Title: Intimate partner violence reporting and assessment of traumatic brain injuries and strangulation by a New Zealand hospital health service

Running title: IPV reporting, TBI and strangulation

Abstract

Purpose: To determine intimate partner violence (IPV) incidence reported by a hospital health service and the proportion of patients who received a traumatic brain injury (TBI) or strangulation assessment. **Method:** This retrospective review utilised IPV, TBI and strangulation screening data from one New Zealand hospital healthcare service between 01/01/2018 and 30/12/2021. **Results:** Over four years, 660 IPV reports showed an average incidence of 44.2 (95% CI: 37.5 to 52.2) per 100,000 population. New Zealand Māori had the highest incidence 81.8 (95% CI: 70.9 to 94.3) per 100,000 population. Nearly half (n=328; 49.7%) of IPV survivors reportedly had been "choked" and over a third (n=252; 38.2%) reportedly "knocked out". Less than 1% of IPV survivors had a recorded TBI (n=5; 0.8%) or strangulation (n=4; 0.6%) assessment. Less than a quarter (24.2%) of IPV reports were completed by doctors and nurses, with social workers completing the most assessments (49.2%). **Conclusions:** Reported loss of consciousness and strangulations caused by IPV were high in this hospital setting, yet they were rarely assessed. New Zealand Māori had the highest incidence per ethnic population of partner inflicted TBI presenting to the hospital. There is a risk of potential TBIs being missed due to lack of assessment by registered medical and nursing professionals given the majority of reports were provided by allied health workers such as social workers. These data underscore the critical need for healthcare provider education and training in understanding, recognizing, and treating brain injuries in females who present to medical facilities with IPV.

Keywords: Intimate Partner Violence; Strangulation; Traumatic Brain Injury; Ethnicity; Incidence

Introduction

Intimate Partner Violence (IPV), also called spousal abuse, is any physical or sexual violence, psychological/emotional abuse, or threat of physical or sexual violence that occurs between people in an intimate relationship of any sex (Baxter & Hellewell, 2019; Campbell et al., 2018; Fanslow & Kelly, 2016). It has been reported that 15% to 71% of females aged 16 years or older experience at least one episode of physical and/or sexual violence by their intimate partner in their lifetime with 4% to 54% experiencing this within the previous year (Garcia-Moreno et al., 2006; Mellar et al., 2023). Of concern is that IPV is rarely a one-time occurrence with some survivors reporting that there are "too many injuries to quantify" (Zieman et al., 2017). These statistics are similar for psychological abuse with over 40% of ever-partnered females aged 18 to 64 years experiencing at least one episode of psychological IPV with a third (33% to 34%) of these reporting repeat psychological IPV (Fanslow et al., 2021).

Regarding timing of IPV perpetration, it has been identified that more females are screened by healthcare services for IPV mid-week, than other week days, (Spangaro et al., 2020) although more IPV is reported to occur during weekends, holidays and hot days (Card & Dahl, 2011; Gantz et al., 2006) and when IPV survivors are required to spend more time with their abuser such as the recent Coronavirus pandemic (Mohan, 2020) and following international sporting events (Kirby & Birdsall, 2022).

Although the majority of people who experience IPV are females, IPV occurs to all sexes across the lifespan (Goldin et al., 2016) and is not only a heterosexual concern but also occurs within same-sex intimate relationships (Badenes-Ribera et al., 2016; Messing et al., 2019). Research has identified that females perpetrate more minor acts of physical aggression at a higher prevalence than males (Archer, 2000; Swan et al., 2008) but more females than males (Hunnicutt et al., 2019; Iverson et al., 2019; Wörmann et al., 2021) will experience severe physical violence and far more sexual assault from an intimate partner throughout their lifetime. Specifically, data have shown that male perpetrators were more likely to beat, "choke" or strangle, whereas female perpetrators were more likely to hit, kick, bite or use objects to hit or throw at their victim (Archer, 2000).

Upwards of 80% of IPV survivors have reported injuries to the head, neck and face regions (Sheridan & Nash, 2007) frequently incurred from punching, violent shaking, pushing and strangulation. A large percentage of those IPV survivors experience a wide range of traumas such as being thrown down stairs and off porches, slammed against walls and floors, punched or kicked in the face and head, hit in the head and body with objects such as bats and other hard/large objects, shaken violently and strangled (Valera et al., 2019). These violent acts all have potential to cause a brain injury (including concussions) (Haag et al., 2022; Sheridan & Nash, 2007). Indeed evidence has shown that 68% of IPV survivors have sustained at least one traumatic brain injury in their lifetime, with one in ten of these injuries being classified as moderate or severe (Valera & Berenbaum, 2003). A recent review (Toccalino et al., 2023) indicated a range of prevalence rates from 13% to 93% depending on how brain injury was defined and from where the sample was drawn. This speaks to the issue that previous research has been limited by restricted or self-selecting samples preventing an accurate epidemiological estimate of injuries to the head and neck, and specifically brain injuries, as a result of IPV. Due to sampling approaches previously, utilised it has not been possible to identify incidence rates of IPV-related brain injury by age, sex, and ethnicity.

