

**USING BEHAVIOUR CHANGE THEORY TO UNDERSTAND FACTORS  
INFLUENCING SCREENING FOR TRAUMATIC BRAIN INJURIES AMONG  
WOMEN WHO HAVE EXPERIENCED INTIMATE PARTNER VIOLENCE**

by

Blake Granville Nicol

B.Sc., University of British Columbia (Okanagan), 2017

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

in

THE COLLEGE OF GRADUATE STUDIES

(Health and Exercise Sciences)

THE UNIVERSITY OF BRITISH COLUMBIA

(Okanagan)

September 2019

© Blake Granville Nicol, 2019

The following individuals certify that they have read, and recommend to the College of Graduate Studies for acceptance, a thesis/dissertation entitled:

Using Behaviour Change Theory to Understand Factors Influencing Screening of Traumatic Brain Injuries among Women who have Experienced Intimate Partner Violence

submitted by Blake Granville Nicol in partial fulfillment of the requirements of the degree of Master of Science .

Dr. Heather Gainforth, University of British Columbia Okanagan, Health and Exercise Sciences

---

**Supervisor**

Dr. Paul van Donkelaar, University of British Columbia Okanagan, Health and Exercise Sciences

---

**Supervisory Committee Member**

Dr. Shelina Babul, University of British Columbia, Pediatrics, Faculty of Medicine

---

**Supervisory Committee Member**

Dr. Eve Valera, Harvard University, Psychiatry

---

**University Examiner**

Click or tap here to enter text.

---

**External Examiner**

**Additional Committee Members include:**

Click or tap here to enter text.

---

**Supervisory Committee Member**

Click or tap here to enter text.

---

**Supervisory Committee Member**

## **Abstract**

*Background:* Women who experience intimate partner violence (IPV) are at a high risk for traumatic brain injuries (TBIs). Women's shelters may be an ideal location for TBI screening. Behavior change theory can help understand factors that influence screening at women's shelters and develop interventions to promote screening.

*Objective:* To use behavior change theory and an integrated knowledge translation approach to understand the local context of women's shelters, factors influencing screening for TBIs among staff that work at women's shelters, and co-develop intervention recommendations to promote screening of TBIs at women's shelters.

*Methods:* The research was conducted in three phases in partnership with the Kelowna Women's Shelter. In Phase 1, participants, who were staff at women's shelters across Canada, completed an online survey that assessed their current TBI screening behaviours, knowledge of TBIs, and factors influencing screening. In Phase 2, participants, who were staff at women's shelters in the Okanagan, completed an interview regarding the factors that influence screening for TBIs. In both phases, factors were analyzed using the Theoretical Domains Framework. In Phase 3, intervention recommendations were co-developed using the Behaviour Change Wheel.

*Results:* In Phase 1, only 25% of participants (n=150) had ever screened for TBIs in their work. On average, participants scored a 12/18 (SD=1.99) on the knowledge of TBI's assessment. Regarding factors hindering screening, findings indicate that participants lack skills (mean=2.1, SD=1.9) and knowledge (mean=2.9 SD=2.2) with regards to screening and are nervous to screen (mean=3.0 SD=2.4) for TBIs. In Phase 2, 194 barriers to screening for TBI were extracted from ten interviews with staff members. Prominent domains included knowledge (37%), beliefs about

capabilities (16%), and environmental context and resources (15%). Finally, in Phase 3, five intervention recommendations were co-developed for interventions aiming to promote TBI-screening in women's shelters.

*Conclusions:* This thesis was the first theory-based study to develop intervention recommendations for promoting screening of TBIs at women's shelters. The recommendations were co-developed with a community partner through an evidence-based process. Recommendations have the potential to increase TBI-screening at women's shelters ultimately improving the quality of life of women who have experienced a TBI from IPV.

## **Lay Summary**

Women who experience intimate partner violence are likely to suffer one or multiple brain injuries because of the physical abuse. However, there is little screening of brain injuries for women who have experienced abuse. This thesis aimed to understand the local context of women's shelters in the Kelowna area, factors that influence whether staff screen for brain injuries at their organization (in Kelowna and across Canada), and ultimately provide intervention recommendations for promoting screening of brain injuries at women's shelters. This thesis was done in partnership with the Kelowna Women's Shelter. Findings from this thesis suggest a variety of components are important to consider when developing an intervention. Five intervention recommendations were developed to help increase screening of brain injuries at women's shelters and improve the quality of life of women who have experienced a TBI from IPV.

## **Preface**

All study procedures for this thesis received ethics approval through the Behavioural Research Ethics Board at the University of British Columbia, Okanagan Campus (#H17-01143). Blake Nicol, Dr. Heather Gainforth, Dr. Paul van Donkelaar, and Karen Mason were involved in the development of the research question and design of the study. Blake Nicol was responsible for the development of recruitment materials, development of the survey, development of the interview guide, conducting all interviews, transcription of interviews, analysis of interview transcripts, and writing the thesis document. Dr. Gainforth supervised Blake throughout the research process. Dr. Gainforth, Dr. Paul van Donkelaar, and Karen Mason provided input and feedback throughout the development of recruitment materials, development of the interview guide, and development of the survey. Dr Gainforth also provided input throughout the analysis of interview transcripts and writing the thesis document. Kennedy Louis was a second coder and helped with the analysis of interview transcripts and analysis of survey results. Karen Mason also helped recruit participants for this study and worked in partnership with Blake, Dr. Gainforth, and Dr. van Donkelaar on reviewing findings and recommendation development.

This thesis has not yet been submitted for publication.

## Table of Contents

<b>Abstract.....</b>	<b>iii</b>
<b>Lay Summary .....</b>	<b>v</b>
<b>Preface.....</b>	<b>vi</b>
<b>Table of Contents .....</b>	<b>vii</b>
<b>List of Tables .....</b>	<b>ix</b>
<b>List of Figures.....</b>	<b>x</b>
<b>Acknowledgements .....</b>	<b>xi</b>
<b>Dedication .....</b>	<b>xiii</b>
<b>Chapter 1: Introduction .....</b>	<b>1</b>
1.1 Intimate Partner Violence .....	1
1.2 Intimate Partner Violence and Traumatic Brain Injury .....	2
1.3 Screening for Traumatic Brain Injury.....	6
1.4 The Value of Women’s Shelters for Ensuring Screening of Traumatic Brain Injury	10
1.5 Knowledge Translation.....	12
1.6 Developing Knowledge Translation Using Theory .....	16
1.7 Engaging Knowledge Users in Intervention Design.....	21
1.8 Thesis Objective.....	22
<b>Chapter 2: Methods .....</b>	<b>23</b>
2.1 Study Design.....	23
2.2 Research Approach .....	23
2.3 Phase 1 Methods .....	24
2.4 Phase 2 Methods .....	29
2.5 Phase 3 Methods .....	33

<b>Chapter 3: Results</b>	<b>34</b>
3.1 Phase 1 Results	34
3.2 Phase 2 Results	43
3.3 Phase 3 Results	48
<b>Chapter 4: Discussion</b>	<b>51</b>
4.1 Traumatic Brain Injury Knowledge	51
4.2 Behavioural Diagnosis and Intervention Recommendations	52
4.3 Limitations and Future Directions	56
4.4 Strengths	58
4.5 Conclusion	60
<b>Bibliography</b>	<b>61</b>
<b>Appendices</b>	<b>70</b>
Appendix A: Example Letter of Rectruitment	70
Appendix B: Example Survey Consent Form	71
Appendix C: Example Survey	74
Appendix D: Interview Consent Form	93
Appendix E: Interview Guide	95



## **List of Tables**

Table 1: Phase 1 Demographics.....	35
Table 2: TBI-Knowledge Questionnaire.....	37
Table 3: TDF Domain Themes and Sub-themes.....	41
Table 4: Interview TDF Domain Themes and Sub-Themes.....	46
Table 5: Intervention Recommendations .....	49

## **List of Figures**

Figure 1: The Knowledge-to-Action Framework .....	15
Figure 2: The Behaviour Change Wheel .....	18
Figure 3: Staff's Perceptions Toward the Number of TBI their Clients have Acquired .....	38
Figure 4: Mean Score of TDF domains rated on a 7-Point Likert Scale .....	39
Figure 5: Frequency of TDF Domains Extracted from Survey Question: "what would stop you from screening your clients for traumatic brain injuries in your work?" .....	40
Figure 6: TDF Barriers Extracted from Interviews.....	44
Figure 7: TDF Facilitators Extracted from Interviews .....	45

## **Acknowledgements**

Dr. Heather Gainforth – You have been the most influential person for me throughout the last two years of my life. Looking back, I do not know where I would be today without your guidance and I will be forever grateful. You have taught me how to have the resilience to overcome numerous circumstances and provided me with skills that I will be able to use throughout the rest of my life. Your positive attitude towards research is contagious and is one of the best parts of our lab. You have made me excited for what is next, and I am so thankful for everything you have done for me the last couple years.

Supervisory Committee: Dr. Paul van Donkelaar and Dr. Shelina Babul. Thank you both for the invaluable feedback on my thesis project. I appreciate the time you both have taken to help me with this project and grow academically. I have learned so much throughout this process and look forward to being able to apply these skills moving forward.

Karen Mason – This thesis would not have been possible without you. Your input from the context of women’s shelters provided so much insight to the context of women’s shelters and helped strengthen this thesis. Your passion towards the topic of IPV and TBIs is impressive and makes me take every opportunity to talk about it and educate people on the topic. The experiences you have provided me within the community were incredible and I am so thankful for them.

The ABC Lab – I have never experienced meetings that are as enjoyable as our weekly meetings. You all are such a great supportive group of people. Thank you for all the times over the past two years. The lab is such a fun environment to be a part of. Kennedy, thank you for your help with coding the data. You did an incredible job and I appreciate all the work that you did on this project.

The Participants – Thank you to everyone who participated in this study. You made this research possible. Your dedication to help women who have experienced intimate partner violence is inspiring and you all do such important work that so many people are grateful for. Thank you for all of your insights towards screening for traumatic brain injuries in your organizations.

### **Dedication**

I would like to dedicate this thesis to my parents. Mom and Dad, you have provided unbelievable support to me throughout my life. I would not be where I am today without you both. Although I still disagree with the “four pillars of Summer” I am unable to think of a way the two of you could have done a better job raising and supporting me throughout the years.

## **Chapter 1: Introduction**

### **1.1 Intimate Partner Violence**

Intimate partner violence (IPV) is a global public health concern with the majority of those experiencing violence being women (Organization & Pan American Health, 2012). It is classified as “any behaviour in an intimate relationship which causes physical, psychological or sexual harm to those in the relationship” (Dicola & Spaar, 2016). IPV can occur in all settings and among all socioeconomic, religious, and cultural groups (Dicola & Spaar, 2016). Nearly one third of women have experienced physical or sexual IPV (Devries et al., 2013).

IPV is a public health crisis in Canada. In 2017, nearly one-third (30%) of all police reported violent crime in Canada was from IPV resulting in 96,000 victims in Canada alone (Burczycka, Conroy, & Savage, 2018). Women in Canada are more likely to be victims of IPV than men. Seventy-nine percent of the victims of IPV are women and 70% of them report having physical force used against them (Burczycka et al., 2018; Sinha, 2013) and from 2009 to 2017, more than half (54%) of IPV resulted in physical injuries (Ibrahim, 2019). Furthermore, it is reported that sixty-seven percent of Canadians know a woman who has experienced physical or sexual abuse in Canada ("Angus Reid Omnibus Survey," 2012), however; it is likely that all Canadians know a women who has experienced physical or sexual abuse in Canada. Every six days, it is estimated that a woman is killed by her partner in Canada (Cotter, 2014). In Canada, IPV is most common among those aged 25 to 35 years and occurs most commonly in rural areas in Canada (Burczycka et al., 2018). IPV is a major public health crisis affecting the health of many women and children. As a result of IPV, each night, more than 6,000 women and children sleep in shelters across Canada for a safe place away from the violence ("Shelters for abused women in Canada," 2014).

## **1.2 Intimate Partner Violence and Traumatic Brain Injury**

Women who experience IPV are at high risk of traumatic brain injuries (TBIs). TBIs are a physiological disruption in brain functioning which is caused by sudden impact or acceleration deceleration trauma of the head (Vos et al., 2012). The head, neck, and face are most likely to be injured during IPV which can often result in a TBI (Berrios & Grady, 1991; Biroscak, Smith, Roznowski, Tucker, & Carlson, 2006; Fonseka, 1974; Greenfeld & others, 1998; Petridou et al., 2002; Sheridan & Nash, 2007; Wong et al., 2014). TBIs are most commonly mild TBIs (Galgano et al., 2017). Mild TBIs occur most frequently from blows to the head with acceleration/deceleration forces taking place (Galgano et al., 2017). There are many symptoms associated with mild TBIs which include: headache, confusion, lightheadedness, dizziness, blurred vision or tired eyes, ringing in the ears, fatigue or lethargy, a change in sleep patterns, behavioural or mood changes (including posttraumatic stress disorder (PTSD) and depression), and problems with memory, concentration and attention (Astafiev, Zinn, Shulman, & Corbetta, 2016). A study done by Astafiev et al. (2016) analyzed the frequency of different symptoms reported by mild TBI patients. Headaches and difficulty concentrating were the most frequently reported symptom (65% of the mild TBI patients) followed by sensitivity to light (40%), blurred vision (25%), and depression (20%) (Astafiev et al., 2016). TBIs are also linked to a reduction in a person's ability to empathize emotionally (de Sousa, McDonald, & Rushby, 2012; Williams & Wood, 2010). Furthermore, TBIs can cause abnormal affective responsivity to emotional stimuli (de Sousa et al., 2012). Therefore, many women who experience a TBI from IPV are likely to experience many negative health consequences as a result.

Although there have been relatively few studies done looking at the prevalence of TBIs from IPV, a review by Kwako et al. (2011) examined six studies and found 30-74% of victims of

IPV suffered a TBI as a result. Valera & Berenbaum (2003) found that 75% of women who have experienced IPV have suffered a TBI as a result and 50% of these women have suffered repetitive TBIs. Another study found that 75% of women who have experienced IPV report having been strangled and nearly half report having experienced “blows to the head” (Mechanic, Weaver, & Resick, 2008).

Furthermore, Hunnicutt, Murray, Lundgren, Crowe, and Olson (2019) used the HELPS questionnaire, a five-item TBI screening tool (Picard, Scarisbrick, & Paluck, 1991), to screen participants (n=130) who have experienced IPV from TBI. Findings indicated that approximately half (n=64) of participants were classified as “at risk for TBI” according (Hunnicutt et al., 2019). Jackson, Philp, Nuttall, and Diller (2002) conducted a pilot study also using the HELPS screening tool to better understand the risk of TBIs in women who have been abused. Fifty-three women completed the survey and were eligible for the study. Forty-nine (92%) of the women reported history of having been hit in the head or face during IPV (Jackson et al., 2002). Thirteen (25%) of the women reported having been hit in the head or face more than 20 times in the “past 5 years” (Jackson et al., 2002). Twenty-one (40%) of the women reported at least one instance when they had lost consciousness from being hit in the head or face or severely shaken by their partner and 41 (77%) reported symptoms consistent with post concussive syndrome (Jackson et al., 2002).

Although the majority of TBIs that women receive because of IPV are classified as mild TBIs, the health consequences of multiple TBIs are even more concerning. Women often return to the abusive relationship with only 43% of women leaving the relationship after five bouts of IPV (Okun, 1986) likely resulting in multiple TBIs. The accumulation of multiple TBIs can expose women to greater risks of decreased cognitive functioning, more executive functioning problems, and more symptoms of depression (Vynorius, Paquin, & Seichepine, 2016). A well-studied area



on the effects of multiple TBIs is in the sport of Boxing. Boxers often experience motor, cognitive, and/or behavioural impairments from multiple TBIs (Jordan, 2000). While further research is needed, it is likely that these impairments are also experienced by women who have experienced multiple TBIs from IPV. Chronic traumatic encephalopathy, a condition developed from exposure to multiple TBIs was initially reported from boxers who developed symptoms of Parkinson's and dementia (McKee, Stein, Kiernan, & Alvarez, 2015). Although not yet studied in the context of IPV and TBI, it is likely that these women are at a much greater risk of developing CTE resulting in Parkinson's disease and dementia like symptoms. To support women who have experienced a TBI from IPV we need to develop IPV-specific supports.

It is important to screen women who have experienced IPV for TBIs as early diagnosis and treatment of a TBI is important for treatment of physiological parameters that may worsen brain pathology (Vos et al., 2012). For example, treatment of TBIs may involve the prevention and treatment of hypoxia, hypotension, and hyperventilation (Badjatia et al., 2008). Although these treatments are relatively rare and most mild TBIs only require rest and gradual return to normal activities, many medications can be prescribed to lower the risk of complications such as; analgesics, anti-anxiety agents, anti-coagulants, anti-convulsants, anti-depressants, anti-psychotics, muscle relaxants, sedative-hypnotic agents, and/or stimulants ("About Brain Injury Medications," 2019). People who are diagnosed with a TBI can also be provided with information on evidence-based recommendations on returning to their pre-injury levels of activity.

TBIs have the potential to affect many aspects of one's life and could make it especially difficult for women who have experienced a TBI from IPV. An undiagnosed TBI could also have major impacts on women's ability to leave an abusive relationship. McDonald and Dickerson (2013) identified six themes which help women leave an abusive relationship: (1) developing and

maintaining self-reliance, (2) negotiating relationships, (3) creating a safe and supportive environment, (4) challenging societal roles and expectations, (5) nurturing the self, and (6) protecting the children. These themes were developed through studying 21 women who have left violent relationships and are now living without violence by asking these women to share stories of their current lives (McDonald & Dickerson, 2013). An open, nondirected interview style was used to collect their stories to form the six themes that were developed (McDonald & Dickerson, 2013). Developing and maintaining self-reliance is the process of women self-sufficiency throughout life and not relying on an intimate partner (McDonald & Dickerson, 2013). Negotiating relationships involves women setting boundaries with intimate patterns, remaining connected to their families and friends, and maintaining self-reliance throughout the relationship (McDonald & Dickerson, 2013). Creating a safe and supportive environment is important for protecting themselves and ensuring that they have a “calm, safe haven” for support (McDonald & Dickerson, 2013). Challenging societal roles and expectations involves challenging the societal roles of women and challenging the idea that violence against women is acceptable (McDonald & Dickerson, 2013). Nurturing the self is developed through self-reflection, self-exploration, and self-discovery and ultimately believing in yourself again (McDonald & Dickerson, 2013). Finally, protecting children by providing for the children’s needs first and ensuring the child’s safety (McDonald & Dickerson, 2013). Suffering from a TBI could make it more challenging to implement and achieve these six strategies making it difficult to leave an abusive relationship.

