Battered and Brain Injured: Traumatic Brain Injury Among Women Survivors of Intimate Partner Violence—A Scoping Review

Halina (Lin) Haag1, Dayna Jones2, Tracey Joseph2, and Angela Colantonio2,*

Abstract

Objectives: The objective of this scoping review is to examine the extent, range, and nature of literature targeting health-care professionals on the prevalence and outcome of intimate partner violence (IPV)-related traumatic brain injury (TBI). The purpose is to gain an understanding of prevalence, investigate screening tool use, generate IPV/TBI-specific support recommendations, and identify suggestions for future research. Method: The review was guided by Arksey and O’Malley’s five stages for conducting a scoping review. A comprehensive search of nine databases revealed 1,739 articles. In total, 42 published research papers that focused specifically on TBI secondary to IPV were included in the study. Synthesis: The literature reports inconsistencies in prevalence rates from IPV-related TBI. There are no current standardized screening practices in use, though the literature calls for a specialized tool. Frontline professionals would benefit from education on signs and symptoms of IPV-related TBI. Empirical studies are needed to generate reliable data on prevalence, experience, and needs of brain-injured survivors of TBI. Conclusions: Findings from this study demonstrate the need for the development of an IPV-sensitive screening tool, more accurate data on prevalence, an interprofessional approach to care, and raised awareness and education on the diffuse symptoms of IPV-related TBI.

Keywords
traumatic brain injury (TBI), intimate partner violence (IPV), women’s health, scoping review

Traumatic brain injury (TBI) is a serious consequence of intimate partner violence (IPV) that is often overlooked or misdiagnosed (Corrigan, Wolfe, Mysiw, Jackson, & Bogner, 2003; St. Ivany & Schminkey, 2016). IPV-related TBI can have debilitating long-term effects on a survivor’s overall function and independence and may masquerade as a number of other physical, social, and mental health issues, preventing survivors from receiving appropriate intervention by health and community professionals (Iverson & Pagoda, 2015; Kwako et al., 2011). Research and guidance for professionals working in this community is limited, despite the resounding call throughout the literature for increased awareness of this population across diverse fields of practice, study, and sites of triage.

IPV encompasses physical, sexual, and emotional abuse, and controlling behaviors, inflicted by an intimate partner (World Health Organization [WHO], 2016). While sex workers are often excluded from this group, there are many shared experiences of violent encounters linked to intimate relationships between women exposed to IPV and sex workers (Bauermann et al., 2018; Farley, Banks, Ackerman, & Golding, 2018), as such, we have chosen to include sex workers in this review. The WHO estimates one in three women throughout the world will experience IPV in their lifetime (WHO, 2017). According to recent Canadian statistics, rates of self-reported spousal violence range from 4% to 8% across provinces (Statistics Canada, 2016). It is estimated that 42% of women survivors experience injury as a result of IPV (Statistics Canada, 2016). The most common injuries are from battery to the face, head, and neck, a pattern of violence leaving survivors vulnerable to TBI (Sheridan & Nash, 2007).

TBI is defined as “an alteration in brain function or other evidence of brain pathology, caused by an external force” such as a blow or injury to the head, severe rotation of the neck, and acceleration/deceleration movement (Menon, Schwab, Wright, & Maas, 2010, p. 1638). Classifications of severity are typically assessed through tests measuring loss of consciousness, post-traumatic amnesia, and postincident deficits. It is a leading
cause of disability worldwide and is more prevalent than breast cancer, spinal cord injury, HIV/AIDS, and multiple sclerosis combined (Haag et al., 2016). While brain injury caused by lack of oxygen through strangulation is technically classified as anoxic or hypoxic injury, resultant challenges closely resemble TBI and both conditions are treated in the same manner (Cullen & Weisz, 2011). As such, we, along with others, have chosen to include IPV-related strangulation injuries (Campbell et al., 2018; Kwako et al., 2011; St. Ivany & Schminkey, 2016; Valera & Kucyi, 2017; Valera et al., 2018).

TBI as a consequence of injuries in football, hockey, soccer, and military service are areas of increasing interest (Schneuer et al., 2018; St. Ivany & Schminkey, 2016; Zetterberg et al., 2018). Public awareness of the concussion crisis in sports and the military has increased, including the long-term effects of a condition found in athletes with a history of repeated brain trauma called chronic traumatic encephalopathy (CTE). However, notwithstanding the mechanism of injury, symptom sequelae, and prognosis of CTE being comparable, IPV-related TBI remains understudied, despite indications of increased prevalence rates (Goldin, Haag, & Trott, 2016; Kwako et al., 2011; St. Ivany & Schminkey, 2016; Valera et al., 2018).

Exposure to TBI through IPV tends to be long term in nature. Women are often exposed to repeated violent encounters before calling police, go through numerous attempts before permanently leaving an abuser, and are at the highest risk of being murdered when attempting to leave or report (Banks, 2007; Car, 2000). Repeated trauma to the head can cause brain tissue degeneration resulting in fatigue, depression and mood changes, memory loss, confusion, aggression, impaired judgment, and difficulty with everyday tasks and can lead to dementia and other chronic health conditions (Langlois, Rutland-Brown, & Wald, 2006). Women exposed to IPV are twice as likely to experience depression, and nearly twice as likely to have alcohol use disorders, compared to women who have not experienced IPV (WHO, 2017).

It is difficult to estimate the impact of this issue and provide appropriate care for survivors without adequate means to measure and understand the relationship between IPV and TBI. Whereas there are distinct bodies of literature examining IPV and TBI, respectively, relatively few studies directly address the correlation between them. While there are some excellent existing literature reviews exploring the link between IPV and TBI, which are informative and relevant in nature and content, they did not use systematic data collection nor do they cover the full scope of the literature available (Banks, 2007; Kwako et al., 2011; Murray, Lundgren, Olson, & Humncutt, 2016; St. Ivany & Schminkey, 2016). Since the last literature reviews available, there have been numerous additional studies published on IPV-related TBI. Therefore, we undertook this scoping review with the following objectives: (a) determine how the literature understands the relationship of IPV and TBI, (b) summarize prevalence of IPV-related TBI as reported in current literature, (c) determine what screening tools are being used to identify TBI in IPV survivors, (d) develop IPV/TBI support recommendations for health-care professionals and support personnel, and (e) identify suggestions for future research.

