBI in the justice sector is to provide one set of overarching processes and policies which makes clear what the roles and responsibilities of each staff member is. This will ensure there is a minimisation in wasted time where staff are uncertain of what their colleagues are doing in different settings with the individuals in their care, for example when TBI is being screened versus where a referral is being made to screen for TBI. One system is also likely to be most efficient in ensuring the efficient and timely transfer of information where needed. However, it is acknowledged that this is likely to be challenging given the multiple organisations involved.

5.4 Data sharing

Once TBI and current impacts had been identified, participants highlighted a need to improve data sharing between different areas within the justice sector. Lack of awareness of

injuries that had been sustained was felt to hinder staff's ability to be responsive towards a person with potential effects of TBI. For example, when an individual arrives in a special treatment facility, staff reported that they did not always have access to information regarding their health history. Staff felt they needed to access health information to be able to best support the individual arriving into their care such as by helping them with setting up GP visits upon arrival to the programme or facilitating continuation of treatment for a current ACC claim. Enabling better access to medical histories may facilitate assessment and management of TBI within the corrections service. However, it is acknowledged that data sharing needs to occur with respect to the person's preferences as some people would prefer for the data not to be widely shared without permission.

Previous research suggests it is important to utilise external agencies to offer help to individuals with a TBI or a suspected TBI (Ramos et al., 2018). Prisoners with TBI are more likely to have difficulties which reduce their ability to benefit from offender rehabilitation approaches that are usually used, meaning they have a greater risk of recidivism upon release from prison (Ramos et al., 2018; Williams et al., 2015; Williams et al., 2010). Therefore, interventions, and agencies delivering them, need to be responsive to the characteristics of the individual and their functional deficits (The Disabilities Trust Foundation, 2016; Williams et al., 2015). Linking individuals into appropriate supports, is likely to reduce their frequency of contact with the justice system which in turn will lead to more appropriate resource management.

Effective communication is known to have numerous benefits in healthcare, for both patients and providers (Vermeir et al., 2015). Although research by Vermeir and colleagues (2015) does not directly investigate the importance of effective healthcare within the justice environment and in regards to TBI, results from the current study support their recommendations for a structured approach to communication, addressing content and timeliness of information transfer. Other research has identified there is an effect of teamwork on performance, regardless of the characteristics of the team or task (Schmutz et al., 2019). This suggests it would be beneficial for systems in the justice sector to re-enforce the value of developing and strengthening a teamwork approach to improve TBI care.

5.5 Type of support required

One of the challenges that participants reported was that it was difficult to distinguish historical TBIs from other cognitive and behavioural difficulties the individuals in their care may be experiencing, for example, trauma, drug and alcohol, or mental health difficulties. Evidence has shown that the needs of people within the prison service are often complex (Butler et al., 2022). The Risk Need and Responsivity model adopted by Ara Poutama

(Andrews & Bonta, 2010) can be used to address this challenge by taking a more holistic view of healthcare by identifying risks (i.e., by conducting a range of assessments), needs (i.e., by targeting treatment to the symptoms and behaviours being exhibited rather than their cause), and responsivity (i.e., developing programmes in a way that recognises and supports the challenges they may be experiencing as a result of these symptoms). Whilst this model is currently implemented within Ara Poutama, the findings of this study suggest the need for a more holistic service that considers TBI in amongst these other possible contributors within a single or coordinated treatment team due to the challenges raised by participants in determining a distinct single cause and effect. The interrelatedness of symptoms, (e.g., a TBI can affect mental health and equally mental health can affect recovery from TBI) also suggests a holistic approach to help the person with the difficulties that they are experiencing despite the cause. It is important to note however there are challenges that may be experienced in this approach due to the way the health system is set up in Aotearoa, specifically the separation of health concerns as a result of injuries (covered by ACC), versus other health concerns (covered by Manatū Hauora, Ministry of Health).