In New Zealand (NZ), preventing and reducing family violence is a priority for the government (Fanslow & Kelly, 2016). As such, a Violence Intervention Programme (VIP) has been implemented across all major hospitals in New Zealand involving routine enquiry, risk assessment, intervention, referral and follow-up for those who report experiencing IPV (Fanslow & Kelly, 2016). Given this information provides routine IPV screening data for a regional population, this dataset offers a unique opportunity to determine incidence of identified IPV, related brain injuries, strangulation, and subsequent assessments in a NZ hospital. Reporting incidence is the primary focus of this report. However, this dataset also provides an opportunity to observe aspects of IPV reported by ethnicity and to examine the professional providers (e.g., nurse, social worker) completing the report. Therefore, we additionally report on and discuss these issues.

Aim

The aim of this study was to identify incidence of documented IPV, IPV-related traumatic brain injury (TBI), and strangulation in one medical facility over a four-year period (broken down by ethnicity, sex, and weekdays) and to determine what proportion received a brain injury or strangulation assessment. Relatedly, we aimed to understand if certain ethnic groups were disproportionately affected and to identify the type of professional (e.g., healthcare professional or other) who reported the IPV and related brain injuries in these cases.

Methods

Data source

A retrospective review was undertaken using data collected by one New Zealand hospital (Wellington) as part of the NZ violence intervention programme. Over the duration of the study period, the Wellington hospital catered for an average population of 320,925 ±4,087 people per year. The review included records from all healthcare services (outpatient, inpatient and emergency department) (Fanslow & Kelly, 2016). It is a requirement in NZ for all females over 16 years old that utilise any health care settings to be routinely asked about their safety and exposure to IPV (Fanslow & Kelly, 2016). For males aged 16 years and older, routine enquiry is not recommended unless there are specific signs and symptoms of IPV (Fanslow & Kelly, 2016).

Recording of assessment for IPV is outlined by the Ministry of Health's publication "Family Violence Assessment and Intervention Guideline: Child abuse and intimate partner violence" (Fanslow & Kelly, 2016). This guideline provides screening questions for IPV in different healthcare settings, and, if there is a positive response, the questions to be asked for a more thorough assessment of the violence.

Cue-card questions are provided to all healthcare professionals upon completing IPV training. Once in a safe and private environment, females are asked a series of four questions about abuse that may have occurred within the past year. For example, "Within the past year, have you been hit, pushed, shoved, slapped, kicked choked or otherwise physically hurt?" For any affirmative responses, females are then asked who performed the abuse. Further questions can be completed by the health care professional or by the person themselves utilising the IPV questionnaire. The questionnaire is written in English and

should the IPV survivor not be fluent in English then interpreters are provided in their spoken language to assist them in completing the questionnaire. The questions for the more thorough assessment are:

1. Is your partner here now?
2. Are you afraid to go/stay home?
3. Has the physical violence increased in frequency or severity over the past year?
4. Has your partner ever choked you (one or more times?)
5. Have you ever been knocked out by your partner?
6. (If applicable) Have your ever been beaten by your partner while pregnant?
7. Has your partner ever used a weapon against you, or threated you with a weapon?
8. Do you believe your partner is capable of killing you?
9. Is your partner constantly jealous of you? If yes, has the jealousy resulted in violence?
10. Have you recently left your partner, or are you considering leaving?
11. Has your partner ever threatened to commit suicide?
12. Have you ever considered hurting yourself/suicide?
13. Is alcohol or substance misuse a problem for you or your partner?
14. Have the children seen or heard the violence?
15. Has anyone physically abused the children?

Answers to questions are documented electronically within the individuals' medical record and a copy is sent to the hospital IPV coordinator for further review and management. The guideline (Fanslow & Kelly, 2016) outlines management and safety planning required for the IPV survivor; strangulation risk assessment, discharge advice information, and child abuse assessment and potential interventions.

We have included information on questions 2-8, 10, 14 and 15 in tables 2 and 3 just to provide additional context as the data were collected with our primary variables of interest. However, to keep our paper focused, we do not include discussion on all the variables.

Definitions

Traumatic brain injury (TBI) is defined as *"an alteration in brain function, or other evidence of brain pathology, caused by an external force that may result in cognitive impairment"* (Menon et al., 2010). Strangulation is defined as the interference of blood or airflow by any "*external compression of a person's neck and/or upper torso in a manner to inhibit that person's airway or the flow of blood into or out of the head*" (Pritchard et al., 2017). During strangulation a victim may experience difficulty breathing, dizziness and severe pain, and/or a loss of consciousness which can result in an ABI (Hammond et al., 2016). As brain injuries from external and internal causes are defined separately, can lead to different impacts on the brain, and there is no recommendation that people who experience strangulation-related brain injuries benefit from traumatic brain injury services (Fanslow & Kelly, 2016), data on TBI and strangulation will be presented separately. However TBI and strangulation will be discussed in combination as acquired brain injuries (ABIs).

Consent

This study received ethical approval by locality consent through the Wellington hospital research office on 24th November 2021. Retrospective data collection by reviewing medical notes from the previous four years of routinely recorded IPV reports (2018-2021) commenced in February 2022 and was completed in November 2022.

Statistical analyses

Data collected from assessment reports were extracted and analysed with SPSS (IBM Corp, Released 2021. IBM SPSS Statistics for Windows, Version 28.0.1.1. Armonk, NY: IBM Corp). Data are reported as means with 95% confidence intervals (CI) (Twellaar et al., 1996). A one-sample chi-squared (χ^2) test was used for analysis by sex, ethnicity, and weekdays. Significance level was set at $p<0.05$. To compare between ethnicity groups, odds ratios (OR) were used. Reported IPV incidence was calculated based on subnational population estimates for the Capital and Coast Hospital region for 2018 to 2021 (https://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7509).