Method

Scoping review methodology (Arksey & O’Malley, 2005; Levac, Colquhoun, & O’Brien, 2010) is used to collect all relevant studies and determine whether a full systematic review is warranted when the scope of existing literature is known to be limited. The systematic nature of this approach to sampling ensures that the search is repeatable and comprehensive, while identifying gaps in knowledge and areas of future study (Arksey & O’Malley, 2005). Although the authors acknowledge that IPV takes many forms and affects other related populations, the study focused on IPV-related TBI in women, addressing a previously identified need to highlight gender differences and complications unique to women and TBI (Haag et al., 2016).

The study followed five major steps of scoping review as outlined by Levac, Colquhoun, and O’Brien (2010): (a) identify the research question, (b) identify relevant studies, (c) select studies, (d) chart data, and (e) collate, summarize, and report the results. Our preliminary search for data was guided by the following research question: To what extent does health-care literature recognize the correlative relationship of TBI and IPV?

The search strategy was designed in consultation with an expert librarian. Nine major health science databases were searched: OVID Medline, Cochrane, CINAHL, EBSCO, Embase, ASSIA, PsycINFO, Scopus, and Web of Science. To qualify for inclusion, each article was required to be peer reviewed, available in English, and explicitly address the intersection of TBI and IPV. In an effort to draw all relevant literature, our search was delimited by time frame. Articles selected corresponded with a paired combination of the following two key word categories:

- domestic violence, spousal abuse, intimate partner violence (IPV), interpersonal violence, battered women, intimate violence,
- traumatic brain injury (TBI), concussion, head injury, post-concussion syndrome, strangulation, choking, face injury, neck injury

An additional manual search was conducted from the reference lists of each included study. The research team developed specific inclusion and exclusion criteria and a three-stage process was completed to identify all relevant articles. In the first stage, two researchers independently completed an initial title review and articles were included based on appropriateness of the title. In the case consensus could not be reached, a third author was consulted and/or it was included in the abstract review. Articles were primarily excluded because they (a) lacked relevance to TBI and IPV, (b) focused on children, (c) addressed IPV or TBI as distinct or unrelated, or (d) emphasized the perpetrator role. Once the title review was completed,
an abstract review was done following the same procedures, and then, full consideration of each remaining article, to determine final suitability for inclusion.

**Results**

The initial search returned 1,739 articles and, with the addition of a hand search by three authors, 42 articles were included in the final sample. Three researchers independently extracted data and compared findings to ensure consistency, using a charting form to organize key variables. The extracted data were then organized into the following four key domains: (a) estimates of prevalence, (b) screening tools and identification procedures for IPV-related TBI, (c) recommendations for health-care professionals, and (d) recommendations for future research. The results provided below are organized into these domains for clarity of reporting. Article summaries reporting original research are listed in Table 1. Literature reviews, editorials, and invited commentary are reported in Table 2.

**Estimates and Reports of Prevalence**

Empirical studies reported original prevalence data figures of IPV-related TBI ranging from 19% (Iverson, Dardis, & Pogoda, 2017) to 75% (Valera et al., 2018) and as high as 100% in studies that included only survivors who reported injuries to the head (Roberts & Kim, 2005; St. Ivany et al., 2018a), itemized by study in Table 1. Diagnostic criteria for TBI-related IPV focused on positive history of physical blows to the head, face, and neck, altered or lost consciousness, TBI symptom sequelae, or a combination of these elements. For example, in one study, 100% of the respondents were positive for both history and lasting TBI symptoms (Roberts & Kim, 2005), while another study reported 92% of respondents had a positive history of blows to the head with 40% losing consciousness (Jackson, Philip, Nuttal, & Diller, 2002). In both cases, a TBI diagnosis was inferred. Studies also referred to IPV-related TBI by a number of different words including TBI, mild TBI, head injury, and concussion, so a positive screen may be named in different ways based on different criteria. History of physical violence to the head, face, and neck was found in anywhere from 35% to 100% (Monohan & O’Leary, 1999; Roberts & Kim, 2005) of respondents in this sample. Estimates of lost consciousness during episodes of physical violence were reported to range from 30% to 81% (Corrigan et al., 2003). One study distinguished between single and multiple episodes of violence resulting in TBI, 100% and 75%, respectively, with strangulation in 25% of these cases (Valera & Kucyi, 2017). Population types included shelter populations (Gutman et al., 2004; Jackson et al., 2002; Monohan & O’Leary, 1999; Roberts & Kim, 2005; Valera & Berenbaum, 2003; Valera & Kucyi, 2017), emergency department and hospital users (Corrigan et al., 2003), survivors in contact with law enforcement (Gagnon & DePrince, 2017), women seeking services in non-IPV specific health-care clinics (Anderson, Stockman, Sabri, Campbell, & Campbell, 2015; Campbell et al., 2018), sex workers (Baumann et al., 2018; Farley et al., 2018), and veterans (Iverson et al., 2017; Iverson & Pogoda, 2015). Many studies recruited for participants who were undiagnosed but suspected of TBI, some selected only on history of IPV, and others were included based on known TBI diagnosis, which may contribute to the variance of reported rates of prevalence.

A number of nonsystematic literature reviews and editorials were also included. Most reported statistics from empirical studies mentioned above. One study combined empirical data and extrapolations from studies concluding that 30–74% of women exposed to IPV and reporting to emergency departments may have an undiagnosed TBI (Kwako et al., 2011).