5.6 Follow up support

After a mTBI has been diagnosed, the current study identified that there seems to be a lack of knowledge around the follow up supports available for individuals experiencing ongoing effects from TBI in their care. Previous research has found Emergency Department staff were not aware of the follow-up services available so had low motivation to identify individuals who may develop long-term complications following their injury (Tavender et al., 2015). Multidisciplinary concussion services are available in Aotearoa and are funded by ACC if a claim is accepted. However there is currently no clear pathway to accessing this support for both acute and historical injuries, resulting in large barriers to access for these individuals, especially whilst they are in prison. Service providers are contracted to provide services where needed and have established processes to provide access for their staff to offer treatment within prison. Increasing awareness and establishing clear pathways for Ara Poutama staff to access these services could assist people experiencing a TBI within the prison service who need rehabilitation access available funding and services, which will therefore result in more equitable care being provided for these individuals. There is also a need to address some of the barriers to accessing ACC services more generally such as ensuring equity of access for all ethnicities. Barriers around injuries such as TBI where there is no visible physical injury, there are existing comorbidities which could exacerbate the symptoms experienced, and for cases where there was no medical presentation following injury.

A complexity was raised in providing people within Ara Poutama with support following TBI when the individual did not want to engage in assessment or treatment for their injuries. Participants expressed how they found these situations challenging however they would still try and offer indirect support such as placing them under observation. Understanding why individuals under the care of Ara Poutama are not wanting to engage may help staff to understand how to manage these situations more effectively. Previous scholars have suggested that gaining consent of an individual may be dependent on their capacity to understand the medical information transmitted (Isailă & Hostiuc, 2022). This suggests an individual's understanding of TBI may be influencing their desire to engage in healthcare services following a TBI.

5.7 Standard care approach

A common issue highlighted by the results of this study is around the need for a standardised identification and management process to reduce the variation and uncertainty described by participants. Previous research in healthcare settings has identified variation in processes around TBI care among specialised neurotrauma centres in the USA (Cnossen et al., 2021), and despite there being numerous evidence-based guidelines around TBI, there is variability in how these are adopted across healthcare systems and by clinicians (Lumba-Brown et al., 2021). Although variation exists around TBI practices in other contexts, it is the presence and utilisation of formalised processes which allows for further research around best practice care approaches. This presents a unique opportunity for the justice sector in NZ as it appears from the current study that processes and policies around TBI care could be established to support implementation of a best-practice approach across the sector. It has been argued that the complexity of healthcare provision is often over-simplified and policies are established based on miscalculations making it important to recognise that what works for healthcare provision in one environment, may not be effective or feasible, in another (Jordan, 2011). Therefore, processes around TBI also need to allow for review as guideline recommendations often require reassessment and updating as further evidence in the area emerges, (Lumba-Brown et al., 2021). This may particularly be the case once there is further research around best approach for individuals under the care of correctional services.

One participant involved in this study noted work has already been done by key stakeholders to establish a new approach to facilitate access to healthcare services following acute injuries while in prison. The pathway includes using the Brain Injury Screening Tool (Theadom et al., 2021) to determine whether the individual requires urgent referral to hospital, early access to rehabilitation services (if they are at high risk of persistent

problems), or management within the prison setting by the health care team. This pathway also makes it clear which forms need to be submitted to ACC to ensure referrals (if needed) are made correctly. Implementing this approach across the sector is likely to improve healthcare professionals' confidence in identifying and managing TBI within prison and will speed up referral to specialist care where needed, thereby improving recovery of those affected by mTBI whilst in the care of Ara Poutama. Implementation of this process however will need support from policymakers and managers, to ensure a consistent implementation and utilisation of the new approach.

5.8 Limitations of the research

Although there are some strengths of this study (such as a deductive approach to data gathering and analysis, open recruitment approaches and two researchers involved in coding and analysing the results) there are also some potential limitations.