TBIs could also impact many other aspects of a women’s life who has experienced IPV. Experiencing any of the TBI symptoms listed earlier could impact women’s ability to press legal charges, address their financial situation, find housing, find employment, and/or take care of their children. Furthermore, women with TBIs may experience significantly higher rates of abuse than

those without TBIs (Colantonio, Collie, Ruseckaite, & Chang, 2014). Reichard, Langlois, Sample, Wald, and Pickelsimer (2007) examined the relationship between traumatic brain injuries, violence, and abuse and neglect. Nine participants with TBIs were interviewed about their lives and the violence, abuse, and neglect that they have experienced (Reichard et al., 2007). Three themes (living with a TBI, experiencing violence, abuse, and neglect, and continuing to live after violence, abuse, and neglect) emerged from the interviews (Reichard et al., 2007). Reichard et al. (2007) found that TBIs often resulted in “help seeking behaviour” which resulted in additional exposure to violence, abuse and neglect. Participants described their TBI-related disabilities as influential in their exposure to violence, abuse and neglect (Reichard et al., 2007). Participants felt that after experiencing a TBI, they have become “too trusting”, “too passive” and “less intuitive” exposing them to more violence, abuse, and neglect (Reichard et al., 2007). Furthermore, significant others were the most commonly identified perpetrators of this violence, abuse, and neglect (Reichard et al., 2007). Not only do TBIs increase exposure to IPV, but women who have sustained a TBI may be less able than others to remove themselves from abusive relationships (Jackson et al., 2002). Therefore, women who experience IPV should be screened for TBIs so they can be provided with the necessary supports to help with TBI-recovery, leaving abusive relationships, and avoiding future violence, abuse, and neglect.

### **1.3 Screening for Traumatic Brain Injury**

There are many benefits to screening for TBIs in women who have experienced IPV. Screening for TBIs among women who have experienced IPV can be helpful in explaining why some women return to the abusive relationship (Loseke, 1992). It also can provide relief for many of these women when they find out that what they are feeling can be explained neurologically (Jackson et al., 2002). Hopefully, screening will result in providing women who have experienced

a TBI from IPV the opportunity to receive better treatment and supports with regards to their TBI which could ultimately improve their overall health and help women leave abusive relationships. Although there is little literature on specific IPV-TBI screening tools, there have been a few screening tools identified as potential options within the IPV context.

A literature review by Goldin, Haag, and Trott (2016) found possible TBI-screening tools that could be used in the context of IPV. They found nine screening tools and five that may work within the context of IPV. Listed below are the five screening tools that may work in the context of IPV: Brain Injury Screening Questionnaire (BISQ), Ohio State University TBI Identification Method (OSU TBI-ID), Philadelphia Head Injury Questionnaire (PHIQ), Traumatic Brain Injury Questionnaire (TBIQ), and the HELPS tool (Goldin, Haag, & Trott, 2016). These tools are briefly described below.

*BISQ.* The BISQ was developed by the Research and Training Center on Community Integration on Individuals with Traumatic Brain Injury at Mount Sinai School of Medicine to assess for a lifetime of TBI and to help reduce the health consequences of an undiagnosed or untreated TBI ("Screening and Assessment Tools for Professionals," 2019). The BISQ can be conducted in an interview with clients and assesses for symptoms including attention, memory, depression, anxiety, mood, aggression, impulsivity, and physical symptoms. It takes approximately 10 to 15 minutes to complete (Dams-O'Connor et al., 2014) and is available in English and Spanish (Cantor et al., 2004).

*OSU TBI-ID.* The OSU TBI-ID was developed for populations at risk for TBI (Corrigan & Bogner, 2007). It consists of three steps to identify TBIs (Corrigan & Bogner, 2007). These steps ask about injuries to the head and neck including follow-up questions regarding previous injuries

to the head and neck (Corrigan & Bogner, 2007). Finally, the OSU TBI-ID attempts to identify multiple TBIs (Corrigan & Bogner, 2007). Corrigan and Bogner (2007) found preliminary support for the reliability and validity of the OSU TBI-ID.

*PHIQ.* The PHIQ was developed by Curry, Ivins, and Gowenis in 1991 and is a much longer TBI-screening questionnaire than the others discussed and consists of seven phases: identifying information, accident information, persistent symptoms, cognitive aspects of head injury, personality changes, pertinent personal/medical history, and comments and/or additional information (Dams-O'Connor et al., 2014). The TBIQ has three steps: TBI history, symptoms, and other health conditions and aims to understand lifetime history of TBIs, symptoms that the clients are experiencing, and understanding other health conditions that may be causing the present symptoms (Dams-O'Connor et al., 2014).

*TBIQ.* The TBIQ is to be administered in an interview style and assesses for a lifetime of TBI. The TBIQ consists of two parts (Diamond, Harzke, Magaletta, Cummins, & Frankowski, 2007). Part 1 includes asking questioning about situations where head injuries are common (e.g. domestic violence). Part 2 consists of a symptom checklist and assesses cognitive and physical symptoms often found with head injuries. The TBIQ also assesses for multiple TBIs (Diamond et al., 2007).

*HELPS.* Finally, the HELPs tool developed by Pichard et al. (1991) asks clients five “yes” or “no” questions and provides a scoring system at the bottom as to whether the client is considered positive for a possible TBI. Questions include: 1) H – Have you ever Hit you Head or been Hit on the Head?; 2) E – Were you ever seen in the Emergency room, hospital or by a doctor because of an injury to your head?; 3) L – Did you ever Lose consciousness or experience a period of being

dazed and confused because of an injury to your head?; 4) P – Do you experience any of these Problems in your daily life since you hit your head? Headaches; dizziness; anxiety; depression; difficulty concentrating; difficulty remembering; difficulty reading, writing or calculating; poor problem-solving; difficulty performing your job/school work; change in relationships with others; or poor judgement (e.g. being fired from jobs, being arrested, being in fights).; and 5) S – Have you had any significant Sicknesses?.

To our knowledge, previous research has not examined the prevalence of screening or the use of these tools within women’s shelters. According to our community partner (The Kelowna Women’s Shelter) many shelters across Canada are not using any of these TBI-screening tools to screen their clients for TBIs which presents a knowledge-to-action gap. A potential resource that may help to reduce this knowledge-to-action gap is the CATT online.

The Concussion Awareness Training Tool (CATT online) is an online resource initially developed in 2013 by Babul and provides education modules and resources with the goal of standardizing concussion recognition, diagnosis, treatment, and management. The CATT online was developed from the principles of the Consensus Statement on Concussion in Sport. Due to the rapid and evolving change of the science around TBIs, the CATT is also updated with additional evidence-based resources. Many online resources are overwhelming and too complicated for people to learn about TBIs and the most up-to-date TBI protocols, however; the CATT online provides up-to-date evidence-based recommendations that are easy to access and easy to understand for many different populations making it a very user friendly resource. The “Return to Activity” tool provided by the CATT online is a guideline for managing an individual’s return to activity after a TBI and consists of five stages: stage 1 “Initial rest”, stage 2 “Prepare to return to activity”, stage 3 “Increase your activity”, stage 4 “Gradually resume daily activities”, and stage

5 “full return to activity”. Stage 1 (initial rest) recommends that the individual stays home in a quiet and calm environment, limit screen time, keep social visits brief, and sleep as much as your body needs. Stage 2 (prepare to return to activity) recommends that the individual tests their readiness by trying some simple, familiar tasks, keep the time on each activity brief, go for walks or other light activity, and to keep bed rest during the day to a minimum. Stage 3 (increase your activity) recommends that the individual gradually returns to usual activity, decreases rest breaks, and start with less demanding activities. Stage 4 (gradually resume daily activities) involves resuming daily activities and although it may be challenging, it should improve day-to-day or week-to-week. Finally, stage 5 (full return to activity), involves the individual fully resuming pre-TBI activities (Babul, n.d.). Each stage also provides recommendations for when it is appropriate to progress through the stages. Resources such as the “Return to Activity” may be very useful for women who have experienced a TBI from IPV to help them recover from their TBI. Currently, there is an IPV-TBI specific section being developed for the CATT online which likely will be helpful for educating staff at women’s shelters about IPV specific TBIs.

#### **1.4 The Value of Women’s Shelters for Ensuring Screening of Traumatic Brain Injuries**

One pragmatic solution for screening for TBIs among women who have experienced IPV is to screen for TBIs at women’s shelters. Women’s shelters provide a safe place to stay, counseling, and referrals for women who experience IPV. Before the 1970’s IPV was commonly viewed as a personal issue within the relationship and a private issue (Goodhand, 2017). However, in 1973 women began to recognize a need for change and the recognition for a need to change was the beginning of the women’s shelters movement (Goodhand, 2017). Women’s shelters, referred to as the “underground railroad for women in crisis” started becoming more popular because what was viewed as a personal issue became much more public and political in the 1970’s (Goodhand,

2017). Many of the women pioneering the movement were in their twenties and their work changed laws, police and court procedures, education programs, public policy, and public perceptions (Goodhand, 2017). Today, there are 627 shelters operating across Canada with a total of 12,058 funded beds ("Family violence in Canada: A statistical profile, 2014," 2016). Although we believe there is currently little to no screening being conducted at women's shelters across Canada and there is potential for changing the behaviours of staff members at women's shelters and promote screening of TBIs.

Staff at women's shelters often complete an initial assessment when women first arrive at the shelter. This assessment can include a history of the IPV, what type of violence they experienced, and a physical assessment of the women. Nemeth, Mengo, Kulow, Brown, and Ramirez (2019) studied the knowledge and perspectives of domestic violence agency service providers with regards to TBIs. Data were collected from 62 domestic violence agency service providers during 11 focus groups (Nemeth et al., 2019). Findings indicated that these service providers felt like they have limited knowledge towards brain injury and the impact it could have on survivors of IPV (Nemeth et al., 2019). Staff and administrators also had mixed feelings about addressing TBIs at their work place stating that "I don't think it's our role because we don't know enough and so we don't want to offend", but with others stating "I feel like we have an obligation, an ethical obligation, to figure out how to best meet their needs with a TBI... like what is different and how do we best serve them to the best of our ability?" (Nemeth et al., 2019). Staff and administrators both cited that there is no policy or procedures with regards to screening for TBIs and that there are gaps impacting their ability to respond to survivors of IPV with TBIs (Nemeth et al., 2019). By addressing their barriers towards screening for TBIs and adding a TBI-assessment



tool into their workplace, staff could refer women who have experienced a TBI from IPV to the proper TBI supports.

Due to the high risk of TBIs among women who have experienced IPV and the benefits of a TBI diagnosis it is important to screen these women for TBIs. Screening for TBIs at women's shelters may help increase referrals to TBI-supports and improve the quality of life of women who have experienced a TBI from IPV, however; little screening is being done at women's shelters. This presents a knowledge-to-action gap. The research has shown the high rates of TBIs among women who have experienced IPV but they are still not being screened for TBIs. Knowledge translation is an imperative step to help implement screening of TBIs into women's shelters.

## **1.5 Knowledge Translation**

Researchers often conduct their research without help or insight from those who are intended to use the research. Therefore, research is often not relevant or used by the intended population. On average, it takes 17 years for 14% of research to be implemented into practice (Morris, Wooding, & Grant, 2011). Knowledge translation (KT) is a process that aims to minimize this gap between research and practice and is defined as “a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system.” (“Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches,” 2015). KT, especially in the healthcare setting, has the potential to save money, time, improve care, and reduce malpractices (Bosch, Tavender, Bragge, Gruen, & Green, 2013; Grimshaw, Eccles, Lavis, Hill, & Squires, 2012; Lang & Johnson, 2012). Each aspect of the KT process is briefly described below:

*Knowledge synthesis* is central to KT. It involves contextualizing and integrating individual research within the context of evidence that is available on the topic ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015). There are multiple methods in which knowledge synthesis is conducted. Systematic reviews and meta-analyses are frequently undertaken to synthesize knowledge ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015). The methods must be reproducible and transparent while using quantitative and/or qualitative methods ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015). Other forms of synthesis include: realist syntheses, narrative syntheses, meta-analyses, meta-syntheses and practice guidelines ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015).

*Dissemination* is the process of identifying and tailoring the research to the target audience ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015). This can be done through mass communications, interpersonal communications, health education of the public and continuing education of professionals, social marketing, information technology, and influence from authoritative sources to the intended users of the information (Green, Ottoson, Garcia, & Hiatt, 2009).

*Exchange* is a mutual exchange of knowledge between researchers and the knowledge-user ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015). Knowledge exchange is an important part of KT as it helps policymakers and researchers understand more about the environment in which they are providing their policies and research findings (Ward, Smith, House, & Hamer, 2012). The problem, context, knowledge, intervention, and use are five knowledge exchange components that help with mutual learning of researchers

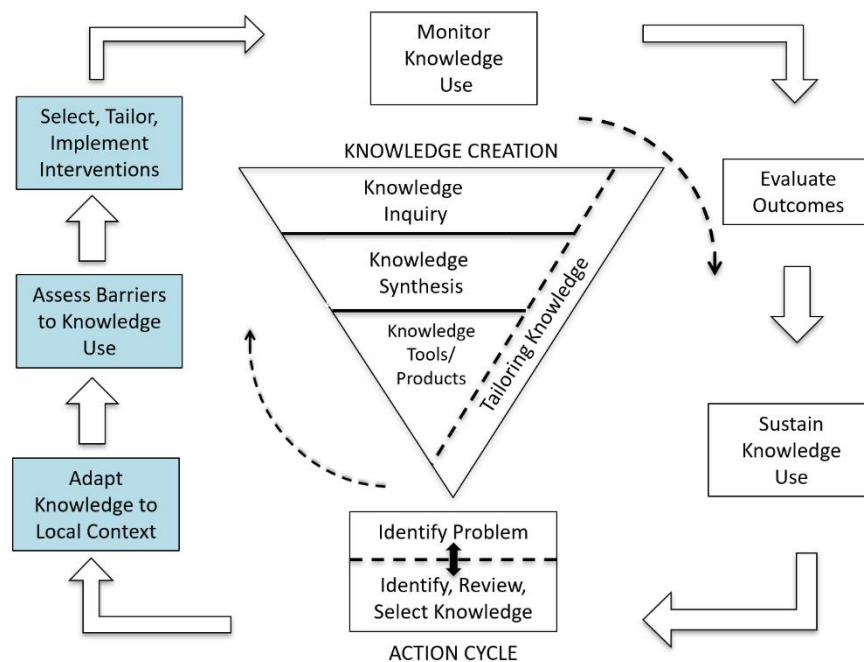
and knowledge users through the process of planning, producing, disseminating, and applying research in decision-making (Ward et al., 2012).

Finally, *ethically-sound application of knowledge* is being consistent with ethical principles and norms, social values, legal, and other regulatory frameworks ("Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches," 2015).

A scoping review highlighted the complexity of KT by extracting nineteen KT competencies (Mallidou et al., 2018). The nineteen competencies were grouped into three main KT competencies: “knowledge”, “skills”, and “attitudes” (Mallidou et al., 2018). “Knowledge” is expanded into the sub-components of understanding the context, understanding the research process, sharing knowledge, being aware of evidence resources, understanding KT processes, and understanding translation and dissemination activities (Mallidou et al., 2018). “Skills” involves collaboration and teamwork, leadership, sharing knowledge, knowledge synthesis, dissemination of research findings, use of research findings, fostering innovation, and knowledge brokering (Mallidou et al., 2018). Finally, “Attitudes” are developed from confidence, having trust, valuing research, self-directed lifelong commitment to learning, and valuing teamwork (Mallidou et al., 2018). It is also important to understand who the research should be transferred to in the process of KT. Grimshaw et al. (2012) reviewed potential stakeholders and found that knowledge regarding health services should be transferred to: consumers, professionals, local administrators, national policy makers, regulatory bodies, industry, research funder, and researchers (Grimshaw et al., 2012). The Knowledge-to-Action (KTA) framework (figure 1) can be helpful with the complexity of KT, in targeting the stages and competencies of KT, and ensuring that the knowledge is transferred to the stakeholders (Graham et al., 2006).

The KTA framework was developed by Graham et al. (2006) and helps with the process of KT. The KTA framework describes the processes of KT through two components: knowledge creation and action cycle (Graham et al., 2006). The knowledge creation component consists of knowledge inquiry, synthesis, and the development of tools and products from evidence (Graham et al., 2006). The action cycle consists of seven cyclical, dynamic, and iterative steps: identify problem, adapt knowledge to local context, assess barriers to knowledge use, select, tailor, implement interventions, monitor knowledge use, evaluate outcomes, and sustain knowledge use (Graham et al., 2006). These steps help to improve the likelihood that these tools and products are used in the real world (Graham et al., 2006).

**Figure 1: The Knowledge-to-Action Framework**



In the context of screening women who have experienced a TBI from IPV, the knowledge creation cycle has occurred in that there are TBI screening tools available, however; these screening tools aren't being used in the women's shelters and therefore, the action cycle needs to

be targeted. Accordingly, this thesis is focused on developing intervention recommendations to support TBI screening of women who have experienced IPV among staff at women's shelters and therefore addresses the first three components of the action cycle (adapt knowledge to local context, assess barriers to knowledge use, and select, tailor, implement interventions) (See Figure 1 highlighted in blue). The first three components of the action cycle with regards to the aims of this thesis involves understanding the local context of the women's shelters, understanding barriers and facilitators to screening for TBIs among shelter staff, and co-developing intervention recommendations with regards to screening women for TBIs at women's shelters. Separate but related research will be conducted to target the evaluation components of the KTA framework.

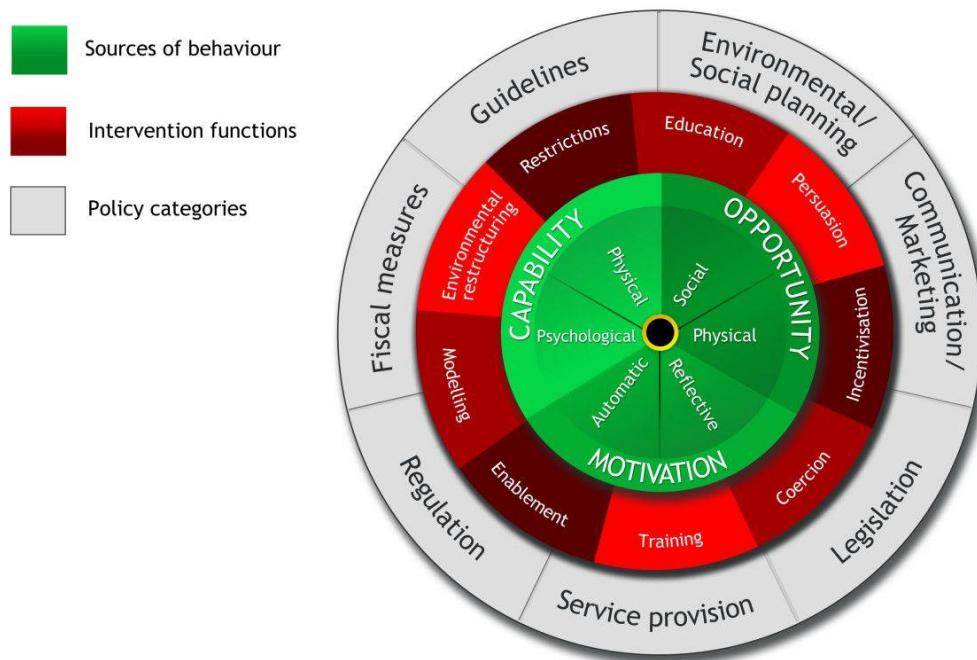
## **1.6 Developing Knowledge Translation Using Theory**

The use of theory can be helpful when trying to target the components of the KTA framework. Theory can help to understand barriers and design interventions; however only 22.5% of studies report using theory for dissemination and implementation strategies (Davies, Walker, & Grimshaw, 2010). The first three steps of the KTA Framework broadly focus on intervention development. When considering how to change staff's behaviours at women's shelters with regards to screening their clients for TBIs, it is important to consider the benefits of using behaviour change theory. Behaviour change theory is evidence based and allows for a systematic approach to behaviour change. Theory is defined as "a set of concepts and/or statements with specification of how phenomena relate to each other, providing an organizing description of a system that accounts for what is known, and explains and predicts phenomena" (Davis, Campbell, Hildon, Hobbs, & Michie, 2015). Behaviour change theory can be useful when trying to address the four stages of intervention development: (1) identification of the problem, (2) assessment of

the problem, (3) formation of possible solutions, and (4) evaluation of the selected intervention (French et al., 2012; Michie, West, Campbell, Brown, & Gainforth, 2014). Theory allows for a systematic approach to intervention development and helps to explain why, when, and how a behaviour does or doesn't occur, why an intervention succeeds or fails, and helps to improve the replicability of interventions (Gainforth, West, & Michie, 2015; Michie et al., 2016; Michie et al., 2014).