**Screening Tools and Identification Procedures for IPV-Related TBI**

While there are currently no validated tools designed specifically to detect IPV-related TBI, two have been developed by researchers (Ackerman & Banks, 2002; Valera & Berenbaum, 2003), and the HELPS tool has been adapted for use in an IPV context. A recent study examining existing TBI screening tools found that the Ohio State University TBI-Identification Method (OSU-TBI-ID) and the Brain Injury Screening Questionnaire were the two most adaptable for this specialized population as they met the following criteria set out by the authors:

1. include prompts relevant to the events that can result in TBI in this population;
2. allow for safe and private endorsement of an event;
3. offer ease of administration by IPV knowledgeable staff without the need for special training in TBI. (Goldin et al., 2016, pp. 2–3)

Reflecting this gap, many different options were present in the studies reviewed. Four studies used the original HELPS Brain Injury Screening Tool, developed by head trauma specialists for use by individuals without a neurology background (Gagnon & DePrince, 2017; Hux, Schneider, & Bennett, 2009; Jackson et al., 2002; Zieman, Bridwell, & Cardenas, 2017). The OSU-TBI-ID was used by Baumann and colleagues (2018), while Iverson and colleagues (2017, 2015) used the Modified Veterans Affairs TBI Screening Tool. Other tools included TBI-specific measures, magnetic resonance imaging, neuropsychological batteries, and mood or trauma measures. Self-report demographics and history as well as clinical observation were also frequently used.