Results

Incidence

Over four years there were 660 IPV reports lodged from 568 different individuals (see Table 1) resulting in an IPV incidence average of 44.2 (95% CI: 37.5 to 52.2) per 100,000 population.

Sex

Females accounted for 96.3% of IPV reports over the study.

Ethnicity

Although there were significantly more IPV reports for New Zealand Europeans (n=293) compared with New Zealand Māori (n=225, $\chi^2_{(1)}$=8.93; p=0.0028), when analysed by per 100,000 population, New Zealand Māori recorded a higher IPV incidence than Asian-Indian (OR: 6.8 [95% CI: 4.3 to 10.8]; p<0.0001), New Zealand European (OR: 2.2 [95% CI: 1.8 to 2.6]; p<0.0001), and Pacific Peoples (OR: 1.6 [95% CI: 1.2 to 2.2]; p=0.0014).

Day

There were fewer IPV reports completed on Mondays (14.1%) than Wednesdays (19.0%; $\chi^2_{(1)}$=4.2; p=0.0411) and Fridays (19.7%; $\chi^2_{(1)}$=5.3; p=0.0209).

Potential brain injuries

Nearly half of IPV survivors reported they had been "choked" (n=328; 49.7%) while over a third (n=252; 38.2%) reported they had been "knocked out" due to the IPV violence (see Table 2). Less than 1% of IPV survivors had a recorded TBI (n=5; 0.8%) or strangulation evaluation (n=4; 0.6%) completed as part of the assessment. As a result, only 0.5% of IPV survivors (n=3) had a referral for concussion or brain injury rehabilitation services made for follow-up assessment.

Type of professional reporting the IPV

There were significantly more (n=462; 70%) IPV reports completed by Social Workers when compared with Nurses ($\chi^2_{(1)}$=250.7; p<0.0001), Doctors ($\chi^2_{(1)}$=288.8; p<0.0001) and Allied Health ($\chi^2_{(1)}$=362.0; p<0.0001) workers (see first row of Table 3).

Discussion

This study completed a retrospective chart review of a New Zealand hospital's (including outpatients, inpatients, and emergency department patients) IPV and strangulation records over four consecutive years. This report includes a number of novel findings including: the high prevalence of IPV, strangulation and TBIs in New Zealand, the disparity between number of reported incidents and number of assessments or referrals, ethnic differences in who is sustaining these injuries, and important information about care providers and referral services for these issues. Such information is critical to advancing knowledge in this poorly and understudied area so that appropriate resources are allocated for NZ women sustaining IPV-related brain injuries and can inform research in other countries. Such resources are required to treat these women properly. Specifically, the key findings of this report are:

- 44.2 per 100,000 population average incidence of reported IPV.
- Most (92%), but not all, survivors were female.
- New Zealand Māori had the highest incidence of reported IPV when analysed by ethnicity at 81.8 per 100,000 population.
- More IPV reports were conducted on Wednesdays and Fridays than other weekdays.
- Forty-eight percent of the IPV survivors reported being "choked" and 38% reported being "knocked out" by a partner.
- Less than 1% of IPV survivors had an TBI assessment, only 0.6% had a strangulation assessment, and only 0.5% had a referral for brain injury rehabilitation services.
- Slightly less than a quarter (24.2%) of IPV reports reviewed in this study were completed by registered medical and nursing professionals.

IPV incidence

The finding of the incidence of IPV in this district was 44.2 per 100,000 population is likely an underestimation of the true incidence. It has been reported (New Zealand Police, 2022) that only 33% of IPV is reported in New Zealand making the IPV incidence in this district estimated to be at least 133.9 per 100,000 population. Unfortunately, this incidence is unable to be compared with other research as the number of male and female presentations to the hospital as patients over the study

duration was not recorded and any comparisons were unable to be undertaken as most studies have reported a percentage of people who report having experienced IPV not the number of reports per population.

Sex

The low number of males in our data analysis was expected given IPV screening guidelines in the New Zealand Healthcare system are focused on females, (Fanslow & Kelly, 2016) however, there is a need to screen both male and females for IPV (Mills et al., 2003; Mills et al., 2006). Some (Carmo et al., 2011; Savall et al., 2017; Thureau et al., 2015) but not all (Saleem et al., 2022) international studies have reported higher percentages of males (9-13%) when compared with our study (3%). In a recent scoping review, it was identified that study populations for IPV research were almost exclusively female survivors (Toccalino et al., 2023). However, an international study has noted a higher likelihood that females would report IPV events to formal institutions, and there are more IPV support services targeting females (Thureau et al., 2015). The low reporting rate by males may be related to the sense of shame and fear, injuries being considered 'minor', a lack of information and appropriate support, stigma attached to being a male victim, (Dutton & Nicholls, 2005; Mechem et al., 1999; Mills et al., 2006) and some males not seeing female violence against them as a crime (Dutton & Nicholls, 2005).