Firstly, due to the nature of recruitment, it may be that the participants involved in this study may not accurately represent the full range of perspectives of the workforce. For example, those with an interest in TBI were more likely to come forward and take part in the study and discussion with staff who did not have an interest in the area was unlikely to occur due to a lack of incentive to participate. Despite this, all participants were able to identify areas of potential improvement and they were all open to growth and learning around TBI for themselves and their colleagues. Participants were also passionate about ensuring the individuals in their care were receiving the best possible support to meet their needs which was evidenced by the information and the time they provided.

Recruitment was also challenging due to Covid-19 and staff shortages. Therefore, there were some staff roles which may have been beneficial to interview, however were not available to participate in this study, such as nursing staff. Staff in these roles may have provided further insight into the more routine workings of the processes, however their lack of availability, in itself, may reflect how they need further support to effectively identify and manage people in their care with mTBI while busy with other tasks and responsibilities. Despite this, a strength of this study is that the recruited sample encompassed a diverse range of professions across services within Ara Poutama and provided perspectives on the issues that would have been encountered by staff in these other roles.

Another limitation with this research is the large amount of data obtained through the interviews. Although there was a systematic analysis of this data, it is noted that potential nuances expressed by participants may have been missed in an attempt to glean the overarching messages conveyed by participants. For example, by capturing a range of professional views, specific professional views may have become lost.

However, despite these limitations the research has provided an overview of how TBIs are currently identified and managed within Ara Poutama alongside highlighting areas for improvement in the future.

5.9 Summary of recommendations

Table 2. Summary of recommendations arising from the research

Recommendation	Rationale
Improve staff awareness of TBI.	Staff were aware of some potential implications of TBI exposure on current behaviour but wanted to know more. Structured training would ensure staff have a baseline understanding of the cognitive and behavioural difficulties individuals may experience while involved in the justice sector as these can often be difficult to identify if staff members are not trained in this area (Durand et al., 2017). Ongoing education around TBI may include the appointment of a motivated Subject Matter Expert, provision of accessible reference material and development of relationships with external agencies.
Establish processes for screening TBI histories.	Participants reported how knowing a person's TBI history and nature of their difficulties was helpful in assisting them to work with someone more effectively. Prior TBI is a key risk factor for longer term consequences or delayed recovery so it is important for clinicians to know about and should be routinely assessed (for example by using protocols established by Mitchell et al., 2017).
Promote the use of ACC pathways to facilitate access to rehabilitation services for those with chronic difficulties, an existing claim or those with unrecovered acute injury.	ACC funded services are available in Aotearoa to support people with persistent problems following TBI. However, awareness of these services, information required on the injury and how to access them need to be improved.
Medical review of acute assessment process for suspected TBI within prison.	Need to consider broadening medical review to include standardised assessment of TBI symptoms and need for rehabilitation services. Routine review of identification, classification and referral processes for people with a TBI through working with healthcare staff will ensure consistent standard of care.
Clarify the roles of actors across the system with respect to TBI care.	Participants were unclear as to whose role it was to assess a person with suspected TBI and wanted further clarification around the roles of external agencies.

Build capability to support the communication of individuals' TBI history across services.	Participants expressed that it would be helpful to share knowledge of a person's TBI history as they move between services to help guide the individual's care.
Adopt consistent approaches between services.	Adopting established processes from the community may support greater acceptability and uptake of new processes or procedures. For example, for acute identification and management, the BIST tool (Theadom et al., 2021) is used in primary and secondary healthcare environments. This would support integration across services (with likely minimal implementation resources required) between the justice and health sectors. Further research would be useful in confirming the effectiveness of these processes in a justice sector environment.
Develop a standard of care for identifying and managing TBI in the justice sector.	Due to the high prevalence of TBI in NZ prisons (Mitchell et al., 2017), it would be beneficial to ensure there is an expectation set around the standard of care provided by staff for identifying and managing individuals in their care with TBI. Participants noted clear communication from management around these would be useful.