**Recommendations for Frontline Professionals**

The onus of screening, assessment, and triage for IPV largely falls on frontline professionals in health-care and community contexts. As early screening and intervention can lead to improved outcomes, routine screening for TBI when IPV is disclosed or suspected was encouraged by a number of authors (Ackerman & Banks, 2009; Amoroso & Iverson, 2017; Baumann et al., 2018; Campbell et al., 2018; Corrigan et al., 2003; Davis, 2014; Farley et al., 2018; Iverson et al., 2017; Iverson &
| Article                          | Purpose                                                                 | Study Design/Population                                                                 | Key Findings                                                                 | Screening/Intervention Methods Used                                      | Recommendations for Health Professionals                                | Recommendations for Future Research                        |
|--------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------|
| Monohan and O'Leary (1999) USA | Call attention to IPV-related TBI and how social workers can intervene | Descriptive 26 residents of domestic violence shelter                                   | 35% of battered women experienced head injury during battering incident     | Demographic self-report Assessment of depression self-report Medical history self-report Interview questions related to head trauma Extensive clinical observation | Awareness that battered women rarely report abuse may present as normal or near normal on neuropsychological testing Increase training of shelter workers to screen Advocacy for assessment and medical care by social workers | Use neurological assessment and standardized instruments Compare to control group, community sample of battered women |
| Jackson, Philip, Nuttall, and Diller (2002) USA | Establish IPV/TBI correlation and illustrate need for appropriate screening and intervention | Descriptive 53 women attending support groups at three battered women's shelters and four community support programs | 92% reported having received blows to the head 40% reported loss of consciousness 77% report symptoms consistent with post-concussive symptom(PCS) | HELPS Brain Injury Screening Tool | Routine screening Attend to history of repetitive assaults to head and face Neuropsychological testing Interventions for cognitive, affective, and social impairments Psychosocial and rehabilitation treatment Prescribe medications with caution | Examine effectiveness of psychotherapy in mTBI Develop treatment strategies specific to IPV-related TBI Diverse samples and comparison groups Neurological testing Longitudinal studies considering long-term implications |
| Corrigan, Wolfe, Mysiw, Jackson, and Bogner (2003) USA | Estimate incidence of IPV-related TBI, identify barriers to identification and intervention and report on impact and consequences | Observational 51 emergency department users | 35% were identified as potentially having sustained mTBI 30% reported loss of consciousness 67% report residual problems | Brief survey used during focused interview administered by domestic violence staff | Early evaluation of IPV survivors to identify TBI Prevention of subsequent episodes of TBI | Long-term neurobehavioural and vocational consequences of mTBI Address identified methodological challenges Study designs capable of elucidating relationship between number and nature of brain injuries, severity of partner abuse, and cognitive functioning including longitudinal studies and control groups Use of reliable information on past TBI not reliant on self-report Impact on women's functioning Prevalence rates |
| Valera and Berenbaum (2003) USA | Examine if battered women are sustaining TBI and whether such TBIs are associated with abuse severity, cognitive functioning, or psychopathology | Descriptive 99 shelter and nonshelter women exposed to IPV | 74% sustained brain injury from their partner 50% sustained multiple brain injuries TBIs not restricted to shelter population TBI associated with diminished cognitive abilities TBI associated with psychopathology | Conflict Tactics Scale Severity of Violence Against Women Scale Semi-structured Interview Neuropsychological battery PTSD Checklist-5 (PCL-5) Mood and Anxiety Symptom Questionnaire The Penn State Worry Questionnaire Modified Psychoactive Substance Use model | Increased awareness of potential dangers of physically abusive relationships Professionals to learn more about potential effects of brain injury and choking mTBI can be present without any abnormal signs revealed by imaging or neurological examination | (continued) |
| Article | Purpose | Study Design/Population | Key Findings | Screening/Intervention Methods Used | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|-------------------------|--------------|-------------------------------------|------------------------------------------|-------------------------------------|
| Gutman et al. (2004) USA | Assessment of an intervention for cognitive deficits following IPV-related TBI | Quasi-experimental 26 women with past or present IPV exposure | 81% indicated achieving their most favorable outcome postintervention | Intervention addressed cognitive-deficit remediation to support abuse-free living Goal Attainment Scale | Shift of health-care paradigm of treating this population as psychiatric patients to address cognitive deficits of brain damage | Epidemiological studies to determine prevalence rates Develop and assess treatment for resultant cognitive impairment |
| Roberts and Kim (2005) USA | Examine link between chronic woman battering and head injuries | Qualitative 52 participants randomly selected from a larger exploratory study of 160 chronically battered women which was completed by the first author | 100% cases reported injury to the head, face, and neck, and symptoms of mTBI 61% contacted police following worst incidence of violence 38% did not call police or get medical care despite injury severity | Semi-structured interviews | Interprofessional recognition of TBI that may present as mental disorder Computed tomography/ neuropsychological tests Biopsychosocial assessment Standardized screening Evidence-based intervention checklist Consent to photograph form and digital camera for documenting injuries | Use variety of data sets from National Crime Victimization Survey and quality assurance records at large medical centers |
| Hux, Schneider, and Bennett (2009) USA | Document TBI prevalence among high risk populations including IPV survivors | 1999 participants in a Midwest state requesting services from any of four organizations in a 6-month period | 27% positive for possible history of TBI overall 52% positive for possible TBI in IPV-specific sample | HELPS Brain Injury Screening Tool | Interprofessional workers need accurate information about TBI and its educational, vocational, cognitive, social, emotional, and physical implications | N/A |
| Linton and Kim (2014) USA | Understand demographic characteristics of people who experience violence-resultant TBI | Secondary data analysis of the Arizona Trauma Database consisting of 18 868 cases of TBI between 2008 and 2010 | Native Americans and Blacks more likely to experience violent TBI Females, children, and older adults have significantly lower odds of violent TBI | Self-report demographics Medical professional report of etiology | Awareness among professionals of TBI differences among Native Americans and Blacks Encourage patients that experience blunt traumas to receive assessments and treatment for TBI | Data on reasons for blunt trauma Explore factors associated with violent TBI such as perpetrators of traumas, socioeconomic status among Native Americans and Blacks across the life span |
| Article                     | Purpose                                                                 | Study Design/Population                                      | Key Findings                                                                 | Screening/Intervention Methods Used                                                                 | Recommendations for Health Professionals                                           | Recommendations for Future Research                      |
|-----------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------|
| Anderson, Stockman, Sabri, Campbell, and Campbell (2015) USA | Examine the prevalence of injury (including head injury) in African American and Caribbean women who reported IPV | Multisite, case-control study 738 Women between the ages of 18 and 55 years who self-identified as being of African descent | 380 women reported experiencing IPV or sexual violence in the last 2 years Head injuries with loss of consciousness were 7.21 times more likely in women reporting recent IPV than in those who not report recent IPV | Abuse Assessment Screen Miller Abuse Physical Symptoms and Injury Scale (MAPSAIS) Women’s Experiences of Battering Scale, Danger Assessment, and Severity of Violence Against Women Scale | Women seen in emergency departments with injuries to the head, face, and neck or alterations in consciousness or memory should be considered high risk of IPV and screened in a safe location Standardized IPV screening in hospital settings Continued education for health-care providers in screening, brief intervention, and referral | Develop and test easy to implement hospital and emergency department-based IPV screening and interventions Computer-based methods for screening and referrals |
| Iverson and Pogoda (2015) USA | Identify occurrence and impact of IPV-related TBI in sample of women veterans | Cross-sectional mail survey 176 women veterans | 19% with IPV-related TBI history Increase in depression/PTSD | Modified Veterans Affairs Screening Tool | Routine screening for women for IPV Further screen for IPV-related TBI Preventive efforts should be made by educators, elders, and leaders in Native American communities | Health consequences of IPV including exposure to multiple concussions Longitudinal studies Collaborate with hospitals to collect primary data about IPV and suspected IPV cases not reported by patients Address association of Native Americans, interpersonal violence, and TBI using national data with larger samples |
| Linton (2015) USA | Assess odds of experiencing TBI as a result of interpersonal violence among Native Americans | Secondary data analysis of Arizona Trauma Database of 18,944 cases of TBI in Arizona State 2008–2010 | Native Americans or other race category patients, females, and those who were insured had higher odds of experiencing interpersonal violence-related TBI | Self-report demographics Medical professional report of etiology | | |
| Gagnon and DePrince (2017) USA | Screening for lifetime exposure to TBI among women recently exposed to IPV | 225 women whose IPV experiences were reported to law enforcement | 80% reported lifetime head injury 56% screened positive for mTBI 13% reported injuries to the head during the recent target IPV incident | Demographics HELPS Brain Injury Screening Tool Revised Conflict Tactics Scale | Screening for TBI and PCS should occur at diverse points (e.g., mental health, community-based, criminal justice services) Refer for neuropsychological evaluation and/or appropriate treatment Awareness of cognitive changes associated with TBI | Longitudinal studies to examine prevalence, duration, and course of head injuries and symptoms Neurological/cognitive impact of head injuries on women who have experienced IPV Advance interventions for survivors of IPV with head injuries |
| Article | Purpose | Study Design/Population | Key Findings | Screening/Intervention Methods Used | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|-------------------------|--------------|-------------------------------------|------------------------------------------|-------------------------------------|
| Iverson, Dardis, and Pogoda (2017) USA | Identify occurrence of IPV-related TBI and associated PTSD symptoms among young women veterans | Web-based survey of national sample of 224 U.S. women veterans | IPV-related TBI history: 28% | 30-min anonymous web survey Modified Veterans Affairs Screening Tool Modified HARK Tool PTSD Checklist-5 (PCL-5) | Screening and assessment of both TBI and PTSD | Examine a range of physical and mental health needs to inform clinical practice, with emphasis on depressive symptoms Longitudinal studies examining contextual variables (timing and # of TBIs, health-care utilization) Account for array of etiologies and symptoms of TBI in women veterans |
| Linton and Perrin (2017) USA | Assess effects of substance use at the time of violent TBI on injury severity and potential mediations by interpersonal violence etiology, BAC, and American Indian race | Secondary data analysis of Arizona Trauma Database of 3,351 cases of violence-related TBI in Arizona State 2008–2010 | American Indians with TBI were more likely to experience interpersonal violence and had significantly higher blood alcohol content (BAC) level than other racial groups. | Self-report demographics Medical professional report of etiology Injury Severity Score Abbreviated Injury Scale Toxicology results/BAC level | IPV survivors may have more severe forms of TBI Interprofessional education on IPV-TBI to be equipped to identify and obtain resources for survivors Violence prevention strategies should include TBI information Interprofessional consideration of TBI-related cognitive sequelae in context of IPV interventions Neuropsychological assessment Consider neuroimaging of IPV-specific neurorehabilitation |
| Valera and Kucyi (2017) USA | Examination of brain-network organization associated with TBI and its cognitive effects | Retrospective 20 women recruited from women’s shelters, domestic violence programs, and word of mouth | 100% reported at least 1 IPV-related TBI 75% reported multiple TBIs 30% reported anoxic or hypoxic effects of strangulation | Semistructured interviews Rivermead Post-Concussion Symptoms Questionnaire Neuropsychological battery Conflict Tactics Scale Mood and Anxiety Symptom Questionnaire Clinician Applied PTSD Scale IV Childhood Trauma Questionnaire magnetic resonance imaging | Improved identification, education, and medical treatment for survivors Better understanding of injuries by interprofessional care providers |
| Zieman, Bridwell, and Cardenas (2017) USA | Improve understanding of TBI as a result of domestic violence to improve care for this population | Retrospective chart review of 115 patients with IPV-related TBI at subspecialty TBI clinic | 88% reported multiple injuries 81% reported loss of consciousness 21% sought medical help | HELPS Brain Injury Screening Tool | N/A |
| Article | Purpose | Study Design/Population | Key Findings | Screening/Intervention Methods Used | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|-------------------------|--------------|-----------------------------------|------------------------------------------|-------------------------------------|
| Baumann et al. (2018) CANADA | Understand experiences of violence and head injury of women and transgender women sex workers | Mixed method-study 10 participants recruited from Elizabeth Fry Toronto | 90% report at least one lifetime TBI 100% report at least 1 head injury related to violence in sex work Participants report widespread stigma and discrimination as barriers to care | Qualitative semi-structured interview protocol Ohio State University TBI Identification Method (OSU TBI-ID) | Screen for TBI Need to educate sex workers on TBI Provide culturally safe care Peer-support programs may improve outcomes Anti-oppressive education for service providers | Prevalence numbers are needed Appropriate screening tool required Compare ways to elicit stories of violence and head injury during screening (e.g., standardized vs. storytelling) More investigation of TBI in transgendered women and men sex workers |
| Campbell et al. (2018) USA | Examine prevalence of and associations between reported probable TBI and central nervous system (CNS) symptoms | Convenience sample of 901 women (543 IPV cases and 358 non-IPV controls) of African descent from outpatient non-IPV clinics in Baltimore MD and the U.S. Virgin Islands | 50% of IPV sample reported probable TBI Women with IPV and probable TBI more likely to report CNS symptoms | Abuse Assessment Screen MAPSAIS Primary Care-PTSD Screen Center for Epidemiologic Studies Depression Scale-10 | Screening in nonacute settings as well as across medical settings Education needed for frontline staff in support organizations | Development of appropriate screening tools is critical Risk/benefit analysis of screening needed Development of treatment protocols for various health care and IPV settings is needed |
| Farley, Banks, Ackerman, and Golding (2018) USA & Canada | Estimate the prevalence and demographic correlates of TBI in women and transwomen sex workers | Qualitative focus groups Survey with statistical analysis Sample of 65 sex workers | 95% report lifetime injuries to the head of which 65% sustained injury during prostitution 38% who report head injury during prostitution also report childhood head injury 88% report injuries severe enough to warrant urgent medical treatment and 63% of those received care | Questionnaire developed by the authors to elicit information regarding occurrence of head injuries, symptoms experienced, and health consequences Broad focus group discussions included TBI information, violence-related injuries, general health information, and referrals | Screening for head injury and TBI recommended for this population Health-care professionals have opportunity for intervention Treatment for pain and/or sleep disturbance may be beneficial Accurate diagnosis, particularly between TBI and PTSD, is critical to inform treatment path | Larger samples Inquiry to include questions regarding length of time in prostitution, locations where prostitution occurred, and locations where violence occurred Further investigation into childhood TBI and the possible relationship with sex work and adult TBI More research into PTSD and TBI and how to recognize each from the other is necessary |
| Article | Purpose | Study Design/Population | Key Findings | Screening/Intervention Methods Used | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|------------------------|--------------|-------------------------------------|------------------------------------------|-------------------------------------|
| St. Ivany et al. (2018a) USA | Expand knowledge of the impact of IPV/TBI on women’s lives | Qualitative design, purposive and snowball sampling (n = 19) | 100% of sample reported a TBI previous to first IPV event | Positive response to DOVE questionnaire: “Have you ever passed out from being hit in the head by your partner?” | Women at high risk of IPV-related TBI should be screened for depression | Long-term effects of IPV-related TBI |
| St. Ivany, Kools, Sharps, and Bullock (2018b) USA | Understand the social context of the lives of women who experienced a head injury from IPV | Qualitative method, 21 interviews from 9 participants in the DOVE program | Instability related to cycles of incarceration, drug/alcohol use & fear of losing their children | Self-report loss of consciousness from hits to the head during IPV | Routine TBI screening of women experiencing IPV should be implemented | Need to explore relationship between TBI and psychological abuse |
| Valera et al. (2018) USA | Increase understanding of neural mechanisms underlying mild TBI and cognitive functioning in women experiencing IPV using diffusion MRI | 20 women recruited from women’s shelters, domestic violence programs, and word of mouth | Demonstrate associations between white matter microstructure and IPV-related TBI | Semi-structured Interviews, Neuropsychological battery, Conflict Tactics Scale, Mood and Anxiety Symptom Questionnaire, Clinician Administered PTSD Scale IV, Childhood Trauma Questionnaire, Diffusion MRI Imaging | Increase awareness of implications of mild TBI on cognitive functions | Further research needed with a larger sample to see if relationship between white matter diffusion anisotropy and IPV-resultant mild TBI still exists |