Ethnicity

New Zealand Māori (81.8 [95% CI: 70.9 to 94.3] per 100,000 population) had 1.6 to 6.8 times higher incidences than non-Māori in our study. This finding is consistent with other studies (Marie & Fergusson, 2008) where both male and female Māori IPV occurred more commonly (e.g., 2.4 to 3.6 times higher) relative to non-Māori. Previous surveys have identified that New Zealand Māori are more at risk of IPV relative to New Zealand Europeans with 49% to 52% of Māori females experiencing at least one form of IPV during their current relationship (Morris et al., 2003). It has also been reported that New Zealand Māori are between 1.6 to 2.0 times more likely to experience at least one form of IPV than New Zealand European and Pacific females over their lifetime (Kazantzis et al., 2000). This is similar to aboriginal females when compared to non- aboriginal females (2 to 5 times) (Spangaro et al., 2020) in Australia and non-white females (African Americans, Native Americans, Aleut, Inuit, Asians,

and Pacific Islanders) when compared with white females in the United States (Powers & Kaukinen, 2012). It has been reported that there is a systematic racism experienced by Indigenous women, including survivors of IPV-related ABI in the way they are viewed by the dominant culture (Haag et al., 2019; Toccalino et al., 2022). This generally arises from a general societal failure to adequately prepare those working within the system to understand and communicate with Indigenous people (Haag et al., 2019). The data provided once again underscore the importance of healthcare workers to be particularly mindful of elevated rates of IPV in Indigenous communities and be particularly vigilant to the possibility of brain injuries associated with such abuse.

Day of report

The finding that there were more IPV reports completed on Friday and Wednesdays compared to weekends was unexpected. In a study (Spangaro et al., 2020) reporting on Emergency Department screening presentations in rural New South Wales in Australia, it was identified that more IPV screenings were conducted on Mondays (n=147) than any other day of the week. The Australian study was limited for comparison to our NZ study as no data were collected on where the IPV reports were conducted within the healthcare setting. Interestingly other studies (Card & Dahl, 2011; Kirby & Birdsall, 2022; People, 2005) have reported that most IPV events occur during weekends with a 1.5 times higher rate of occurrence (People, 2005) than during weekdays yet the recording of positive IPV reports was lowest during weekends in both the current study and the New South Wales Emergency Department setting (Spangaro et al., 2020). Given the Australian emergency department was rural, rather than city based for the NZ study, travel times to access emergency department treatment may explain why Monday was frequently reported for the rural setting. This may also reflect a lack of presence of social workers on the weekends in NZ.

Potential brain injuries

The finding that 38.2% of IPV survivors reported they had been “knocked out” is alarming given that a loss of consciousness is not required for the presence of a TBI - so this number is likely a notable underestimation of the actual numbers of IPV-related TBIs. It has been reported (Toccalino et al., 2023) that an estimated 13% to 93% of IPV survivors have sustained a brain injury. Most alarming here is that

only 0.8% received an assessment and only 0.5% a referral for brain injury rehabilitation services. The ABI prevalence as a result of IPV is likely higher than indicated here, with many injuries going unreported, or undetected during clinical assessment (Hamberger et al., 2015). IPV related ABI and its potential long term sequelae are an underappreciated and unrecognised public health problem (Valera et al., 2019). Unlike sports athletes or military veterans, IPV survivors are not rested, do not have any form of routine monitoring and may have limited opportunities to recover between brain injuries (Iverson & Pogoda, 2015; Meyer et al., 2022; Voelker, 2018). In addition, IPV survivors may experience multiple ABI's within days of each other with minimal or no rest or any form of recovery between incidents (Valera & Kucyi, 2017; Voelker, 2018).

The finding that approximately half (48%) of all IPV reports identified the victim as having been strangled was disturbing as strangulation is one of the most terrifying events females report experiencing. However, even more disturbing was that 0.6% of IPV survivors had a documented strangulation assessment. In samples of convenience, high rates (e.g., 27% (Valera et al., 2022) to 89% (Pritchard et al., 2017)) of strangulation have been found in females who have experienced IPV. Other data have indicated that many females survive upwards of 50 strangulation events within a relationship (Messing et al., 2019).

Studies have reported that IPV survivors of strangulation may experience a loss of, or an alteration in consciousness (AIC; e.g., memory loss and confusion) (Valera & Kucyi, 2017; Valera & Berenbaum, 2003). This AIC is important as it may indicate a hypoxic or ischemic insult to the brain and should be considered as a possible hypoxic-ischemic brain injury (HIBI) (Valera et al., 2022). Even mild oxygen deprivation with no loss of consciousness can result in a brain injury (Murray et al., 2016; Nemeth et al., 2019). A recent report (Valera et al., 2022) showed that strangulation related alterations in consciousness were associated with poorer performance on memory tests are well as higher ratings of depression and post-traumatic stress. Strangulation may not leave visible marks on the IPV survivor, and information about any signs of AIC may serve as a flag for other more serious or possible fatal outcomes in the ensuing period following the IPV (De Boos, 2019; Valera et al., 2022). Furthermore, as with TBIs, in the absence of any visible marks or signs, the symptoms of neurological impairment

(e.g., dizziness, confusion, combativeness) may be misinterpreted (Meyer et al., 2022). Additionally, in a review (Anderson & Arciniegas, 2010) examining the effects of various causes of HIBI (e.g., from cardiac arrests) it was reported that disturbances in cognition (e.g., attention, speed of processing, memory and executive function) were the most common and prominent alterations identified. These findings should be taken into consideration when assessing females who have experienced IPV-related strangulation. This is important given that Social Workers completed the majority (70%) of the IPV documentation reviewed in this study and may need training regarding the effects of strangulation and the need for further medical assessment and management.