There are many theories and frameworks available for guiding behaviour change interventions; however, they are often incomplete, have overlapping constructs, and few theories have been tested in healthcare settings (French et al., 2012). To our knowledge, none have been tested in the context of women's shelters. It is also difficult to select a specific behaviour change theory as there are overwhelming number of theories (>80 theories) with many having overlapping constructs (>1000 constructs) (French et al., 2012). To address these challenges, Michie, Stralen, and West (2011) developed the Behaviour Change Wheel (BCW) (figure 2) as a structured approach to designing behaviour change interventions. Nineteen different frameworks for classifying behaviour change interventions, nine intervention functions, and seven policy categories were used to develop the BCW (Michie et al., 2011). The development of the BCW resulted in a comprehensive and evidence-based framework that allows intervention targets to be directly linked to specific mechanisms identified in behaviour change theory (Michie et al., 2011).

**Figure 2: The Behaviour Change Wheel**



The BCW consists of three different layers; COM-B (capability, opportunity, motivation, and behaviour) model, intervention functions, and policy categories (Michie et al., 2014). At the core of the wheel and the starting place for intervention development is the COM-B model (Michie et al., 2014). The COM-B model is composed of four constructs: capability (physical or psychological), motivation (automatic or reflective), opportunity (physical or social), and behaviour (Michie et al., 2014). A COM-B analysis can be done to help understand what needs to change to promote screening of TBIs at women's shelters. A COM-B analysis involves understanding each of the four constructs with regards to a specific behaviour. A COM-B diagnosis states the constructs that are lacking and inhibiting the behaviour and therefore should be targeted in an intervention (Michie et al., 2014).

For a more detailed understanding of the barrier and facilitators that staff are experiencing with regards to screening women for TBIs, the Theoretical Domains Framework (TDF) can be used (Michie et al., 2005). The TDF expands capability, opportunity, and motivation into 14 different domains and each domain is considered a determinant of behaviour. Created from 128 theoretical constructs from 33 theories of behaviour change, the TDF was developed through a consensus approach by identifying theories and theoretical constructs, simplifying into theoretical domains, evaluating the importance of the theoretical domains, interdisciplinary evaluation, validating the domain list, and pilot interview questions (Michie et al., 2005). Since the creation of the TDF, it has been validated and refined into 14 domains of theoretical constructs (Cane, O'Connor, & Michie, 2012). The 14 domains consist of: knowledge, skills, emotions, memory and attention and decision processes, behavioural regulation, social or professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, intentions, goals, and reinforcement (Cane et al., 2012).

Once the target behaviour (screening for TBIs) is understood in the context of the 14 TDF domains, these domains (determinants of behaviour) can be collapsed into the components of the COM-B (capability, opportunity, motivation) model through an evidence-based matrix by Michie et al. (2014) to complete the next steps of the BCW (intervention functions and policy categories). Knowledge, memory, attention, and decision processes, and behavioural regulation can be linked to psychological capability. Skills can be linked to physical capability. Social influences can be linked to social opportunity. Environmental context and resources can be linked to physical opportunity. Social professional role and identity, beliefs about capabilities, optimism, intentions, goals, and beliefs about consequences can be linked to reflective motivation. And reinforcement and emotion can be linked to automatic motivation (Michie et al., 2014).



After completing a behavioural diagnosis using the COM-B model and the TDF, the BCW helps to systematically identify the most relevant intervention functions using evidence-based matrices that link COM-B components to nine intervention functions (Michie et al., 2014) (See Appendix G). Intervention functions are categories that help target components of the COM-B at the individual level or organizational level and include: education, persuasion, incentivization, coercion, training, restriction, environmental restructuring, modelling, and enablement (Michie et al., 2014). In addition, the BCW can then be used to link intervention functions to seven policy categories (Michie et al., 2014). Policy categories also aim to target the components of the COM-B but at a more of a population level. These include communication/marketing, guidelines, recommend or mandate practice, fiscal, regulation, legislation, environment/social planning, and service provision (Michie et al., 2014). As a whole the BCW provides a systematic approach to developing intervention recommendations.

Once intervention options are identified using the BCW, the APEASE (affordability, practicability, effectiveness/cost effectiveness, acceptability, safety/side effects, equity) criteria can be helpful in deciding between potential intervention functions and policy categories that are recommended for use in the context (Michie et al., 2014). The APEASE criteria is a checklist to help ensure that the intervention functions and policy categories chosen are affordable (within an acceptable budget), practicable (can be implemented as intended), effective/cost effective (reasonable effect size and ratio of effect to cost), acceptable (appropriate for all stakeholders), safety/side effects (need to consider potential unwanted side-effects or unintended consequences), and equity (the extent to which an intervention may reduce or increase the disparities) (Michie et al., 2014). Using the APEASE criteria help to make strategic judgements towards the most appropriate intervention functions and policy categories for the intervention (Michie et al., 2014).

The BCW has been applied in a wide range of health behaviour interventions. The BCW has been used to improve the management of mild TBI in the emergency department, encourage timely cancer symptom presentation among people living in deprived communities, to help understand facilitators and barriers to smoking cessation among minority men, to increase cardiovascular disease risk screening by pharmacists, to help understand barriers and facilitators for engagement and implementation of exercise in end-stage kidney disease, promote smoking cessation, increase standing at work, implementation of sexual counselling guidelines, and implementation of national policies for the promotion of physical activity and healthy nutrition in the workplace (Almansour et al., 2019; Clarke, Jhamb, & Bennett, 2019; Daoud et al., 2018; Gould et al., 2017; Mc Sharry, Murphy, & Byrne, 2016; Munir et al., 2018; Seppala, Hankonen, Korkiakangas, Ruusuvuori, & Laitinen, 2017; Smits et al., 2018; Tavender et al., 2015). It has also been used outside of the health care setting. For example, a study by Gainforth, Sheals, Atkins, Jackson, and Michie (2016) used the BCW to develop interventions to change recycling behaviours. Although the BCW has not been used in the context of women's shelters or an IPV specific setting, its success as listed above where specific behavior change theories have not been developed makes it a promising option for developing interventions to change the screening behaviour of staff at women's shelters with regards to TBIs.

## **1.7 Engaging Knowledge Users in Intervention Design**

Working with partners who understand the “real world” context can be an important aspect of using the BCW. They can provide valuable input when making decisions throughout each step of the BCW. End-of-grant KT, as mentioned before, is the process of taking research and implementing it into the “real world”. Integrated knowledge translation (IKT) however, involves engaging knowledge users throughout the entire research process from the development of the

research question to the dissemination of findings (Gagliardi, Berta, Kothari, Boyko, & Urquhart, 2016). IKT results in research that is more relevant and more likely to be useful to knowledge users (Gagliardi et al., 2016). IKT is the process of including knowledge users in each stage of the research and allows knowledge users to have say in the development of the research question, development of the methodology, data collection, development of tools, selection of outcome measures, interpretation of findings, crafting messages and the dissemination of results (Gagliardi et al., 2016). Given the benefits of IKT for developing interventions, this thesis was done in partnership with the Kelowna Women's Shelter. The Executive Director was involved from the development of the research question through to the dissemination of the results.

## **1.8 Thesis Objective**

The overarching aim of this thesis is to use behaviour change theory and an integrated KT approach to target the first three components of the action cycle in the KTA framework (i.e. adapt knowledge to local context, assess barriers to knowledge use, and select, tailor, implement interventions). Therefore, the specific aims of this thesis are to use the Theoretical Domains Framework and the Behaviour Change Wheel to (1) understand the local context of women's shelters, (2) understand barriers and facilitators to screening for TBIs among shelter staff, and (3) co-develop intervention recommendations with regards to screening women for TBIs at women's shelters.

## **Chapter 2: Methods**

### **2.1 Study Design**

Aligned with my aims, this thesis involved three phases. Phase 1 was a cross-sectional survey using questionnaire to ask women's shelters staff across Canada about their current practices, knowledge of TBIs, the factors influencing whether they screen for TBIs, and demographic details. In Phase 2, interviews were conducted to better understand the local context of the women's shelters in the Kelowna area and to provide a more detailed understanding of the factors influencing whether staff screen for TBIs. Finally, in Phase 3, the research team used the BCW to identify relevant intervention functions and policy categories. The APEASE criteria was then used to co-develop intervention recommendations for promoting screening of TBIs at women's shelters. This chapter outlines the methods for all three research phases.

### **2.2 Research Approach**

A pragmatic and IKT research approach were used to address the research aims of this thesis. A pragmatic approach "accepts the use of multiple methods in one study and emphasizes the relevant research questions and reliable findings or correct answers to the questions" (Tashakkori & Teddlie, 2003). According to Andrew and Halcomb (2007) there are six benefits to using a pragmatic approach to research: triangulation, complementarity, development, initiation, expansion, and enhancement of significant findings. A pragmatic research approach also aligns with the aims of IKT in the sense that a pragmatic approach often brings together multiple methods to offer a practical and outcome-oriented approach towards answering the research question (Hyde, 2000). In research there are generally two approaches to reasoning: inductive reasoning and deductive reasoning (Hyde, 2000). Using pragmatism, the researchers can use both inductive and deductive reasoning to find solutions and have a better understanding of the people and world that

is being studied (Onwuegbuzie & Leech, 2005). Additionally, a pragmatic approach has been used to help develop recommendations (Horvath et al., 2016). IKT is the process of involving practitioners, policy makers, and the public throughout the entire research process to support the creation of knowledge that is more insightful, relevant, and useful than knowledge created by researchers only (Nowell, 2015). The research team partnered with the Kelowna Women's Shelter at the beginning of the research project. The Kelowna Women's Shelter was involved in the development of the research aims, the development of the research design, interpreting the results, and the dissemination of the research findings. This IKT partnership aligned with a pragmatic approach to research resulted in a mixed method design that was developed with the help of the Kelowna Women's Shelter to better understand the first three components of the action cycle of the KTA framework.

### **2.3 Phase 1 Methods**

Using the Theoretical Domains Framework to Understand Factors Influencing TBI-Screening Behaviours Among Staff at Women's Shelters Across Canada: A Cross-sectional Study

#### **Objective**

The objectives of Phase 1 were to understand (1) the current practices of staff at women's shelters with regards to screening for TBIs at their organization, (2) the staff's current knowledge of TBIs, and (3) the theoretical domains that influence the staff's screening for TBIs at their organization. The theoretical domains were then be linked to the components of COM-B (capability, opportunity, and motivation) to conduct a behavioural analysis and diagnosis of staff at women's shelters TBI screening behaviours.

## **Design, Sample and Procedure**

Phase 1 was a cross-sectional study that used online/paper-based surveys to collect data from women's shelter staff. Individuals who were staff members at organizations who support women who have experienced IPV across Canada were invited to participate in the survey. The inclusion criteria required participant to be 18 years of age or older, speak English or French, and work in an organization that supports women who have experienced IPV. Recruitment occurred through three IPV conferences in 2018 (Women's Shelters Canada National Conference, Exposing the Links between Intimate Partner Violence and Traumatic Brain Injuries, and the BC Society of Transition Houses Annual Training Forum). Members from the research team attended the conferences to recruit participants. At the Women's Shelters Canada National Conference and the Exposing the Links between Intimate Partner Violence and Traumatic Brain Injuries Conference recruitment was done at the registration desk. After completing registration for the conference, participants were asked if they would like to participate in the online survey which was available on laptops. The online survey was hosted by the UBC Survey Tool provided by Qualtrics. At the BC Society of Transition Houses Annually Training Forum, the survey was distributed by the research team on paper. Participants filled out the paper survey prior to the beginning of the training forum. The survey was approximately 15 minutes long and participants were entered for a chance to win \$100 gift card upon completion.

## **Measures**

The survey measures aligned with each of the aims and consisted of measures to assess staff's (1) current practices with regards to screening for TBIs at their organization, (2) current knowledge of TBIs, (3) perceptions of the theoretical domains that influence screening for TBIs

at their organization, and (4) demographics. A complete copy of the survey is provided in Appendix D.

*Current Practices.* Participants' current practices with regards to screening for TBIs at their organization was assessed using one yes or no item. Specifically, participants were asked "Whether it's your organization's practice or not, have you ever screened for traumatic brain injuries in your work?".

*Knowledge of TBIs.* Participants' current knowledge regarding screening for TBIs at their organization were assessed using an 18-item questionnaire adapted from Kurowski, Pomerantz, Schaiper, and Gittelman (2014). Participants were presented with eleven signs or symptoms and were asked to respond "true" or "false" to whether that they believed a person would be likely to experience that sign or symptom after a TBI. An example of a sign or symptom provided was "nausea and/or vomiting". Subsequently, participants were asked to respond "true" or "false" to seven statements about concussions. An example statement that participants responded to was "a person can only get a concussion if hit in the head". Finally, participants were also asked "how common do you think traumatic brain injury is within your client population?" with the following options "less than 10%", "11%-25%", "26%-50%", "51%-80%", and "more than 80%".

*Factors influencing screening of TBIs.* The factors that influence participants' screening for TBIs were assessed using a 13-item questionnaire developed using the TDF which was adapted by selecting statements from Huijg, Gebhardt, Crone, Dusseldorp, and Presseau (2014), a TDF questionnaire for use in implementation research, and tailoring the items to an IPV-TBI context. Huijg et al. (2014) developed the questionnaire by identified existing questionnaires assessing construct within TDF domains and developing new ones. Discriminant content validity was

measured for 79 items that nineteen judges allocated to one or more TDF domains (Huijg et al., 2014). Knowledge, skills, social/professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, intentions, memory, attention and decision processes, environmental context and resources, social influences, and emotion were all determined to have discriminant content validity and therefore were used in the questionnaire (Huijg et al., 2014). For this section of the participants were asked to assume that “Screening for a TBI would likely involve a questionnaire that would ask you to assess the symptoms of a TBI and how severe it is. The questionnaire would also include a thorough assessment of symptoms which would include; attention and memory, depression, anxiety, and mood; aggression and impulsivity; and physical symptoms. For the purpose this survey, please assume screening would take 5 minutes” and responded to the statements on a seven-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree). Participants also had an “unsure” option. According to (Huijg et al., 2014), the domains “goals”, “reinforcement”, and “behavioural regulation” do not demonstrate discriminant content validity and therefore were omitted from the questionnaire. The TDF domains included in the statements were: knowledge, skills, social/professional role and identity, beliefs about capabilities, optimism, beliefs about consequences, intentions, environmental context and resources, and social influences. An example statement from the intention domain was “I intend to screen clients at my organization for traumatic brain injuries in the next month”. In addition, if participants indicated that they had screened for TBIs before, they were asked to respond to one additional item that related to the domain of memory, attention and decision processes. To further probe any additional factors that may have influenced their screening behaviours, participants were also asked two open-ended questions: (1) “What would stop you from screening your clients for traumatic brain injuries?” and (2) “what would help you screen for traumatic brain injuries?”.



## Analysis

All quantitative data was analyzed using IBM SPSS Statistics Version 25. Open-ended questions were coded and analyzed using Excel 2016. Specific analyses are outlined below.

*General Descriptives.* General descriptives were reported for staff's current practices, knowledge of TBIs, theoretical domains that influence screening for TBIs, and demographics. The TBI-knowledge questionnaire questions were reported by the number and percentage of correct responses for each question. Categorical data were reported as frequencies and continuous data were reported as means with range and standard deviations.

*Theoretical Domains Framework.* The open-ended question regarding factors that influence screening of TBIs were extracted into an excel sheet. Responses to open-ended questions were independently and deductively coded into TDF domains by two coders (BN and KL). Disagreements were resolved through consensus over discussions between BN and KL. Where consensus could not be reached, a third expert coder (HG) was consulted. Inter-coder agreement was calculated on the coding of the TDF domains. Cohen's Kappa (Cohen, 1968) and prevalence adjusted bias adjusted Kappa (PABAK) (Byrt, Bishop, & Carlin, 1993) was used to show agreement between BN and KL. According to Landis and Koch (1977), inter-coder agreement values between 0.41-0.60 indicate "moderate" reliability, values between 0.61-0.80 indicate "substantial" reliability, and values between 0.81-1.00 indicate "almost perfect" reliability.

*Thematic Analysis.* A thematic analysis outlined by Braun and Clarke (2006) was conducted to determine themes among the TDF domains that were extracted from the open-ended question regarding factors that influence screening of TBIs. A thematic analysis involved six phases; (1) familiarizing yourself with your data, (2) generating initial codes, (3) searching for

themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report (Braun & Clarke, 2006). BN followed these steps to analyze the data thematically and develop subthemes within each TDF domain. KL and HG acted as critical friends throughout the process ensuring that the themes were accurate and representative of the data.

*Behavioural Analysis and Diagnosis.* Finally, a behavioural analysis and diagnosis was conducted. The relevant TDF domains were linked back to the COM-B components (capability, opportunity, and motivation) through an evidence-based matrix developed by Michie et al. (2014) to produce the behavioural diagnosis.

## **2.4 Phase 2 Methods**

Using the Theoretical Domains Framework to Understand Factors Influencing TBI-screening Behaviours Among Staff at Women's Shelters Across Canada: An Interview Study

### **Objectives**

The objectives of Phase 2 were to understand (1) the local context of the Kelowna Women's Shelter and (2) the factors that influence the staff at the Kelowna Women's Shelter with regards to screening for TBIs. By taking a qualitative approach, this phase aimed to provide further insight into the findings of Phase 1. The theoretical domains were then be linked to the components of COM-B (capability, opportunity, and motivation) to conduct a behavioural analysis and diagnosis of staff at women's shelters TBI screening behaviours.

### **Design, Sample, and Procedure**

Phase 2 was a semi-structured interview study. Participants were staff members from three organizations in Kelowna who support women who have experienced IPV. The Executive Director of the Kelowna Women's Shelter distributed an email with a link to the pre-interview survey to

staff members at the three organizations. Staff members provided their contact information from the online-survey to be contacted for the interview. Participants were then contacted by phone or email by BN to schedule an interview time. Nine interviews were done over the phone and one was done in person at the University of British Columbia Okanagan.

Interviews were approximately 30 minutes long and a semi-structured interview guide was used that was developed using the TDF. The interview guide used for Phase 2 included a verbal consent process which was read out loud by BN before initiation of the interview. Participants were asked to consent to participating in the interview and to consent to having the interview audio-recorded. Aligned with guidance for conducting TDF interviews, the interviewer asked about the local context of their shelter and barriers and facilitators with regards to screening for TBIs. Nine of the participants consented to having their interviews audio recorded and BN took notes during the one interview that was not recorded. Participants were reimbursed with a \$20 gift card after the completion of the interview.