Note: IPV = intimate partner violence; TBI = traumatic brain injury; mTBI = mild traumatic brain injury; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders; DOVE Program = Domestic Violence Home Visitation study; CAPS-2 = Clinician-Administered PTSD Scale for DSM-IV.
| Article | Purpose | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|------------------------------------------|-----------------------------------|
| Banks and Ackerman (2002) USA | Raise awareness of specific challenges faced by African American women experiencing IPV/TBI | • Neuropsychological assessments for Black women experiencing IPV | N/A |
| Ackerman and Banks (2003) USA | Overview of two treatment modalities for mild traumatic brain injury (mTBI) | • Psychotherapy should be TBI informed | N/A |
| Plichta (2004) USA | Review of research findings on IPV and women’s physical health and use of health services | • Psychotherapists should determine if clients have sustained head injury and assess neuropsychological status | Longitudinal studies needed to explain how violence is related to disability, TBI, substance use, unmet needs for care |
| Stern (2004) USA | Invited commentary | • Use of biofeedback as adjunct to feminist psychotherapy | Interprofessional approaches to care |
| Banks (2007) USA | Review IPV-related injury literature and examines research on equivalent injuries sustained by athletes | • Universal screening for IPV | Longitudinal studies on survivors with and without TBI IPV/TBI integrated into education of health-care professionals |
| Ackerman and Banks (2009) USA | Overview of types of injuries sustained by IPV survivors and discussion on need for accurate assessment and appropriate treatment | • TBI screening and evaluation should be standard in IPV contexts (IPV/TBI screen tool developed by authors) | Outcome studies to determine effectiveness of culturally relevant neuropsychological rehab |
| Kwako et al. (2011) USA | Highlight gaps in current findings related to neuropsychological complications and medical and psychosocial symptoms, societal costs of failing to acknowledge association of IPV and TBI in women | • Refer for neuropsychological assessment and care | Specific focus on reduction of murder rates |
| Davis (2014) USA | Examine relationship between mTBI and cognitive, emotional, and psychological disorders in women exposed to violence and raise awareness of the issue | • Increase awareness of mTBI-related triad of disorders, including post-concussion syndrome, depression, and acute stress disorder leading to post-traumatic stress disorder (PTSD) in women survivors of violence | Encourage interdisciplinary approaches |
| | | • Support for IPV screening in health-care settings | |
| | | • Support for TBI screening in IPV settings | |
| | | | Need to develop an appropriate IPV/mTBI screening tool for use in variety of settings may need to make them location/purpose specific depending on population being screened |