5.10 Conclusion

There is a high prevalence of TBI in the justice sector compared to the general population. As the effects of TBI can last for many years after an injury, it is important that people within the justice sector are able to access rehabilitation services where they require it. This study highlights that there is a need for standardised assessments, pathways and clarity of roles and responsibilities across the different professions to facilitate access to rehabilitation for those with acute and historical injuries, alongside robust processes and policies to maximise benefit in this area. There is a complex interaction of factors determining the healthcare provided for individuals in the justice sector with TBI, suggesting a need for an overarching approach supported by policy to ensure the most effective use of resources leading to the best outcomes of people with TBI. Recommendations for improving the standard of care for TBI provided within the justice sector have been proposed.

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Appendices

Appendix A: AUT Ethics Letter

Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

23 February 2022

Alice Theadom
Faculty of Health and Environmental Sciences

Dear Alice

Re Ethics Application: **21/431 How are mild brain injuries identified and managed within the justice sector?**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 23 February 2025.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: larahbwilson@gmail.com

Appendix B: Research advertisement

AUT TRAUMATIC BRAIN INJURY NETWORK

How are mild brain injuries identified and managed within the justice sector?

We are looking to gain a better understanding of what happens when a brain injury occurs in the justice sector. The aim of this research is to talk to a range of professionals within Ara Poutama Aotearoa (Department of Corrections) to identify what the current barriers and facilitators are to assessing and managing an offender who may have had a traumatic brain injury.

Interested?

If you are interested in taking part in this study, or would like further information, please contact:

- Lara Wilson (larahbwilson@gmail.com or 0220527294) or;
- Professor Alice Theadom (Alice.theadom@aut.ac.nz or 0212460728).

This study is part of a Master of Philosophy project at Auckland University of Technology (AUT) supervised by Professor Alice Theadom and Dr Jason Chua. The research has received approval from the AUT ethics committee. If you have any ethical concerns about the study, please contact the Executive Secretary of AUTEC (ethics@aut.ac.nz).

Appendix C: Participant information sheet

Participant Information Sheet

Date Information Sheet Produced:

10 January 2022

Project Title

How are mild brain injuries identified and managed within the justice sector?

An invitation

Hi, my name is Lara Wilson and I am completing a Masters degree at AUT. I want to invite you to join a study which aims to identify how mild traumatic brain injury (mTBI), also known as concussion, is identified and managed in the justice sector. I want to learn from you about how mTBI care is provided, and how we can do better.

What is the purpose of this research?

The earlier people with justice system involvement (i.e. people in prison or on community based sentences) with mTBIs are identified and managed, the better their ability to make decisions and overall health.

Compared to the general population, the number of people with mTBI involved in the justice system is higher. Yet we do not see more referrals to healthcare providers coming through for people in the justice system, suggesting that people involved with the justice sector are receiving delayed access to mTBI care.

To improve this situation, I am particularly interested to learn how mTBI is currently managed, what resources you might find helpful and how we can do better from people providing mTBI care in the justice sector. I am keen to hear from a variety of people working within the justice sector including prison healthcare providers, corrections officers, probation officers, and health leaders/change champions.

The findings of this research will be reported in my Masters dissertation, shared/presented with the Department of Corrections as well as in academic journals and at national or international conferences.

How was I identified and why am I being invited to participate in this research?

You have been invited to take part in an interview as you are currently working in the justice sector. We have asked for information about this project to be circulated around the Department of Corrections and we understand you are interested in knowing more about this study.

To participate in this study, you must: i) currently work within the justice sector and ii) provide clinical care or oversight to people with TBI or a suspected TBI.

The clients you work with will not be invited to participate within this study which is focusing on current system processes.

How do I agree to participate in this research?

Please contact Lara Wilson at larahbwilson@gmail.com; phone 0220527294.

Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you.

You can withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

I will ask you to participate in an interview lasting approximately one hour duration. I will ask you to about your knowledge and experience identifying and managing mTBI in the justice sector, and how we could make it better. The interviews will only be with you and the researcher (Lara Wilson) unless you would prefer to have someone attend the interview with you. The interviews will take place via zoom teleconference or over the phone. The discussion will be audio recorded and then converted into word-for-word text.