Upwards of 72% of IPV victims are reportedly not identified (Costello & Greenwald, 2022) when they present to the ED. Therefore, of the 28% of IPV victims that may be identified when they present to the ED, most of these people are unlikely to be screened for any form of ABI given the current findings. Many people who do present for medical care because of IPV injuries typically have injuries to the brain, skull, face, neck and nearly one-fifth of these injuries are classified as an ABI. It has been identified that between 13% to 93% of IPV survivors have a potential ABI (Toccalino et al., 2023). In cases where strangulation has occurred during IPV, it has been estimated that up to 92% of survivors have a potential ABI (Campbell et al., 2018). Some studies (Shah et al., 2007; Whyte et al., 2009) have reported that people with ABI's have similar short-term outcomes, although there is a paucity of information pertaining to the long-term prognosis after HIBI's (Whyte et al., 2009).

Repetitive concussive and subconcussive ABI's that occur from IPV have been associated with bad outcomes many years later (Smith et al., 2022; Toccalino et al., 2023; Voelker, 2018). There have been only two (Danielsen et al., 2021; Roberts, Whitwell, et al., 1990) published case studies reporting on the presumed long-term neuropathologic outcomes of female victims of IPV. In 1990, the Lancet published a letter (Roberts, Whitwell, et al., 1990) that, for the first time, linked neuropathologic findings from a 76 yr. old female IPV victim to those of boxers. By bridging the gap between "battered-woman syndrome" (Dorkins & Smith, 1998; Swanson, 1984) and "punch-drunk" boxers, also termed dementia pugilistica, (Roberts, Allsop, et al., 1990) the potential long term effects of IPV were highlighted to be a public concern (Casper & O'Donnell, 2020). The second case study (Danielsen et

al., 2021) reported on a 29 year old female IPV victim that also had neuropathologic findings similar to those reportedly seen in numerous deceased male sports participants of various ages (McKee et al., 2009).

The prevalence of ABIs as a result of IPV may be higher than estimated, with many of these injuries going unreported, or undetected during clinical assessment (Hamberger et al., 2015). In a systematic review (Ayton et al., 2019) on the incidence and prevalence of ABIs in IPV, 94% of people with IPV reported symptoms. Although the effects of IPV are associated with a myriad of negative outcomes including higher rates of emotional disturbances (post-traumatic stress disorder, depression, anxiety, increased suicide thoughts, eating disorders) (Carbone-López et al., 2006; Laskey et al., 2019) physical problems (increased morbidity and mortality, chronic pain, poor sleep, fatigue and higher rates of sexually transmitted infections (Breiding et al., 2008; Coker et al., 2005) and cognitive issues (executive function capabilities, academic difficulties, inability to drive) identification of the ABI may assist with reducing the subsequent morbidity of these injuries, and provide more appropriate interventions and treatments.

In NZ, The Ministry of Health (the government's principal advisor on health and disability) (MOH) implemented the family violence programme in 2001. The family violence programme undertook a pilot study that assisted in the development of family violence guidelines that were implemented in 2002 in four health boards across New Zealand (Fanslow & Kelly, 2016). The guidelines required that routine screening was undertaken on all women presenting to healthcare services for partner abuse, and for the assessment of males over the age of 16 years old and children when there was a suspicion of abuse (Ritchie et al., 2013). In 2007, this work was extended nationally into the Violence Intervention Programme (VIP) and further evaluations were undertaken on the programme over the ensuing years.

Although there are several tools available for the assessment of IPV-related ABI internationally, (Costello & Greenwald, 2022; Dams-O'Connor et al., 2023; Goldin et al., 2016; Raskin et al., 2023; Valera et al., 2019) none of these screening tools have been identified in the MOH guidelines, nor are they routinely utilised in the care of IPV victims assessed and managed under the New Zealand healthcare system. In 2016, the MOH guidelines for IPV were revised and updated (Fanslow & Kelly,

2016) to provide the assessment tools for IPV evaluation and strangulation nationally and to have these tools used across all hospital boards in New Zealand. However, although the revised guidelines did include the new update on strangulation, it did not account for the assessment of ABI IPV victims except to indicate that strangulation was a '*…bit like the injury that happens after a concussion, or being knocked out*' (Fanslow & Kelly, 2016). Nowhere in the guidelines do they advise or indicate that an ABI be considered nor even assessed for. The concept of the effects of repetitive brain injuries, was not even identified in a recent study reporting on the exposure to IPV and self-reported health outcomes in a NZ cohort (Mellar et al., 2023).

The lack of nationally identified assessment tools for these victims can result in a lack of awareness of ABI's and their potential for long term sequalae of these injuries. A review is required for the MOH guidelines and identification of a nationally approved screening tool for ABI be implemented. Some of the currently available screening tools require interview administration while some are self-reported and enable the IPV victim to report the symptoms in a discretionary manner (Goldin et al., 2016). The data reported here make it clear that assessment tools and implementation of their use is critical if proper care is to be given women being seen with IPV-related brain injuries in New Zealand hospitals.