(continued)
| Article | Purpose | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|------------------------------------------|-----------------------------------|
| **Wong and Mellor (2014)** Australia | Explore prevalence of health consequences related to IPV including TBI | • Nurse recognition of IPV and physical and mental health outcomes, cultural implications, association with child sexual abuse, decision of women to stay in IPV relationship | Investigate how different types of IPV might interact with other social and psychological factors to predict health outcomes |
| **Wong, Fong, Lai, and Tiwari (2014)** Hong Kong | Establish neurological impact and cognitive dysfunction connection in women with history of IPV | • Train interprofessional workers re: Brain function and assessment of neurological functioning, acquire skills of caring for women with neurological or neuropsychological damage | Gain scientific evidence of impacts of IPV through neuroimaging studies to provide relevant information to develop cost-effective interventions for women survivors of IPV |
| **Goldin, Haag, and Trott (2016)** USA | Propose framework for screening for history of TBI in women exposed to IPV, investigate applicability of TBI-screening instruments | • Neuroimaging recommended | Empirical evaluation of proposed criteria Development/refinement and validation of brain injury screening tools for IPV-related TBI | Empirical development of uniform screening guidelines |
| **Murray, Lundgren, Olson, and Hunnicutt (2016)** USA | Consolidate current research and present guidelines for professionals working with clients who may have IPV-related TBI | • No screening tools meet full criteria | Revise recommendations to promote best practice as new information emerges |
| **St. Ivany and Schminkey (2016)** USA | Raise awareness of IPV/TBI link to provide appropriate treatment and improve health of women and families | • Recommends Brain Injury Screening Questionnaire and OSU TBI-ID as tools best suited to detect IPV-related TBI, particularly if modified | Reliable and valid screening tool More research to understand the prevalence |
| **Amoroso and Iverson (2017)** USA | Acknowledge additional and nondeployment risk factors for TBI such as IPV for women service members and increase awareness and knowledge of TBI among women veterans | • TBI education and screening required in IPV settings | Evaluate potentially additive effects of TBI in women veterans and increase women in chronic traumatic encephalopathy (CTE) research | Increased data on unique effects of IPV that can exacerbate and prolong post-concussion symptoms and/or complicate and delay recovery |

*(continued)*
Some authors also emphasized the need for increased training for workers around identification of TBI in IPV survivors and its effects (Ackerman & Banks, 2009; Anderson et al., 2015; Baumann et al., 2018; Farley et al., 2018; Hux et al., 2009; Kwako et al., 2011; Linton & Perrin, 2017; Wong, Fong, Lai, & Tiwari, 2014). Recommendations for training included administering standardized assessments, responding to positive screens, differentiating TBI symptoms from related comorbidities, and neurological from psychiatric.

Several studies advocated for improved awareness of the intricacies of this unique population (Amoroso & Iverson, 2017; Hunnicutt, Lundgren, Murray, & Olson, 2017; Hux et al., 2009; Linton & Kim, 2014; Monohan & O’Leary, 1999; Roberts & Kim, 2005; Stern, 2004; St. Ivany & Schminkey, 2016; Valera & Berenbaum, 2003; Valera & Kucyi, 2017; Wong & Mellor, 2014; Zieman et al., 2016). Examples included awareness of IPV and its associated dangers, IPV survivors rarely reporting without being asked, and IPV-related TBI presenting as mental health and/or addictions issues. Even when neuropsychological testing is completed appropriately, it is possible survivors with IPV-related TBI may present as normal or near normal (Monohan & O’Leary, 1999; Valera & Berenbaum, 2003). Support approaches should include referral for assessment and/or external programs for clients who screen positive or are suspected of TBI (Banks, 2007; Campbell et al., 2018; Iverson & Pogoda, 2015; Jackson et al., 2002).