## **Materials**

The semi-structured interviews were guided by an interview guide (See Appendix F). The interview guide was informed by “a guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems” by Atkins et al. (2017) and consultation with the Kelowna Women’s Shelter. The interview guide consisted of questions regarding background information about the participant for example “can you describe your role at your organization” and “for you, what does a typical workday entail?”. Participants were then asked questions about their knowledge with regards to TBIs. For example, “what do you know about traumatic brain injuries?” and “before this study, were you aware of any recommendations or guidelines for screening for traumatic brain injuries?”. Furthermore, participants were asked about

their current practices at their organization. They were asked if they “currently assess clients for TBIs”. The next section of the interview guide was aimed at understanding the barriers and facilitators that the staff were experiencing with regards to screening for TBIs. Participants were asked to describe “any factors that would make it difficult to do an assessment for TBI?” and “any situations that would make it easier for you do an assessment for TBI?” with additional probes specific to domains within the TDF. To further inform KT efforts, the interview guide also consisted of questions regarding how to best adapt knowledge to the context of women’s shelters, how to evaluate the tools and resources that are created from this study, and questions regarding any additional thoughts or concerns.

## **Analysis**

*General Descriptives.* General descriptives were reported for staff’s demographics. This included; age, years of experience working with women who have experienced IPV, years of experience at their organization, and level of education.

*Theoretical Domains Framework.* The audio recordings were transcribed verbatim in QSR International’s NVivo 12 software and analyzed abductively. Abductive reasoning involves using both a deductive and inductive approach. First a deductive analysis was conducted. Two coders (BN & KL) independently extracted barriers and facilitators from the transcripts with regards to the factors that influence staff with regards to screening for TBIs. Barriers were defined as anything contributing to the lack of screening for TBIs. Facilitators were defined as anything contributing to the screening of TBIs. BN & KL met after every two transcripts to compare barriers and facilitators extracted and resolve any disagreements through a discussion. Where consensus could not be reached, a third expert coder (HG) was consulted. Once extracted, the barriers and facilitators were deductively and independently coded by two coders into TDF domains (BN &

KL). The researchers met after every two transcripts to compare codes and resolve any disagreements through a discussion. Where consensus could not be reached, a third expert coder (HG) was consulted. Inter-coder agreement was calculated on the coding of the TDF domains. Cohen's Kappa (Cohen, 1968) and prevalence adjusted bias adjusted Kappa (PABAK) (Byrt et al., 1993) was used to show agreement between BN and KL. The inter-coder agreement values are as follows: 0.41-0.60 indicate "moderate" reliability, values between 0.61-0.80 indicate "substantial" reliability, and values between 0.81-1.00 indicate "almost perfect" reliability (Landis & Koch, 1977).

*Thematic Analysis.* Subsequently, an inductive analysis was conducted within each coded domain. BN thematically analyzed the data using the six steps of thematic analysis outlined by Braun and Clarke (2006). This analysis involved BN familiarizing himself with the data, generating initial codes within each coded domain, searching for themes within the domains, reviewing themes, defining and naming themes, and producing the report (Braun & Clarke, 2006). HG and KL served as a critical friend to provide feedback to BN throughout this process.

*Behavioural Analysis and Diagnosis.* A behavioural analysis and diagnosis was completed based on the relevant TDF domains. The domains were linked back to the COM-B components (capability, opportunity, and motivation) through an evidence-based matrix developed by Michie et al. (2014) to produce the behavioural diagnosis.

## **2.5 Phase 3 Methods**

### **Developing Intervention Recommendations Using the Behaviour Change Wheel**

The research team met to discuss the behavioural diagnoses developed from Phase 1 and Phase 2. Using evidence-based matrices provided by Michie et al. (2014), BN identified intervention functions and policy categories that were linked to the theoretical factors influencing screening behaviours. This data was presented to the research team by BN and the team then brainstormed intervention recommendations. Team members then used the APEASE (affordability, practicability, effectiveness and cost-effectiveness, acceptability, side-effects/safety, and equity considerations) criteria to determine appropriate intervention functions and policy categories, and co-develop intervention recommendations (Michie et al., 2014)

### **Chapter 3: Results**

In this Chapter, results are presented from all three phases. First, the data associated with the behavioural analyses and diagnoses resulting from Phase 1 and Phase 2 are presented. Finally, co-developed intervention recommendations for promoting screening among women's shelter staff are presented.

#### **3.1 Phase 1 Results**

Using the Theoretical Domains Framework to Understand Factors Influencing TBI-Screening Behaviours Among Staff at Women's Shelters Across Canada: A Cross-sectional Study

*Participants.* 152 participants participated in the survey (34.21% from Women's Shelters Canada National Conference, 42.76% from Exposing the Links Between Intimate Partner Violence and Traumatic Brain Injury, and 23.68% from BC Society of Transitional Houses Annual Training Forum), however; response rates varied depending on the question. On average, participants were 43.3 (SD=12.47) years old. They had an average of 10.8 (SD=9.37) years of experience working with clients who have experienced IPV and 7.6 (SD=8.05) years of experience at their current organization. The majority of participants were from Nova Scotia (45.7%) and Ontario (23.6%). Participants were Front-line works/Support staff (60.6%), Managers (14.6%), Executive Directors (7.3%), Administrative staff (2.9%), and the remainder engaged in other roles (14.6%). Participants were primarily white (75.4%) or indigenous including First Nations, Metis and Inuk (11.6%). Most participants have completed at least a bachelor's degree (57.6%). Table 1 provides an overview of all demographic characteristics.

**Table 1: Phase 1 Demographics**

<b>Demographics</b>		
<b>Gender</b>	<b>Frequency</b>	<b>%</b>
Female	133	97.1
Male	4	2.9
<b>Age (Years)</b>		
18-30	29	21.6
31-45	41	30.6
46-60	54	40.3
>61	10	7.5
<b>Experience working with clients who have experienced IPV (Years).</b>		
0-10	77	57.5
10-20	33	24.6
20-30	22	16.4
>30	2	1.5
<b>Geographical Area</b>		
Central Canada	26	18.4
The Atlantic Region	65	46.1
The West Coast	40	28.4
The Prairie Provinces	10	7.1
<b>Education</b>		
High school degree or less	10	7.2
Some College or CEGEP	32	23.0
Some university studies	17	12.2
Bachelor's degree	45	32.4
Master's or PhD	35	25.2
<b>Organizational role</b>		
Front line worker/Support staff	83	60.6
Administrative staff	4	2.9
Manager	20	14.6
Executive Director	9	6.6
Other	21	15.3
<b>Ethnicity</b>		
White	102	73.9
Aboriginal	16	11.6
Black, Filipino, Japanese, Korean, Latin American, South Asian, Southeast Asian	14	10.1
Other	6	4.3



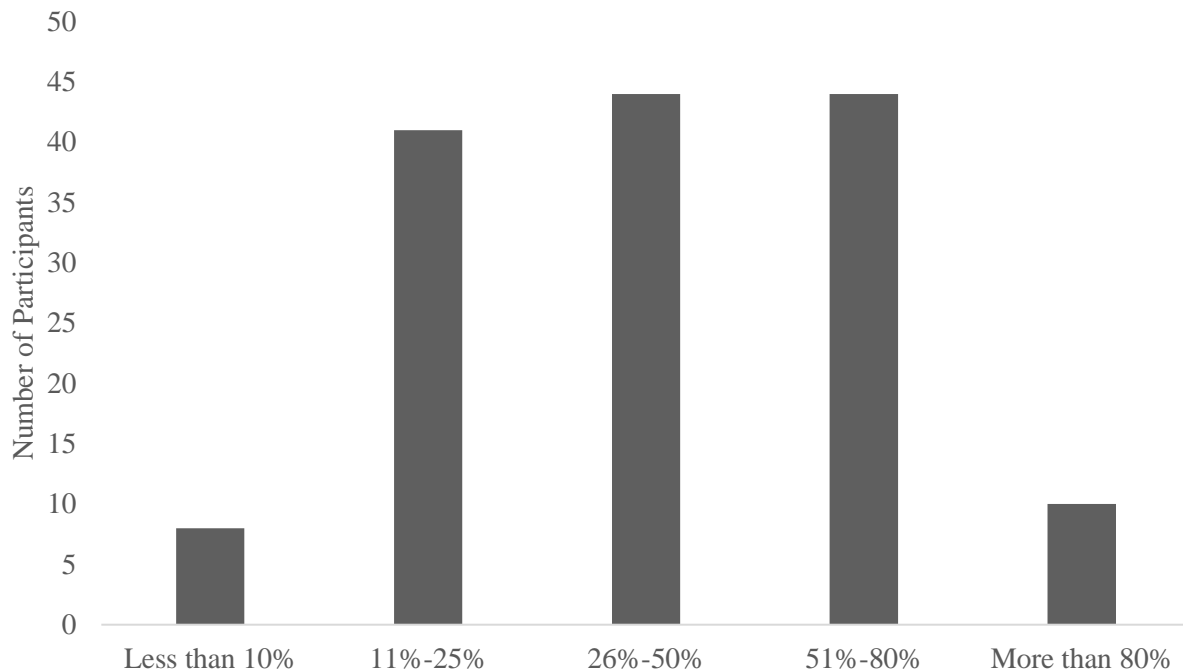
*Current Practices.* Three-quarters of participants had never screened for TBIs in their work (75.3%; n = 110).

*Knowledge of TBIs.* Table 2 shows the knowledge questionnaire and the findings regarding the number of correct responses for each question and overall. Staff scored an average of 12/18 (SD=1.99) on the knowledge questionnaire. Figure 3 represents participants' perceptions of how common they thought TBIs were within their client population.

**Table 2: TBI-Knowledge Questionnaire**

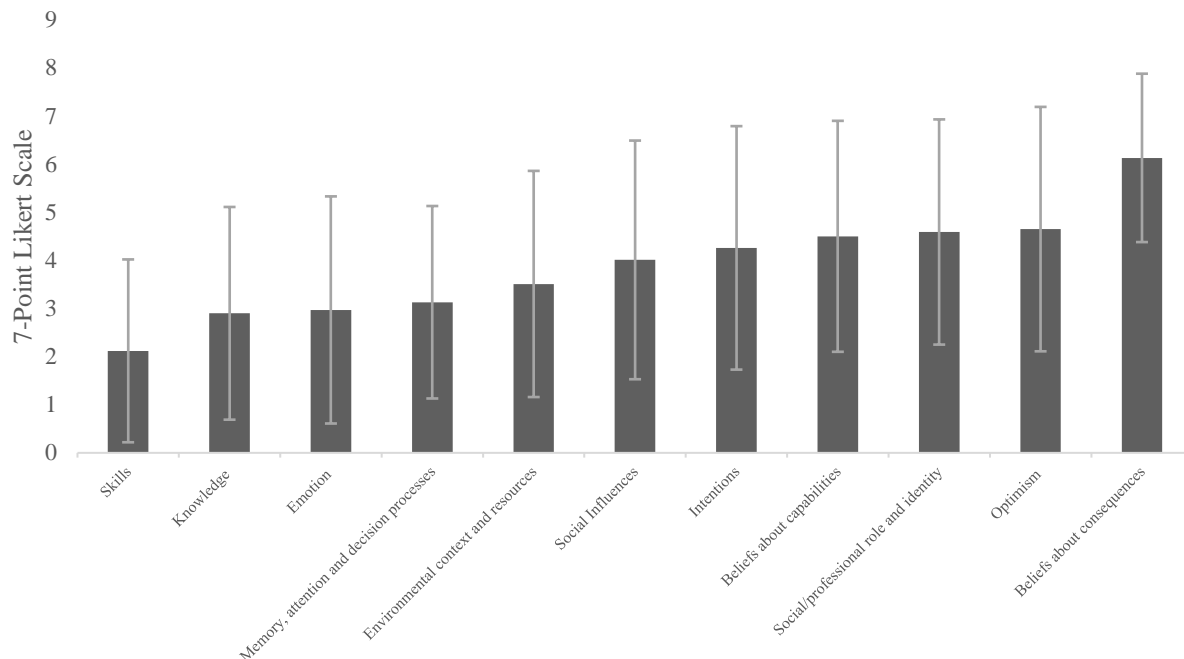
<i>Knowledge Questions</i>	
Questions (Correct Response)	Correct Responses, n (%)
Emotional changes (true)	148 (98.7)
Unusual thirst (false)	59 (41.3)
Hallucinations (false)	24 (16.4)
Shortness of breath (false)	40 (27.2)
Tingling in feet (false)	37 (25.3)
Sensitivity to noise and/or light (true)	147 (98.7)
Nausea and/or vomiting (true)	144 (98.6)
Difficulty concentrating and/or remembering (true)	149 (99.3)
Slower reaction time (true)	148 (99.3)
Confusion (true)	147 (98.7)
Headache (true)	146 (98.6)
There is a higher risk of death if a second traumatic brain injury occurs before the first one has healed. (true)	137 (92.6)
A person can only get a traumatic brain injury if hit in the head. (false)	119 (79.9)
Imaging of the brain, such as MRIs and CT scans, show visible physical damage to the brain after a traumatic brain injury. (false)	34 (23.3)
If a person gets one traumatic brain injury, they are more likely to get another. (true)	100 (68.0)
Being knocked out causes permanent damage to the brain. (false)	79 (53.7)
The majority of symptoms last for at least one month. (false)	53 (36.1)
A person must be knocked out to get a traumatic brain injury. (false)	140 (95.9)
<b>Total Score (Mean, SD)</b>	12/18, 1.99

**Figure 3: Staff's Perceptions Toward the Number of TBI their Clients have Acquired**



*Theoretical Domains Framework.* Figure 4 outlines the mean scores and standard deviations of participants' ratings of each TDF domains item assessed in the questionnaire. The lowest rated items were skills, knowledge, emotion, and memory, attention and decision processes and the highest rated items were intentions, beliefs about capabilities, social/professional role and identity, optimism, and beliefs about consequences.

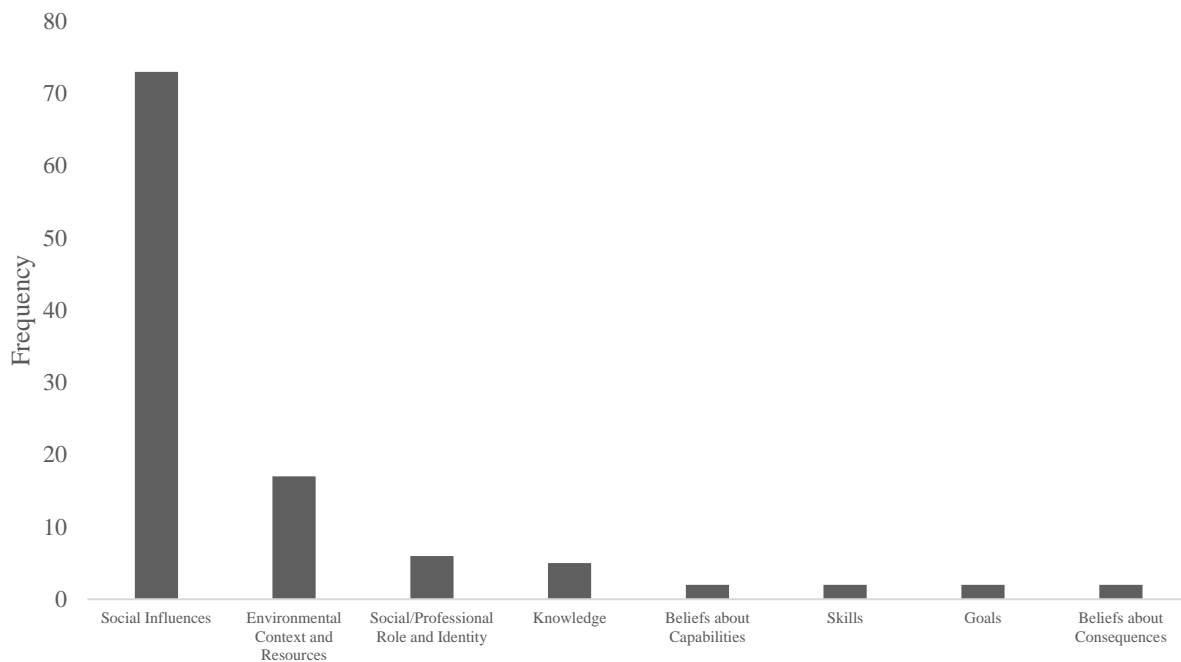
**Figure 4: Mean Score of TDF domains rated on a 7-Point Likert Scale**



Note. Errors bars represent standard deviation.

Figure 5 outlines the extracted barriers from participants' responses from the open-ended question "what would stop you from screening your clients for traumatic brain injuries?". The most frequent barriers extracted were social influences ( $n = 73$ ) and environmental context and resources ( $n = 17$ ) ( $Kappa = 0.94$ ,  $PABAK = 0.98$ ).

**Figure 5: Frequency of TDF Domains Extracted from Survey Question: “what would stop you from screening your clients for traumatic brain injuries in your work?”**



*Thematic Analysis.* Subthemes emerged from the TDF domains of “social influences” and “environmental context and resources”. The sub-themes related to domain of social influences included: Staff Safety, Client Distress, Lack of Consent, and Inability to Screen. The sub-themes related to the domains of environmental context and resources were; Time Constraints, Lack of Staff, and Lack of Screening Tool. Table 3 outlines the TDF domain and each sub-theme within the domains. Exemplar quotes are provided for each sub-theme and domain.

**Table 3: TDF Domain Themes and Sub-themes**

Phase 1: “What would <u>stop</u> you from screening for a traumatic brain injury?”		
TDF Domain Theme	Sub-theme	Exemplar quotes
Social Influences	<b>Client Aggression and Staff Safety:</b> Concerns related to the client being aggressive or unsafe towards staff.	“Client is showing aggression towards me and angry”
	<b>Causing Client Distress:</b> Concerns that the client will feel distressed as a result of answering the screening questions.	“I would be fearful that it would contribute to further trauma for the person having to recollect the events of what happened.”
	<b>Client Emotional State:</b> Concerns that the client may be in crisis and may not be in an emotional state to respond to screening questions.	“If the client had very recently experienced trauma and was too upset to sit through the screening”
	<b>Lack of Consent:</b> Client refusing to be screened by staff.	“If the client does not agree to the screening”
	<b>Inability to Screen:</b> Concerns that the client may not have the psychological or physical capability to respond to the screening questions. Barriers cited related to disability status, use of substances, literacy, etc.	“If the client was non verbal, unable to hear, see etc.”
	<b>No Reports of Injury to the Head:</b> Clients reports that they have not sustained any injuries to the head.	“If they state that they have never been hit in the head”

**Table 3: TDF Domain Themes and Sub-Themes**

Phase 1: “What would <u>stop</u> you from screening for a traumatic brain injury?”		
TDF Domain Theme	Sub-theme	Exemplar quotes
<b>Environmental Context and Resources</b>	<b>Time Constraints:</b> Concerns that they would not have enough time to complete the screening and concerns that screening could take longer than described.	“Lack of time to do the screening at work”
	<b>Lack of Staff:</b> Concerns that additional staff will be needed to implement screening.	“Being single staffed”
	<b>Lack of Screening Tool:</b> Concerns that a screening protocol is not available to them.	“Not having a screening tool”
<b>Social/Professional Role and Identity:</b> Concerns related to beliefs that it is someone else’s role within or outside the organization (e.g. medical professional) and/or screening is outside of their scope of practice. <b>Knowledge:</b> Concerns related to needed additional training and knowledge to understand TBIs and screening for TBIs. <b>Beliefs about Capabilities:</b> Concerns related to staff’s confidence in their abilities to screen for TBIs. <b>Skills:</b> Concerns related to staff feeling that they have inadequate training to screen for TBIs. <b>Goals:</b> Related to staff prioritizing other tasks before screening for TBIs.	N/A	“A sense that I was not a medical professional, and this might be out of my realm of service”
	N/A	“Lack of understanding”
	N/A	“Not having data previous to injury to compare with”
	N/A	“Lack of training”
	N/A	“need medical attention ASAP”

---

Phase 1: “What would <u>stop</u> you from screening for a traumatic brain injury?”		
TDF Domain Theme	Sub-theme	Exemplar quotes
<b>Beliefs about Consequences:</b> Concerns with how screening of TBIs will benefit their clients.	N/A	“What is the benefit to our clients?”