What are the discomforts and risks?

There is a small possibility that you may experience discomfort sharing your personal experience of providing care for someone with mTBI.

How will these discomforts and risks be alleviated?

The interviews will be with a researcher who has an understanding of TBI. You will be able to stop the interview or take a break whenever you wish. You do not have to answer any questions you do not wish to.

Each participant will be given a unique study number. Once the interview has been transcribed (written up) all identifying details will be removed so no one will know that what was said, was said by you. Common themes identified by all participants will then be collated and shared.

AUT Counselling services are able to offer three free sessions of confidential counselling support for adult participants in an AUT research project. These sessions are only available for issues that have arisen directly as a result of participation in the research and are not for other general counselling needs. To access these services, you will need to:

- drop into our centre at WB203 City Campus, email counselling@aut.ac.nz or call 921 9998.
- let the receptionist know that you are a research participant, and provide the title of my research and my name and contact details as given in this Information Sheet.

You can find out more information about AUT counsellors and counselling on https://www.aut.ac.nz/student-life/student-support/counselling-and-mental-health

What are the benefits?

Currently the care a patient receives following presentation with a mild brain injury (concussion) can be highly variable. We may discuss how this process may be improved, such as potential ways to speed up referrals to specialist services if required. We hope that these interviews will identify some of the facilitators and barriers to identification and management of mTBI within the justice sector so that we can suggest feasible improvements in service delivery that lead to more consistent concussion care in the justice sector. We also may consider what resources, supports and training may be needed to improve this process to help achieve more consistent outcomes for patients who experience a mTBI while in the justice system. The research will also help me attain my Masters degree.

How will my privacy be protected?

You will only be identified using a study specific number. Once the audio recording has been transcribed it will be deleted and any identifying features e.g. names of places will be removed to protect your privacy. All the data will be password protected and stored on a restricted access AUT server. Data collected about you such as your profession will be stored separately from your interview.

To protect the privacy of people you work with, we will ask you do not provide us with information that could identify your clients or colleagues. Any identifiable information will be removed from the transcript and will not be included in any findings.

What are the costs of participating in this research?

There are no costs other than your time – approximately 1 hour duration.

What opportunity do I have to consider this invitation?

You can take as long as you like as long as we are still recruiting for the study.

Who is funding this research?

This study is being completed as part of a student thesis and there is no specific funding for the project.

Will I receive feedback on the results of this research?

A summary of the research findings will become available on the AUT Traumatic Brain Injury Network website when it is available and will be sent to you if you request this in the consent process.

We will also be providing a copy of the findings of this research to the Department of Corrections and rehabilitation providers. A working group made up with staff from Department of Corrections and ABI rehabilitation will use the information identified in this research to consider what resources, supports and training may be needed to improve the identification and management of mild TBI within the justice sector. The findings may also be published in an academic peer-reviewed journal. We will also disseminate the findings through the AUT TBI Network website.

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

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, *Professor Alice Theadom on 0212460728 or email alice.theadom@aut.ac.nz*

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *ethics@aut.ac.nz* , (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Lara Wilson (larahbwilson@gmail.com), phone 0220527294.

Project Supervisor Contact Details:

Professor Alice Theadom (alice.theadom@aut.ac.nz) and Dr Jason Chua (jason.chua@aut.ac.nz)

Approved by the Auckland University of Technology Ethics Committee on 23/02/2022, AUTEC Reference number 21/431.

Appendix D: Participant consent form

Oral Consent Protocol

Project title: How are mild brain injuries identified and managed within the justice sector?

Project Supervisor: Professor Alice Theadom and Dr Jason Chua

Researcher: Lara Wilson

The participant joins the videoconference

- ○ Do you agree to my recording your consent to participate?