### Table 2. (continued)

| Article | Purpose | Recommendations for Health Professionals | Recommendations for Future Research |
|---------|---------|------------------------------------------|-----------------------------------|
| Foushee (2017) USA | Role of medical imaging professionals with IPV-related concussion injuries | Recommends taking detailed history including TBI-specific questions | Determine if TBI causes long-term challenges |
| Hunnicutt, Lundgren, Murray, and Olson (2017) USA | Consider relationship of IPV and TBI, difficulty in detecting and measuring, ethical concerns | • Identification of IPV-related TBI and integration into clinical practice<br>• Interprofessional workers to be sensitive to complicated terrain of IPV-related TBI in diverse environmental contexts | Assess for TBI in IPV survivor studies<br>Study developmental trajectory of IPV-related TBI<br>Examine symptom patterns and practice implications for different severity levels<br>Examine challenges in daily life for survivors<br>Examine sociodemographic variables<br>IPV/TBI training and education in schools of social work |
| Monohan (2018) USA | Invited commentary | | |
| Smith and Holmes (2018) USA | Overview of IPV/TBI intersection and provide suggestions for counselors treating IPV survivors | • Ask questions to elicit information re head injury and strangulation and if present, discuss TBI and importance of being assessed<br>• Safety planning should include brain safety<br>• Self-education re IPV-related TBI<br>• Recommends initial TBI screening | N/A<br>• Incorporate TBI and PTSD-specific trauma-informed therapy approach<br>• IPV/TBI education among researchers, medical professionals, psychologists, IPV advocates, law enforcement, and judicial personnel is recommended<br>• Systematic studies examining health outcomes of TBI in women exposed to IPV are needed |
| Valera (2018) USA | Invited commentary | | |
| Valera, Campbell, Gill, and Iverson (2019) USA | Summarize existing research focusing on women in shelters or primary care, from the community and veterans | • Screening should be done in IPV settings<br>• TBI conscious risk and safety planning<br>• IPV-related TBI education for health-care and frontline workers<br>• Raise awareness of TBI among IPV survivors | Larger samples with broader range of neuropsychological and neuroimaging measures<br>Blood-based biomarkers<br>Long-term health considerations such as Alzheimer’s Disease, dementia, and CTE<br>Better understanding of short- and long-term consequences of IPV-related TBI |

Note. IPV = intimate partner violence; TBI = traumatic brain injury; ER = emergency room.
Some authors cited the need for health professionals to support safety planning in an effort to reduce subsequent and repetitive assaults that may have a cumulative effect on the brain (Corrigan et al., 2003; Jackson et al., 2002; Banks, 2007). Suggestions for practice included provision of transportation vouchers to aid women in finding emergency shelter and support and keeping emergency hospital or security staff in view and/or accessible at all times (Roberts & Kim, 2005). Health professionals are encouraged to maintain quality documentation and use an interprofessional approach, providing services for community reintegration and follow-up counseling in a healthy and safe atmosphere (Banks, 2007; Davis, 2014; Murray et al., 2016; Roberts & Kim, 2005; Sheridan & Nash, 2007; St. Ivy & Schminkey, 2016). Authors indicated that workers should gain competence in addressing the physical, cognitive, and psychosocial factors that may influence the experience, function, and recovery of IPV-related TBI rather than focusing purely on a medical model (Davis, 2014; Farley et al., 2018; Gutman et al., 2004; Jackson et al., 2002; Murray et al., 2016; Roberts & Kim, 2005; St. Ivy & Schminkey, 2018a).

Health-care professionals who suspect or are aware of IPV should anticipate a TBI outcome, remaining cognizant that survivors tend to report psychosomatic symptoms of abuse such as headaches, fatigue, nausea, memory issues, cognitive changes, or dizziness rather than the violence itself (Monohan & O’Leary, 1999; St. Ivy & Schminkey, 2016; St. Ivy et al., 2018a, 2018b; Valera et al., 2018). Physical symptoms include headaches, fatigue, sleep disturbances, vertigo, and pain, while cognitive symptoms affect attention, concentration, and executive functioning, suggesting interventions should serve to strengthen the capacity of the survivor to process and interpret information (Corrigan et al., 2003; Jackson et al., 2002; Murray et al., 2016; Valera & Berenbaum, 2003; Valera et al., 2018).

Some studies noted that health professionals should seek education on patterns of brain function and dysfunction, as medical treatment and intervention for TBI may be different and more varied than a psychiatric disorder (Banks, 2007; Farley et al., 2018; Gagnon & DePrince, 2017; Gutman et al., 2004; Roberts & Kim, 2005; Valera & Kucyi, 2017; Valera et al., 2018; Zieman et al., 2017). Recommended psychosocial interventions included providing support and reassurance to survivors and facilitating development of important skills such as problem-solving, self-esteem, and coping strategies (Banks, 2007). The need to reduce the experience of isolation and for education on available resources was also emphasized (Jackson et al., 2002; St. Ivy & Schminkey, 2016). Other educational topics identified included information on the effects of head injuries, monitoring worsening symptoms, and encouraging health-promoting behaviors (Corrigan et al., 2003; Jackson et al., 2002; Murray et al., 2016).

**Recommendations for Future Research**

The literature highlighted key recommendations for future research that would advance this field of study while also improving frontline approaches to care. Many authors cited the need to establish a reliable, valid, and standardized screening tool to identify TBI in survivors of IPV (Anderson et al., 2015; Baumann et al., 2018; Campbell et al., 2018; Corrigan et al., 2003; Davis, 2014; Goldin et al., 2016; Iverson & Pogoda, 2015; Kwako et al., 2011; Monohan & O’Leary, 1999; St. Ivy & Schminkey, 2016; St. Ivy et al., 2018b; Valera & Berenbaum, 2003). A population-specific tool may inform triage and eventual outcomes for survivors while also contributing more accurate estimates of prevalence to the literature (Davis, 2014). A few studies demonstrated the potential value of neuroimaging in research and diagnosis of IPV-related TBI (Valera & Kucyi, 2017; Valera et al., 2018; Wong et al., 2014).