---

*Behavioural Analysis and Diagnosis.* The lowest rated barriers from the 7-point Likert scale consisted of skills, knowledge, emotion, and environmental context and resources. Furthermore, through the open-ended question the domain of social influences was also a relevant barrier towards staff screening for TBIs. After linking these TDF domains to the COM-B model, the behavioural diagnosis is that in order for an intervention to change screening behaviours, it must target women’s shelter staff’s physical and psychological capability, physical and social opportunity, and automatic motivation. Accordingly, all nine intervention functions and seven policy categories are relevant for targeting staff’s TBI-screening behaviours.

### 3.2 Phase 2 Results

Using the Theoretical Domains Framework to Understand Factors Influencing TBI-Screening Behaviours Among Staff at Women’s Shelters Across Canada: An Interview Study

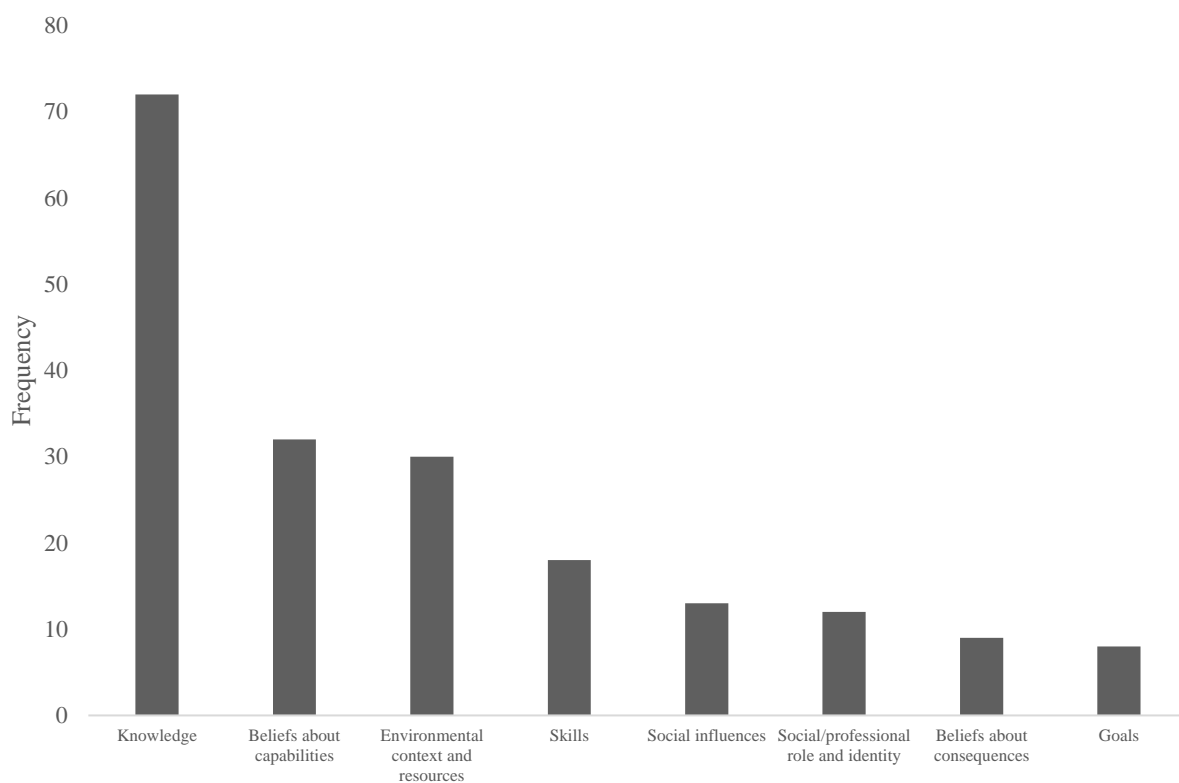
*Participants.* Participants (n=10) were on average 45.3 (SD=14.41) years old. They had an average of 10.83 (SD=8.37) years of experience working with women who have experienced IPV and 4.93 (SD=3.92) years of experience at their current organization. The majority of participants (77.78%) have at least a bachelor’s degree.

*Theoretical Domains Framework.* In total, the coders extracted 194 barriers which were categorized into eight domains. The domains consisted of knowledge (n=72), beliefs about



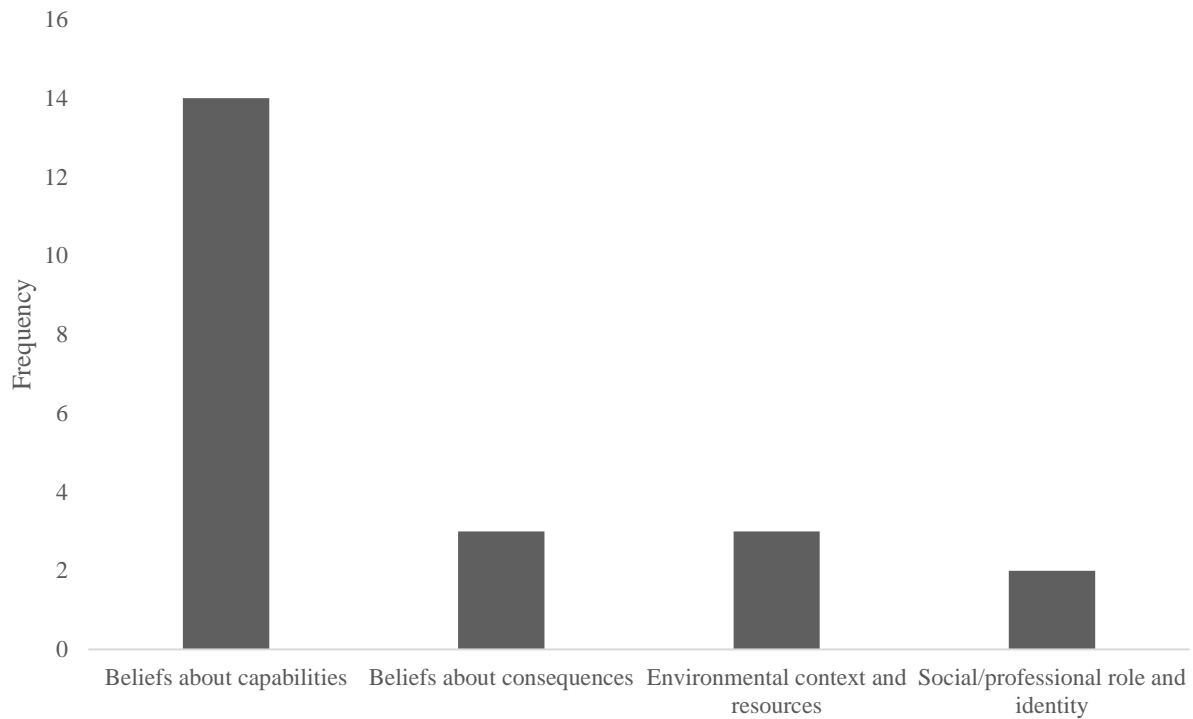
capabilities (n=32), environmental context and resources (n=30), skills (n=18), social influences (n=13), social/professional role and identity (n=12), beliefs about consequences (n=9), and goals (n=8) (figure 6). The interrater reliability for coding the TDF domains were between “substantial” and “almost perfect” (Kappa = 0.76, PABAK = 0.94). Table 4 shows examples from each of the nine domains that were present in the interviews.

**Figure 6: TDF Barriers Extracted from Interviews**



The coders also extracted 22 facilitators and categorized these into four domains (figure 7). The domains consisted of beliefs about capabilities (n=14), beliefs about consequences (n=3), environmental context and resources (n=3), and social/professional role and identity (n=2). The interrater reliability for coding the TDF domains were between “substantial” and “almost perfect” (Kappa = 0.76, PABAK = 0.94).

**Figure 7: TDF Facilitators Extracted from Interviews**



*Thematic Analysis.* Sub-themes emerged from the TDF domain environmental context and resources and social influences. Sub-themes that emerged within the domain environmental context and resources included: lack of staff, lack of space, and lack of time. Whereas, themes for the social influence domains include: client's emotion, inability to screen, and building trust.

**Table 4: Interview TDF Domain Themes and Sub-Themes**

<b>Phase 2</b>		
<b>TDF Domain Theme</b>	<b>Sub-theme</b>	<b>Exemplar Quotes</b>
<b>Knowledge:</b> Concerns related to needed additional training and knowledge to understand TBIs and screening for TBIs <b>Beliefs about Capabilities:</b> Concerns related to staff's confidence in their abilities to screen for TBIs <b>Environmental context and resources</b>	N/A	"I don't know very much. I would say probably on a scale of 1 to 10, I'd know 1."
	N/A	"I would really like to feel more confident in myself moving ahead"
	<b>Lack of Staff:</b> Concerns that additional staff will be needed to implement screening.	"We would need more staff working if you're going to have those"
	<b>Lack of Space:</b> Concerns that they would not have enough space to screen for TBIs in their work.	"I mean, there is no space so it is a problem because we need more space."
	<b>Time Constraints:</b> Concerns that they would not have enough time to complete the screening and concerns that screening could take longer than described.	"We can't give people more time."

**Table 4: Interview TDF Domain Themes and Sub-Themes**

**Phase 2**

<b>TDF Domain Theme</b>	<b>Sub-theme</b>	<b>Exemplar Quotes</b>
<b>Social influences</b>	<b>Alliance Between the Staff and Client:</b> Concerns that clients may not trust staff enough to tell the truth or open-up during the screening process.	“Sometimes I just think there can be some hesitancy, especially because it’s the first time that you’re meeting this individual and they’re coming and sharing really scary and really private details about their personal life that they may have never told people before. I just know that at times it can be difficult and there can be a lot of hesitancy for the individuals who are coming in and saying that information. So they’re not always saying the full truth the very first time that you meet them. It might take a few more times of talking with them to get a better understanding of what they’ve experienced”
	<b>Causing Client Distress:</b> Concerns that the client will feel distressed as a result of answering the screening questions.	“I don’t want to open any wounds or any traumatic experiences for people.”
	<b>Client Emotional State:</b> Concerns that the client may be in crisis and may not be in an emotional state to respond to screening questions.	“The difficulty would be the women’s emotional state. You know, if she’s just come from being assaulted or if she’s running from her partner.”
	<b>Skills:</b> Concerns related to staff feeling that they have inadequate training to screen for TBIs	“We haven’t had any training through the shelter or anything that way in how to specifically deal with individuals who may be suffering from traumatic brain injuries.”
<b>Social/Professional Role and Identity:</b> Concerns related to beliefs that it is someone else’s role within or outside the organization (e.g. medical professional) and/or screening is outside of their scope of practice	N/A	“I’m not a medical professional so I wouldn’t say that I could assess them.”

**Table 4: Interview TDF Domain Themes and Sub-Themes**

<b>Phase 2</b>		
<b>TDF Domain Theme</b>	<b>Sub-theme</b>	<b>Exemplar Quotes</b>
<b>Beliefs about Consequences:</b> Concerns with how screening of TBIs will benefit their clients	N/A	“Even if I did think that they had a brain injury it wouldn’t change anything about the services they get or anything.”
<b>Goals:</b> Related to staff prioritizing other tasks before screening for TBIs	N/A	“Basic needs need to be met first so if they have no money and no access to money and nowhere to live and nowhere to go and no job, those are sort of obviously the very top of the priority list for lots of people.”

*Behavioural Analysis and Diagnosis.* The most prevalent barriers extracted from the interviews towards screening for TBIs were knowledge (n=72), beliefs about capabilities (n=32), and environmental context and resources (n=30). After linking these TDF domains to the COM-B model, the behavioural diagnosis is that in order for an intervention to change screening behaviours, it must target women’s shelter staff’s psychological capability, reflective motivation, and physical opportunity. Accordingly, all nine intervention functions and seven policy categories are relevant for targeting staff’s TBI-screening behaviours.

### **3.3 Phase 3 Results**

#### **Developing Intervention Recommendations: Using the Behaviour Change Wheel**

All nine intervention functions and all seven policy categories were identified as being relevant to promote screening of TBIs in women’s shelters. From the APEASE meeting with the research team and the Executive Director of the Kelowna Women’s Shelter, six intervention functions and five policy categories were chosen based on the context of women’s shelters to be the most likely to result in improved TBI-screening. This process resulted in five intervention recommendations (table 5) being co-developed for promoting TBI-screening at women’s shelters.

Relevant intervention functions and policy categories associated with each recommendation are outlined in Table 5.

**Table 5: Intervention Recommendations**

<b>Intervention Recommendations</b>	<b>Description</b>	<b>Intervention Functions</b>	<b>Policy Categories</b>
Establish formal policies and procedures requiring clients to be assessed for traumatic brain injuries.	These policies and procedures should be established by upper-management and should make assessing for traumatic brain injuries part of the role of staff at women's shelter. It is important that staff understand that they are not diagnosing TBIs. The TBI assessment is to identify clients at risk for having experienced a TBI.	Persuasion Enablement	Regulations Guidelines
Training needs to be provided to staff who work in women's shelters.	This training should include education regarding knowledge of TBIs (e.g. the CATT online tool), real-world scenarios, and opportunities for practice and to receive feedback. Ideally, this training could be implemented using a train-the-trainer model that helps to establish 'champions' in the workplace. If the train-the-trainer model is adopted, it is recommended that 'champions' be someone in a long-term role due to what can be a high turnover rate of women's shelter staff.	Training Education Persuasion Modelling	Service Provision
Assess for traumatic brain injuries in a conversational style and not at intake.	A conversational assessment of TBIs should be done after intake once the client has settled into the women's shelter. This conversational assessment style should be done in a way that does not feel like a formal screening process.	Enablement	Service Provision

**Table 5: Intervention Recommendations**

<b>Intervention Recommendations</b>	<b>Description</b>	<b>Intervention Functions</b>	<b>Policy Categories</b>
Educate clients about traumatic brain injuries.	Education provided to clients about TBIs should be basic information regarding some signs or symptoms of TBIs and information about TBI-recovery. The information should be provided to the clients in a method that allows them to take the information with them (e.g. pamphlets).	Enablement	Service Provision and Communication /Marketing
Develop a referral system for clients at risk for a traumatic brain injury.	Staff should refer clients at risk for a TBI through a referral system. The referral system should provide clients at risk for TBIs with the opportunity for a TBI diagnosis from a medical professional and TBI-supports to help their recovery. If resources are too limited to develop a referral system, steps should be taken within the women's shelter to help with TBI-recovery (e.g. dim lights and provide quiet spaces).	Environmental Restructuring	Environmental and Social Planning

---

## **Chapter 4: Discussion**

### **4.1 Traumatic Brain Injury Knowledge**

Intervention recommendations were co-developed to support screening of traumatic brain injuries (TBIs) in women's shelters for women who have experienced intimate partner violence (IPV). Recommendations were systematically developed using the TDF and the BCW. It was found that staff are generally not screening for TBIs and lack TBI knowledge. The behavioural analysis of staff at women's shelters shows that staff are lacking psychological capability, social and physical opportunity, and reflective and automatic motivation. Therefore, to change TBI-screening behaviour among women's shelter staff, a multi-component intervention, that not only addresses lack of TBI-knowledge but also addresses intrapersonal, interpersonal, and systemic barriers will be needed.

Few staff across Canada screen for TBIs in women's shelters (24.7%). This highlights the need for interventions promoting TBI-screening in women's shelters. Furthermore, the 24.7% that have screened for TBIs likely do not screen on a regular basis and do not follow any kind of formal policy or procedure with regards to screening for TBIs. This is a major issue because a substantial number of women at shelter are suffering from one or more TBIs and few staff ever screen for them.

Knowledge of TBIs and TBI-screening needs to be improved among women's shelter staff. Our findings indicate that staff at women's shelters have some knowledge towards TBIs. The level of knowledge in our sample is similar in comparison to previous research examining high-school students' knowledge of TBIs (Kurowski et al., 2014). Staff's perceptions with regards to the percentage of their clients that have received a TBI from IPV was lower than what prevalence statistics reported in the literature. Indeed, research has shown that the prevalence is much higher



with estimates that at least 50% of women who experience IPV have received a TBI as a result (Hunnicuttt et al., 2019; Jackson et al., 2002; Mechanic et al., 2008; Valera & Berenbaum, 2003; Wilbur et al., 2001). This discrepancy represents a knowledge-gap among staff's perceptions with the number of TBIs that their clients are receiving and the actual number of TBIs that their clients are experiencing. A potential reason for this discrepancy is the staff's inability to recognize symptoms of a TBI. Ideally, most staff members would respond greater than 50% or overestimate the rate of TBIs among women who have experienced IPV as that perceptions of vulnerability and severity of an issue can influence behaviour (Rogers, 1975). Increasing knowledge and targeting these perceptions could be beneficial to help staff become more aware of the extent of the issue of IPV and TBIs and help these women receive better TBI-supports and referrals.

#### **4.2 Behavioural Diagnosis and Intervention Recommendations**

Findings from our behavioural diagnoses indicate that knowledge is a necessary component to target in interventions that aim to ensure women are screened for TBIs at women's shelters. However, targeting knowledge is not enough to change TBI-screening behaviours among staff at women's shelters. A common mistake when trying to change health-related behaviour is the mindset that "knowledge and information drive behaviour" (Kelly & Barker, 2016). Providing people with information and knowledge likely will not result in change and this belief that mere knowledge can change behavior has the potential to undermine the effectiveness of interventions (Kelly & Barker, 2016).

Findings from the behavioural diagnoses indicated that changing TBI-screening behavior in women's shelters is influenced by several factors. In addition to lacking knowledge, our findings showed that staff are likely not screening for TBIs at their work because they feel that they lack the skills, are nervous, lack the resources, lack the confidence in their capabilities, and are

influenced by their clients. Given the number of TDF domains relevant to screening behaviours, all nine intervention functions and all seven policy categories within the BCW were identified as being relevant to promote screening of TBIs in women's shelters. After applying the APEASE criteria, our intervention recommendations indicate that to successfully change TBI-screening behaviours a multi-component intervention that targets intrapersonal, interpersonal, and systemic barriers will need to be developed. To further unpack our behavioural diagnosis and intervention recommendations, each of the TDF domains influencing screening behaviours are discussed below and discussed alongside intervention recommendations that aim to target the domain.

Staff feel that they are lacking the skills and ability to screen for TBIs. This concern highlights the need to translate screening tools to real-world contexts. Several straightforward and easy to use screening tools have been published in the literature (Goldin et al., 2016). For example, the HELPS tool consists of asking the client five “yes” or “no” questions with instructions on how to determine if they are considered positive for a possible TBI based on the responses to the questions (Pichard et al., 1991). Therefore, this finding may indicate that staff have misperceptions about the steps necessary to screen for TBIs. Given our findings that staff are nervous to screen, have concerns about whether it is their role to screen, and want to maintain a strong bond with their client, it is likely that these screening tools need to be disseminated and that staff need to be trained to deliver these TBI screening tools in an informal and conversational style that is embedded into their everyday practices. To address this barrier, our co-developed intervention recommendations highlight the need to provide staff with training opportunities that allow them to practice and to receive feedback on delivering TBI-screening questions in a casual conversational style rather than in an official screening process.