If they agree, then the record function will be activated and they will be asked the following:

- ○ Have you read and understood the information provided about this research project in the Information Sheet dated 10 January 2022?
- ○ Do you have any questions about the research?
- ○ Do you understand that notes will be taken during the interviews and that the in interview will also be audio-recorded and transcribed?
- ○ Do you understand that taking part in this study is voluntary (your choice) and that you may withdraw from the study at any time without being disadvantaged in any way.?
- ○ Do you understand that if you withdraw from the study then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used? However, once the findings have been produced, removal of your data may not be possible.
- ○ Do you agree to take part in this research?
- ○ Do you wish to receive a summary of the research findings? (please tick one): Yes○ No○
- ○ Do you want me to send you a copy of the audio recording for this consent? Yes○ No○
- ○ Please confirm you name and contact details

Participant's name: .....

Participant's Contact Details (if appropriate):

.....

.....

.....

.....

I will now turn off the recording of the Consent and then will start a separate recording for the interview.

Approved by the Auckland University of Technology Ethics Committee on 23/02/2022 AUTEC Reference number 21/431.

Note: The Participant should retain a copy of this form.

Appendix E: Interview schedule

Demographic questions

1. What is your age? (years)
2. What is your gender?
    a. Male
    b. Female
    c. Other - please specify
    d. Don’t know
    e. Prefer not to say
3. What ethnicities do you associate with? (tick all that apply)
    a. European
    b. Māori
    c. Pacific Peoples
    d. Asian
    e. Middle Eastern/ Latin American/ African
    f. Other Ethnicity
4. What is your occupation?
    a. Manager
    b. Clinician/ health care provider
    c. Probation Officer
    d. Corrections Officer
    e. Other please specify……
5. How many years of experience have you had in your current role?
6. How many years have you been working in the justice sector?
7. What is your highest level of education?
    a. Primary education or lower
    b. Lower secondary education
    c. Upper secondary education
    d. Post-secondary non-tertiary education
    e. Short-cycle tertiary education
    f. Bachelor’s or equivalent level
    g. Master’s or equivalent level
    h. Doctoral or equivalent level
    i. Other

Interview questions

For the purpose of this interview, brain injury is defined as an injury to the brain as a result of an external physical force. We will be discussing mild brain injuries, also referred to as concussions.

1. What currently happens if there is a suspected brain injury within your service?
    - How might you respond to a suspected brain injury within your role?
    - How are injuries currently identified?
    - Is there a specific process that is currently used in your service to identify injuries? E.g., a specific set of questions or tests that are used.
    - What happens after an injury has been identified?
    - What types of health care are available to people within your care after a brain injury has been diagnosed?
    - How easy is it to access health care/rehabilitation for people who have had a brain injury in the justice sector?
    - Are processes any different if there is history of an unrecovered old injury and more recent injury?
2. How have you found the current process so far?
3. What has been helpful about the process?
4. What challenges have you experienced?
5. What improvements could be made to how brain injuries are identified and managed within your service?
6. What would be helpful to support reduction of health inequalities e.g. by age of culture within your service
7. Are there any resources/training that you would find helpful?

Appendix F: Sample of coding

Table 3. Sample of coding process

Data level	Data	Rationale
Excerpt from transcript	You would just literally be asking them a bunch of questions to try and identify whether they actually have something more sinister is going on.	
Initial Code	Try identify something more sinister	Initial code established at the semantic level.
Initial category	Asking questions	Many participants spoke about needing to ask the individuals in their care about a suspected acute TBI or a history of TBI.
Updated/evolved code	Frequency of interactions and questioning	Code changed to encompass more meaning from the excerpt.
Updated/evolved category	Rely on individual to tell me	Category broadened to establish the need for conversation with the individual to occur for information about a suspected TBI to be obtained by the staff member.
Sub-theme	Factors affecting individual (or whānau) in the reporting of suspected TBI	Relying on the individual to disclose the TBI through conversation with the staff member is a factor which affected the individual reporting their suspected TBI.
Theme	Recognition of TBI	