Health and social service providers

Less than a quarter (24%) of IPV reports reviewed in this study were completed by registered medical and nursing professionals, with the majority being completed by social workers. Studies have identified that although IPV survivors are unlikely to report IPV, (Evans et al., 2016) there is a propensity for IPV survivors to seek medical attention and assistance through areas such as the Emergency Department (ED) with presentations for repeat injuries, deliberate self-harm and mental health issues (Boyle et al., 2010; Boyle et al., 2006; Boyle et al., 2004; Boyle & Todd, 2003; Trevillion et al., 2012). As such, it was expected that higher rates of IPV may have been detected in that capacity. However, there are a range of limitations and barriers (e.g., hectic pressured environment for disclosure of IPV, time it would take to gather information and address IPV, provide resources etc) in the ED that may contribute to IPV not being detected. In fact, one study (Kothari & Rhodes, 2006) identified that IPV survivors typically present four times to an emergency department before reporting the IPV, with presentations peaking in

the month of the event and typically for non-injury related complaints. Furthermore, given the current nursing shortages internationally, (Peters et al., 2020; Ross, 2022; Tamata & Mohammadnezhad, 2023) the identification of an IPV victim may result in essential ED staff being unable to continue on with other activities or, more commonly, not being able to provide for the additional care required for the reporting and management of the IPV situation. As such many of these identifications are referred to allied health professionals such as social workers (Dawson et al., 2019; Fanslow & Kelly, 2016). Within the NZ healthcare environment, the availability of social workers are limited to weekdays only and between the hours of 8 am to 4 or 5 pm, depending upon contracted hours. Social workers are typically allocated to areas such as outpatients' clinics, wards and emergency departments but are not permanently stationed in these environments and must be called to see any referral. These data indicate the importance of working with ED personnel to identify IPV-related TBI and then relay relevant information to social workers, and to have social workers adequately trained in TBI and strangulation detection and assessment.

Clinical implications of the findings suggest the need for a standardised brief screening process that includes males and that is conducted by health professionals. Conduct by a health professional would prevent under-reporting of IPV when social workers are not available. An assessment of mTBI needs to be included in the Management and Safety Plan following IPV and ideally services that respond to referrals for IPV need to be able to address or link in with TBI management services to prevent the person having to seek help from different services working in silos.

Limitations

Findings were limited to reports from a single hospital region in New Zealand and only completed IPV reports were included in analyses. It is unknown how many people attended healthcare services and were not screened for IPV, nor how may IPV reports were not completed. No other data sources were reviewed regarding reported IPV. As a result, information pertaining to TBI, and strangulation referrals may have been missed. Finally, it is possible that challenges in accurately translating items pertaining to choking or "being knocked out" may have resulted in artificially lower reporting for those items.

Conclusions

This retrospective review of documented IPV and strangulation records over a four-year period found that females accounted for 96.8% of IPV reports. Although 38.2% of IPV survivors reported they had been “knocked out”, only 0.8% of reports identified a TBI assessment as having been completed and 0.5% of IPV survivors had a post-brain injury referral completed. Of the IPV survivors 48% reported having been strangled but only .6% had a strangulation assessment. These statistics suggest significant gaps in appropriate healthcare and referrals of females sustaining IPV-related brain injuries. Furthermore, given that social workers completed 70% of the IPV documentation reviewed in this study, it is imperative that they receive training regarding the effects of brain injuries, strangulation and the need for further assessment and management by medical professionals.

Tables & Figures

Table 1: Intimate partner violence over 2018 to 2021 by sex, ethnicity, and weekdays by number, mean age and incidence per 100,000 population.

Table 2: Intimate partner violence characteristics, safety plan, evidence, assessment, and referrals by ethnicity of IPV survivor.

Table 3: Intimate partner violence characteristics, assessment, and referrals by type of provider completing the report.

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Table 1: Intimate partner violence over 2018 to 2021 by sex, ethnicity, year, and weekdays by number, mean age and incidence per 100,000 population.

	Report n= *(%)*	**Population n=**	**Age mean (95% CI)**	**Incidence rate* (95% CI)**
Total				
	568 *(100)*	1,283,700	47.8 (44.1-51.6)	44.2 (40.8-48.0)
Sex				
Male	21 *(3.7)*[b]	630,938	49.7 (40.6-58.7)	3.3 (2.2-5.1)
Female	547 *(96.3)*[a]	652,762	35.2 (30.2-40.3)	83.8 (77.1-91.1)
Ethnicity				
NZ European	279 *(49.1)*[defg]	740,695	48.3 (43.5-53.2)	37.7 (33.5-42.4)
NZ Māori	*189 (33.3)*[cefg]	231,066	42.8 (39.0-46.6)	81.8 (70.9-94.3)
Pacific people	*51 (9.0)*[cdf]	102,696	38.5 (32.1-44.9)	49.7 (37.7-65.3)
Asian-Indian	*20 (3.5)*[cde]	166,881	34.0 (29.3-38.7)	12.0 (7.7-18.6)
Other	*29 (5.1)*[cd]	42,362	33.3 (28.3-43.0)	68.5 (47.6-98.5)
Weekdays				
Monday	80 *(14.1)*[mopq]	183,385.7	41.7 (37.2-46.2)	43.6 (35.0-54.3)
Tuesday	102 *(18.0)*[pq]	183,385.7	39.2 (34.4-43.9)	55.6 (45.8-67.5)
Wednesday	108 *(19.0)*[kpq]	183,385.7	41.4 (36.9-45.9)	58.9 (48.8-71.1)
Thursday	103 *(18.1)*[pq]	183,385.7	43.4 (39.4-47.4)	56.2 (46.3-68.1)
Friday	112 *(19.7)*[kpq]	183,385.7	41.2 (36.4-46.1)	61.1 (50.7-73.5)
Saturday	25 *(4.4)*[klmon]	183,385.7	35.8 (31.3-40.4)	13.6 (9.2-20.2)
Sunday	38 *(6.7)*[klmon]	183,385.7	35.1 (30.8-39.3)	20.7 (15.1-28.5)

CI = Confidence Interval; NZ = New Zealand; * = per 100,000 population; Significant difference ($p<0.05$) than (a) = Males; (b) = Females; (c) = NZ European; (d) = NZ Māori; (e) = Pacific People; (f) = Asian-Indian; (g) = Other; (g) = 2018; (h) = 2019; (i) = 2020; (j) = 2021; (k) = Monday; (l) = Tuesday (m) = Wednesday; (n) = Thursday; (o) = Friday; (p) = Saturday; (q) = Sunday.