Lack of knowledge towards TBIs was found as a barrier in this study. Similar results were also found by Nemeth et al. (2019); however, the lack of knowledge that staff feel towards screening for TBIs could also be from the misperception of what TBI-screening involves. This lack of knowledge may also be influencing their emotions, as staff indicated that they were nervous to screen and lacked the capability to screen. Screening for TBIs does not require the same level of knowledge as diagnosing TBIs. Although, it is beneficial when screening to be able to correctly identify symptoms of a TBI, it is important that staff understand that they are not being asked to diagnose TBIs. Rather staff likely need foundational knowledge that helps staff understand that they are not diagnosing TBIs rather they are learning how to recognize, respond, and support women who are experiencing TBIs. For example, staff could receive this education through tools such as the Concussion Awareness Training Tool (CATT; <https://cattonline.com>). This tool was developed by Babul in 2013 and outlines a series of online educational modules and resources with the goal of “standardizing concussion recognition, diagnosis, treatment, and management”. Further tailoring this tool to include knowledge that is specific to the context of IPV and women’s shelters would help to provide a first step towards supporting staff to screen.

Lack of resources was a common barrier towards screening for TBIs at women’s shelters. Within this domain, four sub-themes were found. Staff felt that they lacked the time to screen, the staff to screen, the space to screen, and a screening tool. In the survey, participants were told that screening would take “approximately 5 minutes”. Staff may have felt they lacked time because they believed that they didn’t have an extra five minutes that they could spare to screen for TBIs or because they believed that they wouldn’t be able to screen for a TBI within 5 minutes. The latter barrier could likely be addressed through education as many screening tools are short and can be delivered in less than five minutes (e.g. HELPS tool). Lack of staff was a concern to some

participants when asked about screening for TBIs and lack of space was also a concern as some shelters do not have a quiet space to do TBI-screening. While important, neither of these concerns were addressed in the intervention recommendations as our team felt that it is unlikely that women's shelters have the resources available to employ more staff or provide more space to promote TBI-screening. Finally, establishing formal policies requiring staff to assess for TBIs and training staff to use a conversational assessment of TBIs that occurs after intake will likely address staff concerns that a screening tool does not exist.

Furthermore, our findings indicate staff are not screening for TBIs because of the influences of their clients. Staff were concerned about their own safety when screening clients and they did not want to cause additional trauma or stress to the client by asking about TBIs. Staff also discussed the need for an alliance between themselves and the client and that they would not screen for TBIs if they did not have consent from the client. These concerns may be mitigated by providing the TBI-screening through the conversational style assessment instead of a formal screening process. A conversational style assessment may provide a safer environment for the staff member and a more relaxing environment for the client. Clients may feel less intimidated by a conversational style assessment instead of an official TBI-screening form and may be more willing to be screened. Our intervention recommendations indicate that this conversation should occur after intake once a client has settled into the women's shelter. By delaying screening, staff may have an opportunity to build an alliance and rapport with clients alleviating staff's fears of jeopardizing the relationship or further traumatizing the client.

Finally, staff will not screen a client for a TBI if the client is unable to be screened for a TBI. For example, staff will not screen if the client is intoxicated, unable to hear, see, illiterate, etc. Although some of these circumstances would make it more difficult to screen for a TBI,

training providing real-world scenarios and opportunities for practice and feedback could help staff feel more comfortable screening in various circumstances.

Although, all nine intervention functions were deemed relevant to target TBI-screening behaviours in staff, only six were chosen based on the APEASE criteria. Incentivization was considered unaffordable as an intervention functions as most women's shelters would be unable to provide incentives to their staff for screening. Coercion and restriction were not applicable intervention functions as there are few coercive efforts that could be made within women's shelters and there is likely nothing to restrict from staff to promote screening.

#### **4.3 Limitations and Future Directions**

The recommendations developed in this thesis provide a starting place for intervention design aimed at promoting screening of TBIs at women's shelters. However, there are a number of limitations that present opportunities for future research both within behavioural science as well as in the area of IPV and TBI.

While the use of a systematic and theory-based approach is a strength, these frameworks and our application of them does present limitations for understanding factors influencing behaviour. First, the TDF is a framework and not a theory. Therefore, it does not provide insight into how the domains interconnect with each other. When targeting a specific domain, it is unknown how that will affect the other domains. While our qualitative data does point to interactions between domains, future research should examine how targeting different domains may influence other domains. Second, we were limited to collecting TDF data via a questionnaire that was not specifically developed and validated for the TBI-IPV context in Phase 1. According to Huijg et al. (2014), reinforcement, goals, and behavioural regulation are unable to be

discriminately measured and as such were not included in the Phase 1 questionnaire. Also, due to the lack of time that participants had to complete the survey, the research team decided to only ask participants one statement per domain on the 7-Point Likert Scale. A more comprehensive TDF questionnaire would have multiple statements per domain and would have been developed to specifically examine factors related to screening for TBIs (Huijg et al., 2014). While the use of qualitative interviews in Phase 2 aimed to mitigate the limitations of the survey in Phase 1, future research should aim develop and refine theory-based questionnaires specific to this context. Finally, our application of TDF interview methods in Phase 2 deviated from recommendations by Atkins et al. (2017). Atkins et al. (2017) recommends developing an interview guide with a question on each of the TDF domains followed up by prompts to understand the domain more deeply. The interview guide in this thesis was broader and did not include questions on each domain. This strategy was used to avoid discussing domains that were not relevant to the participants. Furthermore, Atkins et al. (2017) recommends having a minimum of ten participants and although Phase 2 did consist of ten participants, a larger sample size may have provided a better understanding of the local context.

Our research also presents opportunities for future research examining IPV and TBI more broadly. First, our research only examined the first three steps of the KTA framework and did not aim to implement or evaluate our intervention recommendations. Further work is required to implement and evaluate our intervention recommendations in “real-world” behaviour change interventions. Evaluating interventions will provide further insight to the factors influencing TBI-screening behaviour and how these factors vary with regards to the local context. Second, qualitative TDF interviews were only conducted in women’s shelters in the Kelowna area. Future research should aim to use interviews to understand the local context of other women’s shelters

across Canada to help further understand how barriers vary based on the local context as well as among other groups that interact with women who experience IPV (e.g., law enforcement, justice system, health system). Third, this study was conducted with only one partner organization. It would have been helpful to have multiple partnerships with women's shelters to have more insight towards the studied population and more input with regards to the intervention recommendations. The issue of IPV and TBI is not solely present in Canada, with one-third of women worldwide experiencing IPV (Devries et al., 2013). The barriers staff experience within and outside of Canada may vary. Future work should test the affordability, practicability, effectiveness and cost-effectiveness, acceptability, side-effects/safety, and equity of our intervention recommendations within other women's shelters both across Canada and around the world. Finally, this research only examined the behaviour of screening and did not examine referral systems or supports offered to women who have experienced TBI and IPV. Future research needs to be done to develop supports and referral systems for women who experience IPV once they have been identified as potentially acquiring a TBI.

#### **4.4 Strengths**

The recommendations presented from our research were developed with many strengths. This thesis used a comprehensive and systematic approach towards understanding the local context, understanding factors influence screening of TBIs at women's shelters, and ultimately development of intervention recommendations.

Firstly, this thesis provides a national representation of staff at women's shelters. Nine of ten provinces were represented within the sample in Phase 1. This will likely increase the impact these recommendations will have across Canada. Secondly, this thesis was grounded in behaviour change theory. Behaviour change theory explains why, when and how a behaviour does or doesn't

occur, why an intervention succeeds or fails, and may improve the likelihood of effectiveness and replicability of interventions (Gainforth, West, & Michie, 2015; Michie et al., 2016; Michie et al., 2014). The BCW has been used in many different health settings (Almansour et al., 2019; Clarke et al., 2019; Daoud et al., 2018; Gould et al., 2017; Mc Sharry et al., 2016; Munir et al., 2018; Seppala et al., 2017; Smits et al., 2018) however, this is the first time it is being used in the context of women's shelters and IPV. Therefore, this study adds to the field of research as it is the first study using behaviour change theory to help promote screening of TBIs at women's shelters and developing the first theory-based intervention recommendations towards screening for TBIs at women's shelters. Theory allowed these recommendations to be developed in a systematic and evidence-based process.

Thirdly, an IKT approach was used throughout the research process of this thesis. Partnering with the Kelowna Women's Shelter from the beginning of the research project to the dissemination of research findings provided this thesis with many strengths. IKT results in research that is more relevant and useful for the target population (Gagliardi et al., 2016). The Executive Director of the Kelowna Women's Shelter helped with developing relevant and meaningful research aims. Throughout the development of both phases the Executive Director helped tailor the survey and interview guide to make it appropriate for staff who work at women's shelters. The Executive Director also provided insight into our findings and drove the development of the intervention recommendations using the APEASE criteria to help determine intervention functions and intervention recommendations that could be feasibly implemented in women's shelters. This partnership with the Kelowna Women's Shelter has led to plans for future development of interventions with regards to screening for TBIs at women's shelters and the evaluations of the interventions using a theory-based approach.



Finally, our research was conducted using a pragmatic approach. Pragmatism aligns with IKT in the sense that it is interested in the methods best suited to answer the research question (Tashakkori & Teddlie, 2003). This approach allowed us to develop a mixed methods approach and collect data across Canada as well as in-depth data in the Kelowna area. Using a pragmatic approach also provided rationale to use abductive reasoning (Tashakkori & Teddlie, 2003). The data were analyzed deductively using the TDF then inductively by a thematic analysis. This allowed the interview transcripts and surveys to be analyzed in more depth and provided a better understanding of the barriers that staff are experiencing towards screening for TBIs. These strengths allowed for the development of intervention recommendations in a systematic, evidence-based process that are relevant and useful for women's shelters across Canada.

#### **4.5 Conclusion**

This thesis is the first theory-informed study to examine how TBI-screening in women's shelters can be promoted. It provides five intervention recommendations that were co-developed in a systematic and evidence-based process with the Kelowna Women's Shelter to promote screening of TBIs at women's shelters. The developed recommendations hold the potential to greatly impact the health of women who have experienced a TBI from IPV. Interventions aimed at promoting TBI-screening at women's shelters should follow these recommendations to help ensure successful interventions and hopefully increase the number of TBI-supports provided to women who have experienced a TBI from IPV. Ultimately, these recommendations hold the potential to help women who have experienced a TBI from IPV recover from their TBI(s), leave abusive relationships, and improve their quality of life.

## **Bibliography**

- About Brain Injury Medications. (2019). Retrieved from <https://www.biausa.org/brain-injury/about-brain-injury/treatment/medications>
- Almansour, H. A., Mekonnen, A. B., Aloudah, N. M., Alhawassi, T. M., Mc Namara, K., Chaar, B., . . . Saini, B. (2019). Cardiovascular disease risk screening by pharmacists: a behavior change wheel guided qualitative analysis. *Research in Social and Administrative Pharmacy*. doi:10.1016/j.sapharm.2019.04.009
- Andrew, S., & Halcomb, E. J. (2007). Mixed methods research is an effective method of enquiry for community health research. *Contemporary Nurse*, 23(2), 145-153. doi:10.5172/conu.2006.23.2.145
- Angus Reid Omnibus Survey. (2012). Retrieved from <http://www.canadianwomen.org/sixtysevenpercent>
- Astafiev, S. V., Zinn, K. L., Shulman, G. L., & Corbetta, M. (2016). Exploring the physiological correlates of chronic mild traumatic brain injury symptoms. *NeuroImage: Clinical*, 11(C), 10-19. doi:10.1016/j.nicl.2016.01.004
- Atkins, L., Francis, J., Islam, R., O'Connor, D., Patey, A., Ivers, N., . . . Michie, S. (2017). A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *IMPLEMENTATION SCIENCE*, 12(1), 77-18. doi:10.1186/s13012-017-0605-9
- Badjatia, N., Carney, N., Crocco, T. J., Fallat, M. E., Hennes, H. M. A., Jagoda, A. S., . . . Wright, D. W. (2008). Guidelines for prehospital management of traumatic brain injury. *PREHOSPITAL EMERGENCY CARE*, 12, S1-S52. doi:10.1080/10903120701732052
- Berrios, D. C., & Grady, D. (1991). DOMESTIC VIOLENCE - RISK-FACTORS AND OUTCOMES. *WESTERN JOURNAL OF MEDICINE*, 155(2), 133-135.
- Biroscak, B. J., Smith, P. K., Roznowski, H., Tucker, J., & Carlson, G. (2006). Against Women: Findings From One State's ED Surveillance System. *Journal of Emergency Nursing*, 32(1), 12-16. doi:10.1016/j.jen.2005.11.002
- Bosch, M., Tavender, E., Bragge, P., Gruen, R., & Green, S. (2013). How to define 'best practice' for use in Knowledge Translation research: a practical, stepped and interactive process. *Journal of Evaluation in Clinical Practice*, 19(5), 763-768. doi:10.1111/j.1365-2753.2012.01835.x
- Brain Injury Screening Questionnaire (BISQ) (1998). New York: Re-search and Training Center on Community Integration of Individuals with TBI, Mount Sinai Sch Medicine.

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. doi:10.1191/1478088706qp063oa
- Burczycka, M., Conroy, S., & Savage, L. (2018). Family violence in Canada: A statistical profile, 2017. *Juristat: Canadian Centre for Justice Statistics*, 1.
- Byrt, T., Bishop, J., & Carlin, J. B. (1993). Bias, prevalence and kappa. *Journal of Clinical Epidemiology*, 46(5), 423-429. doi:10.1016/0895-4356(93)90018-V
- Cane, J., O'Connor, D., & Michie, S. (2012). Validation of the theoretical domains framework for use in behaviour change and implementation research. *IMPLEMENTATION SCIENCE*, 7(1), 37-37. doi:10.1186/1748-5908-7-37
- Cantor, J. B., Gordon, W. A., Schwartz, M. E., Charatz, H. J., Ashman, T. A., & Abramowitz, S. (2004). Child and parent responses to a brain injury screening questionnaire. *Archives of Physical Medicine and Rehabilitation*, 85(4), 54-60. doi:10.1016/j.apmr.2003.08.113
- Clarke, A. L., Jhamb, M., & Bennett, P. N. (2019). Barriers and facilitators for engagement and implementation of exercise in end-stage kidney disease: Future theory-based interventions using the Behavior Change Wheel. *Seminars in dialysis*. doi:10.1111/sdi.12787
- Cohen, J. (1968). Weighted kappa: Nominal scale agreement provision for scaled disagreement or partial credit. *Psychological Bulletin*, 70(4), 213-220. doi:10.1037/h0026256
- Colantonio, A., Collie, A., Ruseckaite, R., & Chang, V. C. (2014). Original article: Examining the epidemiology of work-related traumatic brain injury through a sex/gender lens: analysis of workers' compensation claims in Victoria, Australia. *Occupational and Environmental Medicine*, 71(10).
- Corrigan, J. D., & Bogner, J. (2007). Initial reliability and validity of the Ohio State University TBI identification method. *JOURNAL OF HEAD TRAUMA REHABILITATION*, 22(6), 318-329. doi:10.1097/01.HTR.0000300227.67748.77
- Cotter, A. (2014). Homicide in Canada, 2013. *Juristat: Canadian Centre for Justice Statistics*, 1.
- Curry L.M., Ivins R.G., Gowen T.L. (1991). Philadelphia Head Injury Questionnaire (PHIQ): Administration and Use Western Psychological Services Los Angeles.
- Dams-O'Connor, K., Cantor, J. B., Brown, M., Dijkers, M. P., Spielman, L. A., & Gordon, W. A. (2014). Screening for Traumatic Brain Injury: Findings and Public Health Implications. *JOURNAL OF HEAD TRAUMA REHABILITATION*, 29(6), 479-489. doi:10.1097/HTR.0000000000000099

- Daoud, N., Jung, Y. E., Muhammad, A. S., Weinstein, R., Qaadny, A., Ghattas, F., . . . Grotto, I. (2018). Facilitators and barriers to smoking cessation among minority men using the behavioral-ecological model and Behavior Change Wheel: A concept mapping study. *PLOS ONE*, 13(10), e0204657. doi:10.1371/journal.pone.0204657
- Davies, P., Walker, A. E., & Grimshaw, J. M. (2010). A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *IMPLEMENTATION SCIENCE*, 5(1), 14-14. doi:10.1186/1748-5908-5-14
- Davis, R., Campbell, R., Hildon, Z., Hobbs, L., & Michie, S. (2015). Theories of behaviour and behaviour change across the social and behavioural sciences: a scoping review. *Health Psychology Review*, 9(3), 323-344. doi:10.1080/17437199.2014.941722
- de Sousa, A., McDonald, S., & Rushby, J. (2012). Changes in emotional empathy, affective responsivity, and behavior following severe traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 34(6), 606-623. doi:10.1080/13803395.2012.667067
- Devries, K. M., Mak, J. Y. T., García-Moreno, C., Petzold, M., Child, J. C., Falder, G., . . . Watts, C. H. (2013). The Global Prevalence of Intimate Partner Violence Against Women. *Science*, 340(6140), 1527-1528. doi:10.1126/science.1240937
- Diamond, P. M., Harzke, A. J., Magaletta, P. R., Cummins, A. G., & Frankowski, R. (2007). Screening for traumatic brain injury in an offender sample: A first look at the reliability and validity of the Traumatic Brain Injury Questionnaire. *JOURNAL OF HEAD TRAUMA REHABILITATION*, 22(6), 330-338. doi:10.1097/01.HTR.0000300228.05867.5c
- Dicola, D. M. D., & Spaar, E. D. O. (2016). Intimate Partner Violence. *American Family Physician*, 94(8), 646-651.
- Family violence in Canada: A statistical profile, 2014. (2016). *Juristat: Canadian Centre for Justice Statistics*, 1.
- Fonseka, S. (1974). A study of wife-beating in the Camberwell area. *The British journal of clinical practice*, 28(12), 400.
- French, S. D., Green, S. E., O'Connor, D. A., McKenzie, J. E., Francis, J. J., Michie, S., . . . Grimshaw, J. M. (2012). Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *IMPLEMENTATION SCIENCE*, 7(1), 38-38. doi:10.1186/1748-5908-7-38
- Gagliardi, A. R., Berta, W., Kothari, A., Boyko, J., & Urquhart, R. (2016). Integrated knowledge translation (IKT) in health care: a scoping review. *IMPLEMENTATION SCIENCE*, 11(1), 38. doi:10.1186/s13012-016-0399-1