Table 2: Intimate partner violence reporting tool* characteristics, safety plan, evidence, assessment, and referrals by ethnicity of IPV survivor.

	Total **n= *(%)***	**NZE** **n= *(%)***	**NZM** **n= *(%)***	**PacP** **n= *(%)***	**As-I** **n= *(%)***	**Other** **n= *(%)***
Total reports	660 *(100)*	280 *(42.4)*	225 *(34.1)*	63 *(9.5)*	32 *(4.8)*	47 *(7.1)*
IPV Characteristics						
Afraid to go/stay home	152 *(23.0)*	65 (*23.2)*	60 (*26.7)*	10 *(15.9)*	8 *(25.0)*	9 (*19.1)*
Physical violence increased	388 *(58.8)*	168 (*60.0)*	145 (*64.4)*	37 *(58.7)*	16 *(50.0)*	22 (*46.8)*
Ever choked you	328 *(49.7)*	146 (*52.1)*	123 (*54.7)*	29 *(46.0)*	12 *(37.5)*	18 (*38.3)*
Ever knocked out	252 *(38.2)*	108 (*38.6)*	99[d] (*44.0)*	27 *(42.9)*	6[e] *(18.8)*	12 (*25.5)*
Weapon used	248 *(37.6)*	108 (*38.6)*	100 (*44.4)*	20 *(31.7)*	8 *(25.0)*	12 (*25.5)*
Consider leaving	473 *(71.7)*	212 (*75.7)*	166 (*73.8)*	44 *(69.8)*	19 *(59.4)*	32 (*68.1)*
Alcohol/substance	398 *(60.3)*	167[d] (*59.6)*	164[d] (*72.9)*	33 *(52.4)*	10[ab] *(31.3)*	24 (*51.1)*
Beaten when pregnant	176 *(26.7)*	69 (*24.6)*	70 (*31.1)*	20 *(31.7)*	5 *(15.6)*	12 (*25.5)*
Have children	253 *(38.3)*	113 (*40.4)*	97[d] (*43.1)*	24 *(38.1)*	6[b] *(18.8)*	13 (*27.7)*
Risk children safety	45 *(6.8)*	16 (*5.7)*	20 (*8.9)*	2 *(3.2)*	3 *(9.4)*	4 (*8.5)*
Children physically abused	102 *(15.5)*	38 (*13.6)*	37 (*16.4)*	13 *(20.6)*	5 *(15.6)*	9 (*19.1)*
Violence around children	249 *(37.7)*	104 (*37.1)*	93 (*41.3)*	29 *(46.0)*	8 *(25.0)*	15 (*31.9)*
Safety Plan						
Safe Accommodation	397 *(60.2)*	169 (*60.4)*	146 (*64.9)*	35 *(55.6)*	20 *(62.5)*	27 (*57.4)*
Safe Transport	298 *(45.2)*	123 (*43.9)*	113 (*50.2)*	32 *(50.8)*	12 *(37.5)*	18 (*38.3)*
Emergency Contact	319 *(48.3)*	132 (*47.1)*	117 (*52.0)*	32 *(50.8)*	18 *(56.3)*	20 (*42.6)*
Exit Plan	237 *(35.9)*	102 (*36.4)*	83 (*36.9)*	25 *(39.7)*	11 *(34.4)*	16 (*34.0)*
Safety Network	393 *(59.5)*	170 (*60.7)*	134 (*59.6)*	40 *(63.5)*	19 *(59.4)*	30 (*63.8)*
Support Information	176 *(26.7)*	75 (*26.8)*	70 (*31.1)*	15 *(23.8)*	7 *(21.9)*	9 (*19.1)*
Evidence						
Clinical Photo offered	25 *(3.8)*	9 (*3.2)*	11 (*4.9)*	3 *(4.8)*	0 -	2 (*4.3)*
Clinical Photo taken	13 *(2.0)*	4 (*1.4)*	5 (*2.2)*	3 *(4.8)*	0 -	1 (*2.1)*
Assessment						
TBI	5 *(0.8)*	2 (*0.7)*	2 (*0.9)*	0 -	0 -	1 (*2.1)*
Strangulation	4 *(0.6)*	3 (*1.1)*	1 (*0.4)*	0 -	0 -	0 -
Referral						
Police	221 *(33.5)*	105 (*37.5)*	67[d] (*29.8)*	20 *(31.7)*	17[be] *(53.1)*	12[d] *(25.5)*
Social Worker	325 *(49.2)*	142 (*50.7)*	112 (*49.8)*	27 *(42.9)*	21 *(65.6)*	23 *(48.9)*
Women's Refuge	263 *(39.8)*	109 (*38.9)*	99 (*44.0)*	21 *(33.3)*	16 *(50.0)*	18 *(38.3)*
Child Support Services	143 *(21.7)*	55[b] (*19.6)*	66[ae] (*29.3)*	11 *(17.5)*	5 *(15.6)*	6[b] *(12.8)*
Post-concussion Service	3 *(0.5)*	2 (*0.7)*	1 (*0.4)*	0 -	0 -	0 -
Sexual Abuse Support	5 *(0.8)*	1[e] (*0.4)*	2 (*0.9)*	0 -	0 -	2[a] (*4.3)*
Ethnic Women's Group	32 *(4.8)*	4[bcde] (*1.4)*	13[a] (*5.8)*	5[a] *(7.9)*	7[a] *(21.9)*	3[a] (*6.4)*
Other	219 *(33.2)*	106[bd] (*37.9*	66[ad] (*29.3)*	23[d] *(36.5)*	1[abce] *(3.1)*	13[d] (*27.7)*