- Gainforth, H. L., Sheals, K., Atkins, L., Jackson, R., & Michie, S. (2016). Developing interventions to change recycling behaviors: A case study of applying behavioral science. *Applied Environmental Education & Communication*, 15(4), 325-339. doi:10.1080/1533015X.2016.1241166
- Gainforth, H. L., West, R., & Michie, S. (2015). Assessing Connections Between Behavior Change Theories Using Network Analysis. *ANNALS OF BEHAVIORAL MEDICINE*, 49(5), 754-761. doi:10.1007/s12160-015-9710-7
- Galgano, M., Toshkezi, G., Qiu, X., Russell, T., Chin, L., & Zhao, L.-R. (2017). Traumatic Brain Injury: Current Treatment Strategies and Future Endeavors. *Cell Transplantation*, 26(7), 1118-1130. doi:10.1177/0963689717714102
- Goldin, Y. P., Haag, H. L. M. S. W. R. S. W., & Trott, C. T. P. (2016). Screening for History of Traumatic Brain Injury Among Women Exposed to Intimate Partner Violence. *PM&R*, 8(11), 1104-1110. doi:10.1016/j.pmrj.2016.05.006
- Goodhand, M. (2017). *Runaway wives and rogue feminists: the origins of the women's shelter movement in Canada*. Winnipeg;Halifax,: Fernwood Publishing.
- Gould, G. S., Bar-Zeev, Y., Bovill, M., Atkins, L., Gruppeta, M., Clarke, M. J., & Bonevski, B. (2017). Designing an implementation intervention with the Behaviour Change Wheel for health provider smoking cessation care for Australian Indigenous pregnant women. *IMPLEMENTATION SCIENCE*, 12(1), 114-114. doi:10.1186/s13012-017-0645-1
- Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., & Robinson, N. (2006). Lost in knowledge translation: Time for a map? *Journal of Continuing Education in the Health Professions*, 26(1), 13-24. doi:10.1002/chp.47
- Green, L. W., Ottoson, J. M., Garcia, C., & Hiatt, R. A. (2009). Diffusion Theory and Knowledge Dissemination, Utilization, and Integration in Public Health. *ANNUAL REVIEW OF PUBLIC HEALTH*, 30(1), 151-174. doi:10.1146/annurev.publhealth.031308.100049
- Greenfeld, L. A., & others, a. (1998). *Violence by intimates: analysis of data on crimes by current or former spouses, boyfriends, and girlfriends*.
- Grimshaw, J. M., Eccles, M. P., Lavis, J. N., Hill, S. J., & Squires, J. E. (2012). Knowledge translation of research findings. *IMPLEMENTATION SCIENCE*, 7(1), 50-50. doi:10.1186/1748-5908-7-50
- Guide to Knowledge Translation Planning at CIHR: Integrated and End-of-Grant Approaches. (2015). Retrieved from <http://www.cihr-irsc.gc.ca/e/45321.html>

- Horvath, K., Semlitsch, T., Jeitler, K., Abuzahra, M. E., Posch, N., Domke, A., & Siebenhofer, A. (2016). Choosing Wisely: assessment of current US top five list recommendations' trustworthiness using a pragmatic approach. *BMJ OPEN*, 6(10), e012366. doi:10.1136/bmjopen-2016-012366
- Huijg, J. M., Gebhardt, W. A., Crone, M. R., Dusseldorp, E., & Presseau, J. (2014). Discriminant content validity of a theoretical domains framework questionnaire for use in implementation research. *IMPLEMENTATION SCIENCE*, 9(1), 11. doi:10.1186/1748-5908-9-11
- Hunnicut, G., Murray, C., Lundgren, K., Crowe, A., & Olson, L. (2019). Exploring Correlates of Probable Traumatic Brain Injury among Intimate Partner Violence Survivors. *Journal of Aggression, Maltreatment & Trauma*, 1-18. doi:10.1080/10926771.2019.1587656
- Hyde, K. F. (2000). Recognising deductive processes in qualitative research. *Qualitative Market Research: An International Journal*, 3(2), 82-90. doi:10.1108/13522750010322089
- Ibrahim, D. (2019). Police-reported violence among same-sex intimate partners in Canada, 2009 to 2017. *Juristat: Canadian Centre for Justice Statistics*, 1-29.
- Jackson, H., Philp, E., Nuttall, R. L., & Diller, L. (2002). Traumatic brain injury: A hidden consequence for battered women. *PROFESSIONAL PSYCHOLOGY-RESEARCH AND PRACTICE*, 33(1), 39-45. doi:10.1037//0735-7028.33.1.39
- Jordan, B. D. (2000). Chronic Traumatic Brain Injury Associated with Boxing. *Seminars in Neurology*, 20(2), 179-186. doi:10.1055/s-2000-9826
- Kelly, M. P., & Barker, M. (2016). Why is changing health-related behaviour so difficult? *Public Health*, 136, 109-116. doi:10.1016/j.puhe.2016.03.030
- Kurowski, B., Pomerantz, W. J., Schaiper, C., & Gittelman, M. A. (2014). Factors that influence concussion knowledge and self-reported attitudes in high school athletes. *JOURNAL OF TRAUMA AND ACUTE CARE SURGERY*, 77(3 Suppl 1), S12-S17. doi:10.1097/TA.0000000000000316
- Kwako, L. E., Glass, N., Campbell, J., Melvin, K. C., Barr, T., & Gill, J. M. (2011). Traumatic Brain Injury in Intimate Partner Violence: A Critical Review of Outcomes and Mechanisms. *Trauma, Violence, & Abuse*, 12(3), 115-126. doi:10.1177/1524838011404251
- Landis, J. R., & Koch, G. G. (1977). The Measurement of Observer Agreement for Categorical Data. *Biometrics*, 33(1), 159-174. doi:10.2307/2529310
- Lang, E. S., & Johnson, D. (2012). How does "knowledge translation" affect my clinical practice? *CANADIAN JOURNAL OF EMERGENCY MEDICINE*, 14(3), 182-U112.

- Loseke, D. R. (1992). *The battered woman and shelters: the social construction of wife abuse*. Albany: State University of New York Press.
- Mallidou, A. A., Atherton, P., Chan, L. Z., Frisch, N., Glegg, S., & Scarrow, G. (2018). Core knowledge translation competencies: a scoping review. *BMC HEALTH SERVICES RESEARCH*, 18(1), 502-515. doi:10.1186/s12913-018-3314-4
- Mc Sharry, J., Murphy, P. J., & Byrne, M. (2016). Implementing international sexual counselling guidelines in hospital cardiac rehabilitation: development of the CHARMS intervention using the Behaviour Change Wheel. *IMPLEMENTATION SCIENCE*, 11(1), 134. doi:10.1186/s13012-016-0493-4
- McDonald, P. W., & Dickerson, S. (2013). Engendering Independence While Living With Purpose: Women's Lives After Leaving Abusive Intimate Partners. *Journal of Nursing Scholarship*, 45(4), 388-396. doi:10.1111/jnu.12044
- McKee, A. C., Stein, T. D., Kiernan, P. T., & Alvarez, V. E. (2015). The Neuropathology of Chronic Traumatic Encephalopathy. *Brain Pathology*, 25(3), 350-364. doi:10.1111/bpa.12248
- Mechanic, M. B., Weaver, T. L., & Resick, P. A. (2008). Mental Health Consequences of Intimate Partner Abuse: A Multidimensional Assessment of Four Different Forms of Abuse. *Violence Against Women*, 14(6), 634-654. doi:10.1177/1077801208319283
- Michie, S., Atkins, L., & West, R. (2014). *The Behaviour Change Wheel: A Guide to Designing Interventions*. Great Britain: Silverback Publishing.
- Michie, S., Carey, R. N., Johnston, M., Rothman, A. J., de, B. M., Kelly, M., & Connell, L. E. (2016). From theory-inspired to theory-based interventions: A protocol for developing and testing a methodology for linking behaviour change techniques to theoretical mechanisms of action. doi:10.17863/CAM.169
- Michie, S., Johnston, M., Abraham, C., Lawton, R., Parker, D., Walker, A., . . . Psychological Theory, G. (2005). Making psychological theory useful for implementing evidence based practice: a consensus approach. *QUALITY & SAFETY IN HEALTH CARE*, 14(1), 26-33. doi:10.1136/qshc.2004.011155
- Michie, S., Stralen, v. M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *IMPLEMENTATION SCIENCE*, 6.
- Michie, S., West, R., Campbell, R., Brown, J., & Gainforth, H. (2014). *ABC of behaviour change theories*. Great Britain: Silverback Publishing.

- Morris, Z. S., Wooding, S., & Grant, J. (2011). The answer is 17 years, what is the question: understanding time lags in translational research. In (Vol. 104, pp. 510-520). London, England: SAGE Publications.
- Munir, F., Biddle, S. J. H., Davies, M. J., Dunstan, D., Esliger, D., Gray, L. J., . . . Edwardson, C. L. (2018). Stand More AT Work (SMaRT Work): using the behaviour change wheel to develop an intervention to reduce sitting time in the workplace. *BMC PUBLIC HEALTH*, 18(1), 319-315. doi:10.1186/s12889-018-5187-1
- Nemeth, J. M., Mengo, C., Kulow, E., Brown, A., & Ramirez, R. (2019). Provider Perceptions and Domestic Violence (DV) Survivor Experiences of Traumatic and Anoxic-Hypoxic Brain Injury: Implications for DV Advocacy Service Provision. *Journal of Aggression, Maltreatment & Trauma*, 1-20. doi:10.1080/10926771.2019.1591562
- Nowell, L. (2015). Pragmatism and integrated knowledge translation: exploring the compatibilities and tensions. *Nursing Open*, 2(3), 141-148. doi:10.1002/nop2.30
- Okun, L. (1986). *Woman abuse: facts replacing myths*. Albany: State University of New York Press.
- Onwuegbuzie, A. J., & Leech, N. L. (2005). On becoming a pragmatic researcher: The importance of combining quantitative and qualitative research methodologies. *International Journal of Social Research Methodology*, 8(5), 375-387. doi:10.1080/13645570500402447
- Organization, W. H., & Pan American Health, O. (2012). *Understanding and addressing violence against women: femicide*. Retrieved from [http://ubc.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwY2AwNtIz0EUrE9KADWFgb8gsyTDRNMnQ1MI81cQ4yTTVPAXUXrVMMURbqgM\\_Nae8XK88Ix\\_YBi3RzwQmen3I0QPArG5mZqoPbLmAtpCzgg\\_5AiblwBAjYA0BVI9UQ7gJMggjbq1VAJbcpSCGEANTap4IA-RyIdgOEgUgpQDM7-AFqEBuGXTjj0JiOrCXXlyiAD4UwUohDbRsPTMIVZRB0801xNIDF2hlPMh58aCzmsF1EGiHRjzYlFgVxqLMfAmgpas55WAt7alSDAoWFikGqQIJZolmiYbmJinJVmYpKWlAZsDFuZJJkaJBmaSDEqEDZYiRpE0AxewnjeCjBzIMLCUFJWmyoKPGZADhxoActh9ag](http://ubc.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwY2AwNtIz0EUrE9KADWFgb8gsyTDRNMnQ1MI81cQ4yTTVPAXUXrVMMURbqgM_Nae8XK88Ix_YBi3RzwQmen3I0QPArG5mZqoPbLmAtpCzgg_5AiblwBAjYA0BVI9UQ7gJMggjbq1VAJbcpSCGEANTap4IA-RyIdgOEgUgpQDM7-AFqEBuGXTjj0JiOrCXXlyiAD4UwUohDbRsPTMIVZRB0801xNIDF2hlPMh58aCzmsF1EGiHRjzYlFgVxqLMfAmgpas55WAt7alSDAoWFikGqQIJZolmiYbmJinJVmYpKWlAZsDFuZJJkaJBmaSDEqEDZYiRpE0AxewnjeCjBzIMLCUFJWmyoKPGZADhxoActh9ag)
- Petridou, E., Browne, A., Lichter, E., Dedoukou, X., Alexe, D., & Dessypris, N. (2002). What distinguishes unintentional injuries from injuries due to intimate partner violence: a study in Greek ambulatory care settings. *Injury Prevention*, 8(3), 197-201. doi:10.1136/ip.8.3.197
- Picard M, Scarisbrick D, Paluck R. (1991). HELPS brain injury screening tool. New York: International Center for the Disabled, TBI-NET, US Department of Education, Rehabilitation Services Administration, 1991.



- Reichard, A. A., Langlois, J. A., Sample, P. L., Wald, M. M., & Pickelsimer, E. E. (2007). Violence, abuse, and neglect among people with traumatic brain injuries. *JOURNAL OF HEAD TRAUMA REHABILITATION*, 22(6), 390-402. doi:10.1097/01.HTR.0000300234.36361.b1
- Rogers, R. W. (1975). A Protection Motivation Theory of Fear Appeals and Attitude Change. *The Journal of Psychology*, 91(1), 93-114. doi:10.1080/00223980.1975.9915803
- Screening and Assessment Tools for Professionals. (2019). Retrieved from <https://icahn.mssm.edu/research/brain-injury/resources/screening>
- Seppala, T., Hankonen, N., Korkiakangas, E., Ruusuvuori, J., & Laitinen, J. (2017). National policies for the promotion of physical activity and healthy nutrition in the workplace context: a behaviour change wheel guided content analysis of policy papers in Finland. *BMC PUBLIC HEALTH*, 18(1), 87-89. doi:10.1186/s12889-017-4574-3
- Shelters for abused women in Canada. (2014). Retrieved from <https://www150.statcan.gc.ca/n1/pub/85-002-x/2015001/article/14207-eng.htm#a3>
- Sheridan, D. J., & Nash, K. R. (2007). Acute injury patterns of intimate partner violence victims. *TRAUMA VIOLENCE & ABUSE*, 8(3), 281-289. doi:10.1177/1524838004303504
- Sinha, M. (2013). Measuring violence against women: Statistical trends. *Juristat: Canadian Centre for Justice Statistics*, 1.
- Smits, S., McCutchan, G., Wood, F., Edwards, A., Lewis, I., Robling, M., . . . Brain, K. (2018). Development of a Behavior Change Intervention to Encourage Timely Cancer Symptom Presentation Among People Living in Deprived Communities Using the Behavior Change Wheel. *ANNALS OF BEHAVIORAL MEDICINE*, 52(6), 474-488. doi:10.1007/s12160-016-9849-x
- Tashakkori, A., & Teddlie, C. (2003). Issues and dilemmas in teaching research methods courses in social and behavioural sciences: US perspective. *International Journal of Social Research Methodology*, 6(1), 61-77. doi:10.1080/13645570305055
- Tavender, E., Bosch, M., Gruen, R., Green, S., Michie, S., Brennan, S., . . . O'Connor, D. (2015). Developing a targeted, theory-informed implementation intervention using two theoretical frameworks to address health professional and organisational factors: A case study to improve the management of mild traumatic brain injury in the emergency department. *Implementation Science*, 10(1), 74. doi:10.1186/s13012-015-0264-
- Valera, E. M., & Berenbaum, H. (2003). Brain Injury in Battered Women. *Journal of Consulting and Clinical Psychology*, 71(4), 797-804. doi:10.1037/0022-006X.71.4.797
- Vos, P. E., Alekseenko, Y., Battistin, L., Ehler, E., Gerstenbrand, F., Muresanu, D. F., . . . European Federation of Neurological, S. (2012). Mild traumatic brain injury. *European Journal of Neurology*, 19(2), 191-198. doi:10.1111/j.1468-1331.2011.03581.x

- Vynorius, K. C., Paquin, A. M., & Seichepine, D. R. (2016). Lifetime Multiple Mild Traumatic Brain Injuries Are Associated with Cognitive and Mood Symptoms in Young Healthy College Students. *Frontiers in neurology*, 7, 188. doi:10.3389/fneur.2016.00188
- Ward, V., Smith, S., House, A., & Hamer, S. (2012). Exploring knowledge exchange: A useful framework for practice and policy. *Social Science & Medicine*, 74(3), 297-304. doi:10.1016/j.socscimed.2011.09.021
- Wilbur, L., Higley, M., Hatfield, J., Surprenant, Z., Taliaferro, E., Smith, D. J., & Paolo, A. (2001). Survey results of women who have been strangled while in an abusive relationship. *Journal of Emergency Medicine*, 21(3), 297-302. doi:10.1016/S0736-4679(01)00398-5
- Williams, C., & Wood, R. L. (2010). Alexithymia and emotional empathy following traumatic brain injury. *Journal of Clinical and Experimental Neuropsychology*, 32(3), 259-267. doi:10.1080/13803390902976940
- Wong, J. Y. H., Choi, A. W. M., Fong, D. Y. T., Wong, J. K. S., Lau, C. L., & Kam, C. W. (2014). Patterns, aetiology and risk factors of intimate partner violence-related injuries to head, neck and face in Chinese women. *BMC WOMENS HEALTH*, 14(1), 6. doi:10.1186/1472-6874-14-6

## Appendices

### Appendix A: Example Letter of Recruitment

**Subject:** Participate in a study about intimate partner violence and traumatic brain injuries

– Chance to win \$100 gift card



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

Women's Shelters Canada have partnered with Dr. Heather Gainforth and Dr. Paul van Donkelaar, researchers at the University of British Columbia Okanagan, to conduct a research study about traumatic brain injury screening and resources provided to women who have experienced intimate partner violence (IPV).

You are receiving this email because you are registered to attend the Women's Shelters Canada National Conference 2018.

**We are currently recruiting staff in organizations that support women who have experienced IPV.** The purpose of this study is to assess the knowledge and practices of staff at these organizations with respect to traumatic brain injury. If you choose to participate in this study, you would take part in an online survey that will take 15 minutes, followed by a post-conference survey that will take 10 minutes to complete.

To be able to take part in this study, you must:

- Be a staff member who works at an organization that supports women who have experienced IPV
- Speak English or French

When you participate in the initial survey and the follow-up survey, you will be entered in a draw to win a **\$100 gift card**.

If you are interested in participating, please click on the following link: [link removed for thesis submission].

If you have any questions about the study, please email Dr. Heather Gainforth at [abc.lab@ubc.ca](mailto:abc.lab@ubc.ca) or call Dr. Heather Gainforth at (250) 807 9352.

## Appendix B: Example Survey Consent Form



**a place of mind**  
THE UNIVERSITY OF BRITISH COLUMBIA

### Understanding traumatic brain injury in women who have experienced intimate partner violence

#### Principal Investigators:

**Dr. Heather Gainforth**

School of Health and Exercise Sciences

University of British Columbia Okanagan

Email: abc.lab@ubc.ca

**Dr. Paul van Donkelaar**

School of Health and Exercise Sciences

University of British Columbia Okanagan

Email: paul.vandonkelaar@ubc.ca

#### Co-Investigator:

**Blake Nicol**

Research Assistant

School of Health and Exercise Sciences

University of British Columbia Okanagan

Email: blake.nicol@ubc.ca

#### Purpose:

The purpose of this study is to assess the knowledge and practices for screening for traumatic brain injuries (TBI) among those who have experienced intimate partner violence. The funding sponsor of this study is the UBC Okanagan VPR's Office, an anonymous donor, the Civil Forfeiture Office in partnership with the Victim Services and Crime Prevention Division of the Ministry of Public Safety and Solicitor General and Social Sciences and Humanities Research Council of Canada.

#### Study Procedures:

To be eligible to participate in this study, participants must serve women who have experienced IPV. Your participation in this study will include completing two surveys. One during the Annual Training Forum and one survey one month following the conference. The final date to complete survey 1 is October 25, 2018. In each survey, you will be asked to answer questions about your current knowledge

of TBI, the assessment and/or screening of TBI in your organization and your TBI referrals. Finally, you will be asked to provide demographic information. To ensure your responses are confidential, you will be asked to create a participant ID prior to filling out the survey. This survey will take approximately 15 minutes to complete. You will then be asked for your contact information and consent to be contacted by a member of the research team to complete a follow-up survey after the conference. The follow-up survey will take approximately 10 minutes to complete. Your contact information will be recorded on a site that is independent from the survey.

**Potential Risks:**

There are no known physical, psychological, economic or social risks associated with this study. You should not feel obligated to answer any material or participate in anything that you find objectionable or that makes you feel uncomfortable. You may also withdraw from the study at any time by contacting Dr. Gainforth by phone or by email.