*=Information collected on the reporting tool for the Ministry of Health; % = Percentage; NZE = New Zealand European; NZM = New Zealand Māori; PacP = Pacific Peoples; As-I = Asian – Indian; Significant difference (p<0.05) than (a) = New Zealand European; (b) = New Zealand Māori; (c) = Pacific Peoples; (d) = Asian – Indian; (e) = Other.

Table 3: Intimate partner violence reporting tool* characteristics, assessment, and referrals by type of provider completing the report.

	Total **n= *(%)***	**Doctor** **n= *(%)***	**Nurse** **n= *(%)***	**Social Worker** **n= *(%)***	**Allied Health** **n= *(%)***
Total reports	660 *(100)*	*70 (10.6)*	*90 (13.6)*	*462 (70.0)*	*37 (5.6)*
IPV Characteristics					
Afraid to go/stay home	152 *(23.0)*	26[c] *(37.1)*	30[c] *(33.3)*	90[ab] *(19.5)*	6 *(16.2)*
Physical violence increased	388 *(58.8)*	43 *(61.4)*	62 *(68.9)*	262 *(56.7)*	21 *(56.8)*
Ever choked you	328 *(49.7)*	42[c] *(60.0)*	49 *(54.4)*	166[a] *(35.9)*	19 *(51.4)*
Ever knocked out	252 *(38.2)*	31 *(44.3)*	40 *(44.4)*	176 *(38.1)*	15 *(40.5)*
Weapon used	248 *(37.6)*	25[c] *(35.7)*	34[c] *(37.8)*	331[abd] *(71.6)*	13[c] *(35.1)*
Consider leaving	473 *(71.7)*	46 *(65.7)*	70[c] *(77.8)*	213[bd] *(46.1)*	26[c] *(70.3)*
Alcohol/substance	398 *(60.3)*	40[c] *(57.1)*	59[c] *(65.6)*	128[abd] *(27.7)*	24[c] *(64.9)*
Beaten when pregnant	176 *(26.7)*	16[c] *(22.9)*	20[c] *(22.2)*	185[ab] *(40.0)*	12 *(32.4)*
Have children	253 *(38.3)*	27[c] *(38.6)*	29[c] *(32.2)*	30[abd] *(6.5)*	12[c] *(32.4)*
Risk children safety	45 *(6.8)*	8 *(11.4)*	4[c] *(4.4)*	73[b] *(15.8)*	3 *(8.1)*
Children physically abused	102 *(15.5)*	17[bc] *(24.3)*	8[a] *(8.9)*	73[a] *(15.8)*	4 *(10.8)*
Violence around children	249 *(37.7)*	30 *(42.9)*	24 *(26.7)*	177 *(38.3)*	18 *(48.6)*
Assessment					
TBI	5 *(0.8)*	1 *(1.4)*	2 *(2.2)*	2 *(0.4)*	0 -
Strangulation	4 *(0.6)*	1 *(1.4)*	1 *(1.1)*	2 *(0.4)*	0 -
Referral					
Police	221 *(33.5)*	26 *(37.1)*	32 *(35.6)*	145 *(31.4)*	18 *(48.6)*
Social Worker	325 *(49.2)*	33 *(47.1)*	41 *(45.6)*	236 *(51.1)*	15 *(40.5)*
Women's Refuge	263 *(39.8)*	24 *(34.3)*	43 *(47.8)*	182 *(39.4)*	14 *(37.8)*
Child Support Services	143 *(21.7)*	16 *(22.9)*	16 *(17.8)*	105 *(22.7)*	6 *(16.2)*
Post-concussion Service	3 *(0.5)*	1 *(1.4)*	1 *(1.1)*	1 *(0.2)*	0 -
Sexual Abuse Support	5 *(0.8)*	0 -	0 -	5 *(1.1)*	0 -
Ethnic Women's Group	32 *(4.8)*	5 *(7.1)*	5 *(5.6)*	21 *(4.5)*	1 *(2.7)*
Other	219 *(33.2)*	18 *(25.7)*	28 *(31.1)*	167[d] *(36.1)*	6[c] *(16.2)*

*=Information collected on the reporting tool for the Ministry of Health; % = Percentage; Significant difference ($p<0.05$) than (a) = Dr; (b) = Nurse; (c) = Social Worker; (d) = Allied Health; Percentages do not total 100% as they represent the number of people reporting that aspect on the reporting form.