**Potential Benefits:**

Your participation in this study will allow for a better understanding of the knowledge of those who serve women who have experienced IPV have about TBI, and will provide information that will help improve TBI assessment and/or screening and referrals.

**Confidentiality:**

All data will be stored and backed up in Canada. Data will be kept for at least five years after publication. All surveys from this study will be kept in a locked filing cabinet in Dr. Gainforth's Lab at UBC Okanagan. Surveys data will be stored on password-protected computers in a locked office in Dr. Gainforth's Lab at UBC Okanagan. All data will be password protected and securely transferred using a UBC file sharing service.

Data shared from this study will only be of general findings and will never breach your confidentiality. Data may be shared through publications in professional journals, presentations at scientific conferences and/or presentation and reports to the community.

**Compensation:**

For participating in the survey, you will be entered to win a \$100 gift card of your choice (i.e. Starbucks, Bath&BodyWorks, Best Buy, Tim Hortons or Cineplex). You will also be entered to win another \$100 gift card of your choice (i.e. Starbucks, Bath&BodyWorks, Best Buy, Tim Hortons or Cineplex) for participating in the follow-up survey after the conference.

**Contact for information about the study:**

If you have any questions or desire more information with respect to this study, you may contact Blake Nicol by email at [blake.nicol@ubc.ca](mailto:blake.nicol@ubc.ca) or Dr. Heather Gainforth at [abc.lab@ubc.ca](mailto:abc.lab@ubc.ca), or by telephone at 250-807-9352. Concerns about the rights of research participants: If you have any complaints or concerns about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Services at 1-877-822-8598 or the UBC Okanagan Research Services Office at 250-807-8832 or by email at

RSIL@ors.ubc.ca. Please reference the study number (H17-01143) when contacting the Complaint Line so the staff can better assist you.

**Consent:**

Consent will be inferred by submission of the survey. Your participation in this study is entirely voluntary and you may refuse to participate, not answer certain questions and/or withdraw from the study at any time. If you prefer, you can email or call Dr. Gainforth to withdraw and have your data deleted from the study.

**Continuing this survey will indicate you have read and understood the above information and have consented to participate in this study. If you do not wish to participate, please exit this website.**

## Appendix C: Example Survey

Please enter the unique code for yourself by answering the three questions below

1. First three letters of your mother's maiden name

\_\_\_\_\_

2. The two digits of your day of birth

\_\_\_\_\_

3. Last two numbers of your phone number

\_\_\_\_\_

**SECTION 1: This section asks about your knowledge of traumatic brain injuries**

4. Below we provide a list of signs or symptoms. Please indicate whether you believe a person is likely to experience these signs or symptoms after a traumatic brain injury.

If you believe a person will experience the sign or symptom, please select true. If you believe a person will not experience the sign or symptom, please select false.

	True	False
Emotional changes	<input type="radio"/>	<input type="radio"/>
Unusual thirst	<input type="radio"/>	<input type="radio"/>
Hallucinations	<input type="radio"/>	<input type="radio"/>
Shortness of breath	<input type="radio"/>	<input type="radio"/>
Tingling in feet	<input type="radio"/>	<input type="radio"/>
Sensitivity to noise and/or light	<input type="radio"/>	<input type="radio"/>
Nausea and/or vomiting	<input type="radio"/>	<input type="radio"/>
Difficulty concentrating and/or remembering	<input type="radio"/>	<input type="radio"/>
Slower reaction time	<input type="radio"/>	<input type="radio"/>
Confusion	<input type="radio"/>	<input type="radio"/>
Headache	<input type="radio"/>	<input type="radio"/>



5. Please indicate whether you believe the following statements about traumatic brain injuries are true or false.

	True	False
A traumatic brain injury is any injury to the head.	<input type="radio"/>	<input type="radio"/>
There is a higher risk of death if a second traumatic brain injury occurs before the first one has healed.	<input type="radio"/>	<input type="radio"/>
A person can only get a traumatic brain injury if hit in the head.	<input type="radio"/>	<input type="radio"/>
Imaging of the brain, such as MRIs and CT scans, show visible physical damage to the brain after a traumatic brain injury.	<input type="radio"/>	<input type="radio"/>
If a person gets three or more traumatic brain injuries, they are more likely to get another.	<input type="radio"/>	<input type="radio"/>
If a person gets one traumatic brain injury, they are more likely to get another.	<input type="radio"/>	<input type="radio"/>
Being knocked out causes permanent damage to the brain.	<input type="radio"/>	<input type="radio"/>
The majority of symptoms last for at least one month.	<input type="radio"/>	<input type="radio"/>
A person must be knocked out to get a traumatic brain injury.	<input type="radio"/>	<input type="radio"/>

---

6. In your opinion, how common do you think traumatic brain injury is within your client population?

- ☐ Less than 10%
- ☐ Between 11% and 25%
- ☐ 26%-50%
- ☐ 51%-80%
- ☐ More than 80%

**SECTION 2: This section asks about factors that may influence whether you screen a client who has experienced intimate partner violence (IPV) for a traumatic brain injury (TBI).**

Screening for a TBI would likely involve a questionnaire that would ask you to assess the symptoms of a TBI and how severe it is. The questionnaire would also include a thorough assessment of symptoms which would include; attention and memory, depression anxiety and mood; aggression and impulsivity; and physical symptoms.

For purpose of this survey, please assume screening a client would take 5 minutes.

7. If using the above technique, what would **stop** you from screening your clients for traumatic brain injuries?

---

8. If using the above technique, what would **help** you screen your clients for traumatic brain injuries?

---

9. Whether it's your organization's practice or not, have you ever screened for traumatic brain injuries in your work?

☐ Yes

☐ No

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Somewhat Disagree</i>	<i>Neither Agree Nor Disagree</i>	<i>Somewhat Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6	7

10. We understand that you may not screen for traumatic brain injuries, however, we are still interested in understanding the following. Please use the scale above to indicate the extent to which you agree with the following statements about screening clients for traumatic brain injuries.

	1	2	3	4	5	6	7	Unsure
I am aware of evidence-based recommendations for screening for traumatic brain injury.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to screen clients for traumatic brain injuries at my organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have been trained to screen clients for traumatic brain injuries at my organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am prepared to identify signs or symptoms of traumatic brain injury within my client population.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Somewhat Disagree</i>	<i>Neither Agree Nor Disagree</i>	<i>Somewhat Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6	7

At my organization, it is routine practice to screen clients for traumatic brain injuries.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

At my organization, there are enough resources and time to screen clients for traumatic brain injuries.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

People who are important to me think I should screen clients for traumatic brain injuries at my organization.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I intend to screen clients at my organization for traumatic brain injuries in the next month.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Somewhat Disagree</i>	<i>Neither Agree Nor Disagree</i>	<i>Somewhat Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6	7

Screening clients for traumatic brain injuries at my organization will benefit women's health.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

It is my professional responsibility to screen clients at my organization for traumatic brain injuries.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I am confident that if I wanted to, I could screen clients for traumatic brain injuries at my organization.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I forget to screen clients for traumatic brain injuries at my organization.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Somewhat Disagree</i>	<i>Neither Agree Nor Disagree</i>	<i>Somewhat Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6	7

I usually expect the best when screening clients at my organization for traumatic brain injuries.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

I feel nervous to screen clients at my organization for traumatic brain injuries.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

At my organization, I am rewarded for screening clients for traumatic brain injuries.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**SECTION 3: The following section asks about your experiences screening for traumatic brain injuries in your organization.**

11. What tools and/or questions do you use to screen for whether a client has a traumatic brain injury?

---



12. Do you or your organization ask clients if they have experienced any of the following? **Select all that apply.**

	I ask my client	It's my organizations practice to ask clients
Hits to the head, face, neck (with fist or object)	<input type="checkbox"/>	<input type="checkbox"/>
Black eyes	<input type="checkbox"/>	<input type="checkbox"/>
Being strangled (chocked)	<input type="checkbox"/>	<input type="checkbox"/>
Being smothered	<input type="checkbox"/>	<input type="checkbox"/>
Being thrown against wall/floor	<input type="checkbox"/>	<input type="checkbox"/>
Being pushed down stairs	<input type="checkbox"/>	<input type="checkbox"/>
Being shaken	<input type="checkbox"/>	<input type="checkbox"/>
Knocked out teeth	<input type="checkbox"/>	<input type="checkbox"/>
Loss of consciousness	<input type="checkbox"/>	<input type="checkbox"/>
Loss of memory or trouble remembering new things	<input type="checkbox"/>	<input type="checkbox"/>
Headache	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty concentrating	<input type="checkbox"/>	<input type="checkbox"/>
Ringing in the ears	<input type="checkbox"/>	<input type="checkbox"/>
Concussion	<input type="checkbox"/>	<input type="checkbox"/>

13. Could you please describe the services you would refer clients to who you think have a traumatic brain injury.

---

14. If tools or resources are developed to help with screening clients for traumatic brain injuries, how would you like them delivered? **Please select all that apply.**

☐

Webinar

☐

1-on-1 training

☐

Group training

☐

Online training

☐

Printed resources

☐

Conference/workshop

☐

Other... 

---

**SECTION 5: This final section asks you to provide additional information about yourself and your job**

15. What region do you work in?

- ☐ Vancouver Island
- ☐ Vancouver Coast & Mountains
- ☐ Thompson Okanagan
- ☐ Kootenay Rockies
- ☐ Cariboo, Chilcotin, Coast
- ☐ Northern British Columbia

16. How long have you worked at your organization? (In years)

---

17. How many years in total have you worked with clients who've experienced intimate partner violence?

---

18. Approximately, how many staff work at your organization?

---

19. What is your primary area of responsibility within the agency? Please choose one only.

- ☐ Front line worker/Support staff
- ☐ Administrative staff
- ☐ Manager
- ☐ Executive Director
- ☐ Other (Please specify) \_\_\_\_\_

20. Please indicate the type of services your agency offers women. Please check all that apply.

	Yes
Shelter services	<input type="checkbox"/>
Legal assistance	<input type="checkbox"/>
Medical assistance	<input type="checkbox"/>
Professional Counselling (e.g. individual or group therapy)	<input type="checkbox"/>
Peer Counselling	<input type="checkbox"/>
Substance use support	<input type="checkbox"/>
Social support services (e.g. social gathering, food or clothing swaps, transportation etc.)	<input type="checkbox"/>
Information/referral services	<input type="checkbox"/>
Settlement services	<input type="checkbox"/>
Job skills training	<input type="checkbox"/>
Ethno cultural specific services	<input type="checkbox"/>
Disability support services	<input type="checkbox"/>
Sexual violence support services	<input type="checkbox"/>
Partner assault response programs (e.g. Partner contact services)	<input type="checkbox"/>

Other:

☐

21. Please indicate an estimated annual budget for your agency. Please choose one only.

- ☐ Less than \$499,000
- ☐ \$500,000 - \$1,000,000
- ☐ \$1,000,000 - \$3,000,000
- ☐ More than \$3,000,000
- ☐ Unsure

22. How old are you? (In years)

---

23. What gender do you identify as?

- ☐ Man
- ☐ Woman
- ☐ Other, please specify... 

---

24. Have you ever experienced a traumatic brain injury?

- ☐ Yes
- ☐ No

25. Have any of your close friends or family members ever experienced a traumatic brain injury?

- ☐ Yes
- ☐ No

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Somewhat Disagree</i>	<i>Neither Agree Nor Disagree</i>	<i>Somewhat Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6	7

26. Please use the scale above to indicate the extent to which you agree with the following statement

	1	2	3	4	5	6	7	Unsure
During the past two weeks I have felt unhappy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. What is your highest level of education?

- ☐ No diploma or certificate
- ☐ High school degree
- ☐ Apprenticeship or trades certificate
- ☐ College degree (1 year or less) or CEGEP
- ☐ College (1 year or more) or CEGEP
- ☐ Some university studies (minimum 1 year)
- ☐ Some university studies (more than 1 year)
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Medical degree
- ☐ Doctorate/PhD



28. Which of the following describes your ethnicity?

- ☐ Aboriginal (First Nations, Metis, Inuk)
- ☐ Arab
- ☐ Black
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Latin American
- ☐ South Asian
- ☐ Southeast Asian
- ☐ West Asian
- ☐ White
- ☐ Other, please specify... \_\_\_\_\_

**Please hand in your survey to receive a ballot for a chance to win a \$100 gift card!**

## Appendix D: Interview Consent Form



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

### Interview Guide

### Understanding traumatic brain injury in organizations that support women who have experienced intimate partner violence

#### Consent Script

##### Introduction:

Hello. I'm Blake Nicol. I am conducting interviews about the knowledge and practices of front-line workers with respect to traumatic brain injuries. I'm conducting this at the University of British Columbia Okanagan in Kelowna, B.C. I'm working under the direction Dr. Heather Gainforth and Paul van Donkelaar of UBC Okanagan's department of Health and Exercise Science.

I located/found your name from the contact information provided during the online survey that you filled out as part of this study.

##### Study procedures:

I'm inviting you to do a one-on-one interview that will take about 60 minutes. I will ask you questions about your knowledge, current practices, and how we can improve resources for frontline workers regarding assessing traumatic brain injuries in your organization. For example, I will ask questions such as "What do you know about traumatic brain injuries?" and "Are there any factors that might affect if or how you assess clients for TBI?". We can set up a time and place that works for us both.

##### Risks:

It is not likely that there will be any serious harms or discomforts associated with the interview. There are no known physical, psychological, economic or social risks associated with this study. You should not feel obligated to answer any material or participate in anything that you find objectionable or that makes you feel uncomfortable. You may also withdraw from the study at any time.

##### Benefits:

It is unlikely that there will be direct benefits to you, however, your participation in this study will allow for a better understanding of the knowledge front-line workers at organizations whose clients may have experienced intimate partner violence have about traumatic brain injuries and will provide information that will help improve TBI assessment and/or screening and referrals in these organizations.

I will keep the information you tell me during the interview confidential. Information that could identify you will not be published or shared beyond the research team unless we have your permission. Any data from this research which will be shared or published will be the combined data of all participants. That means it will be reported for the whole group not for individual persons.

**Voluntary participation:**

- Your participation in this study is voluntary.
- You can decide to stop at any time, even part-way through the interview for whatever reason.
- If you decide to stop participating, there will be no consequences to you.
- If you decide to stop we will ask you how you would like us to handle the data collected up to that point.
- This could include returning it to you, destroying it or using the data collected up to that point.
- If you do not want to answer some of the questions you do not have to, but you can still be in the study.
- If you have any questions about this study or would like more information you can email Blake Nicol at [blake.nicol@ubc.ca](mailto:blake.nicol@ubc.ca).

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail [RSIL@ors.ubc.ca](mailto:RSIL@ors.ubc.ca) or call toll free 1-877-822-8598.

I would be pleased to send you a short summary of the study results when I finish going over our results. Please let me know if you would like a summary and what would be the best way to get this to you.

**Consent questions:**

- Do you have any questions or would like any additional details?
- Do you agree to participate in this study knowing that you can withdraw at any point with no consequences to you?

## Appendix E: Interview Guide

Purpose	Questions
<b>ID Code &amp; Recording</b>	<p>Please confirm that you consent to having our conversation recorded.</p> <p>What are the first three letters of your mother's maiden name?</p>
<b>Background</b>	<p>What are the last two digits of your phone number?</p> <p>Can you describe your role at your organization?</p> <p>For you, what does a typical workday entail?</p> <p>Could you tell me about your intake process for someone who has experienced IPV?</p>
<b>Knowledge</b>	<p>What do you know about traumatic brain injuries?</p> <p>What do you know about screening clients for traumatic brain injuries? Where did you learn this from?</p> <p>Follow-up probes</p> <ul style="list-style-type: none"><li>- For whom should it be done for?</li><li>- When should it be done?</li><li>- What are your views towards it, why should it be done or why shouldn't it?</li></ul> <p>Can you describe any tools or resources that could help clients who have traumatic brain injuries?</p> <p>Follow-up probes</p> <ul style="list-style-type: none"><li>- What are they?</li><li>- How are they supposed to be used?</li><li>- When are they supposed to be used?</li><li>- If they can't describe any, why can't they?</li><li>- What other tools or resources do you use outside TBI screening – Do you do other types of health screening?</li></ul> <p>Before this study, were you aware of any recommendations or guidelines for screening for traumatic brain injuries?</p> <p>Follow-up probes</p> <ul style="list-style-type: none"><li>- What are they?</li><li>- When are they supposed to be used?</li><li>- For whom are they supposed to be used?</li><li>- If no, why not?</li></ul>
<b>Current Practices</b>	<p>Currently, we understand most organizations that support women who have experienced intimate partner violence do not have specific guidelines or policies about screening for traumatic brain injuries. We are interested in learning more about front-line staff's</p>

experience screening and assessing clients for TBIs. Our ultimate goal is to work with you to develop resources that help you screen and support clients with TBI.

Do you currently assess clients for TBIs when they visit your organization?

- If yes, how? If no, why not?
- If yes, how do you ensure you always assess clients?

If you suspect a client has a TBI, what types of resources or support do you provide?

- If no, ask why not?
- Why do you choose some resources over others?

## **Implementation Factors**

Tell me about any factors that might affect if or how you assess clients for TBI?

Follow-up probes

- Does your organization provide any guidelines on how to do so?

Screening for TBI generally includes assessing clients ability to speak, ability to open eyes, and ability to move. Based on what you have told me about the intake process, how/when would you be able to implement this process?

Can you describe any factors that would make it difficult to do this assessment for TBI?

Follow-up probes

- What problems have you encountered?
- What might help you to overcome these problems/difficulties?
- Why is it a problem

Can you describe situations that would make it easier for you to do this assessment for TBI?

Follow-up probes

- Why do you choose these over others?
- How would you ensure that you implement TBI assessment/screening?

Can you describe any factors that would make it difficult to provide resources for a client with TBI?

Follow up Probes

- What problems have you encountered?
- What might help you to overcome these problems/difficulties?
- Why is it a problem

Can you describe any factors that would make it easier to provide resources for a client with TBI?

#### Follow up Probes

- What problems have you encountered?
- What might help you to overcome these problems/difficulties?
- Why is it a problem

Is there anything your organization can do to help you assess clients for TBI?

### **Adapting Knowledge**

We are hoping to develop tools and resources that can help front-line workers assess clients for TBIs.

How would you like us to talk to front-line workers about IPV and TBI (e.g. language, jargon, terms)?

Do you have any initial thoughts about what kinds of tools you think might be helpful?

- What format do you prefer (online/text/email)?
- Who do you think should deliver this information (i.e. credible sources)?
- Would you like to learn about it? If so, how?

Can you give me any examples of practice change in the past?

### **Evaluation**

We would also like to evaluate the tools and resources we create. In your opinion, what would be the best way to know if these tools are working?

How and when would you like us to conduct the evaluation (e.g. interviews, online questionnaire, observations)?

### **Improving iKT methods**

Do you have any thoughts that you would like our research team to consider as this project progresses?

What do you think is the most important research priority related to IPV and TBI?

How could our research team best support organizations that serve women who have experienced intimate partner violence?

What is the best way to involve front-line workers in our research? What might stop front-line workers from getting involved?

**Additional thoughts  
and conclusions**

Do you have anything else you would like the research team to know?

Thank you so much for your time. Your responses will help our team to develop resources and tools to support organizations that serve women with IPV. We will be working with the Kelowna Women's Shelter, Ki-Low-Na Friendship Society, and Central Okanagan Elizabeth Fry Society to ensure the findings from this reach directly support your work.

Please do not hesitate to contact our team if you have any further questions or thoughts related to this project.

---