Several called for research on the long-term effects of IPV-related TBI (Amoroso & Iverson, 2017; Corrigan et al., 2003; Foushee, 2017; Gagnon & DePrince, 2017; Hunicutt et al., 2017; Iverson et al., 2017; Kwako et al., 2011; Plichta, 2004; Stern, 2004; St. Ivy et al., 2018a; Valera & Berenbaum, 2003; Valera et al., 2018; Wong & Mellor, 2014). Evaluation of effectiveness of specific interventions in this population to guide practice was also discussed (Banks, 2007; Baumann et al., 2018; Gutman et al., 2004; Jackson et al., 2002; Wong & Mellor, 2014).

The literature called for researchers to address methodological problems including sample size, population, and generalizability. Authors specifically noted the need for larger population samples and/or inclusion of control groups (Farley et al., 2018; Linton, 2015; Linton & Perrin, 2017; Monohan & O’Leary, 1999; Roberts & Kim, 2005; Valera & Berenbaum, 2003; Valera et al., 2018), longitudinal studies (Gagnon & DePrince, 2017; Iverson et al., 2017; Stern, 2004; Wong & Mellor, 2014; Valera et al., 2018), and more reliable information on past incidences of IPV-related TBI than self-report (Linton, 2015; Valera & Berenbaum, 2003).

Further epidemiological study into the incidence of IPV-related TBI was recommended (Baumann et al., 2018; Gagnon & DePrince, 2017; Gutman et al., 2004; St. Ivy & Schminkey, 2016). Documentation of the chronicity and acuity of these injuries is needed (Amoroso & Iverson, 2017; Farley et al., 2018; Foushee, 2017; Gagnon & DePrince, 2017; Hunicutt et al., 2017; Iverson et al., 2017; Kwako et al., 2011; Linton & Perrin, 2017; St. Ivy et al., 2018a, 2018b; Valera et al., 2018; Wong et al., 2014), as well as inquiry into the causal influences and reasons for blunt trauma (Linton & Kim, 2014). A few authors noted a possible relationship between childhood TBI and subsequent involvement in violent relationships, suggesting further research may provide insight into prevention as well as treatment (Farley et al., 2018; St. Ivy et al., 2018a). A final key recommendation is to increase research grant money to enable future study of IPV-related TBI (Gutman et al., 2004; Roberts & Kim, 2005).

**Discussion**

The 42 articles sampled in this study provide an excellent foundational understanding of IPV-related TBI. However, with
only 22 empirical studies, most of which gathered American data with limited sample size and diversity, the need for a broader understanding and exploration into these intersecting conditions is apparent. Professionals in a number of diverse fields including medicine, occupational therapy, radiological science, and psychotherapy have called attention to this issue and unilaterally agreed that increased awareness and understanding of this population are paramount. Further investigation into prevalence, long-term implications for women’s health and social integration, IPV/TBI-specific interventions, and approaches to prevention are all warranted, particularly with respect to cultural and geographical diversity.

Challenging knowledge synthesis, this field of study is plagued by the abundance of terms for both TBI and IPV used in various contexts, functionally referring to the same group of survivors. Even in this targeted effort to collect all that is known on the topic, extensive hand searching was necessary to account for differences in terminology across time periods and fields of study that would have otherwise been excluded or missed entirely. Professionals and the public are similarly unlikely to have shared language to identify IPV-related TBI or find what limited resources exist. This gap in knowledge and understanding leaves women at risk of continued violence and ongoing exposure to increased physical and psychological trauma as health-care practitioners are without clear protocols, service providers are without a dedicated screening tool, and support personnel remain unaware of the unique challenges faced by brain-injured women survivors of IPV. Further action by researchers and direct service providers, combined with increased social awareness, is critical to developing effective supports.

The limited amount of literature may be due to the sensitive nature of IPV. Survivors may be reluctant to disclose violence due to stigma and fear of retribution making locating this population very difficult. Complicating the issue further, the long-term effects of TBI itself may hinder a survivor’s awareness and insight into her own deficits, preventing her from seeking help or being capable of leaving an abusive situation independently, thereby remaining vulnerable to repeat and/or chronic violence. It is important to note that allowing TBI to go undetected in IPV survivors increases the probability of cumulative effects of repeated injury to the head, face, and neck (Banks, 2007; Campbell et al., 2018; Davis, 2014). Violence-related TBI has poorer outcomes than nonviolence-related TBI (Kim, Colantonio, Dawson, & Bayley, 2013), and repeated injury further compounds negative outcomes making it critical to identify and support survivors at the earliest possible point of contact.

Raising awareness and challenging outdated assumptions among health-care practitioners and society at large around who is likely to suffer a head injury, how that injury will present, and the considerable risk for IPV-related TBI may lead to improved outcomes for women survivors. Even when a woman presents with an obvious injury to the head, face, or neck and is suspected of being involved in IPV, a TBI diagnosis is often not made (Banks, 2007). One explanation offered is that emergency departments are simply not aware that survivors of IPV are at great risk of TBI (Jackson et al., 2002). They tend to see brain injury in young men as a result of high-risk behaviors. Additionally, IPV/TBI survivors may initially present with addiction and/or mental health issues rather than an obvious trauma, as they are nearly twice as likely to have challenges with alcohol use and self-medication with drugs, potentially masking TBI symptoms (WHO, 2017). Professionals are urged not to wrongfully assume that a person presenting with symptoms such as headaches, depression, agitation, and suicidal behavior is suffering from mental illness and requires psychiatric medication (Campbell et al., 2018; Car, 2000; Farley et al., 2018; Smith & Holmes, 2018). In fact, medication carries its own risks in TBI populations, as survivors can be particularly vulnerable to side effects (Jackson et al., 2002). Awareness of this comorbidity can improve screening and avoid misdiagnosis.

Interprofessional workers providing direct services to IPV survivors across the care continuum and researchers are encouraged to advocate for the needs of this vulnerable population. Health-care costs can be prohibitive, and preventing women from gaining access to services and financial dependency is often a mechanism of control for abusers. Increased financial assistance through social programming may encourage or enable more survivors to seek adequate health care (Banks, 2007; Car, 2000). Frontline workers are often the first line of contact for women exposed to IPV and are well positioned to combat the socially derived culture of shame and blame often associated with both IPV and TBI. Advocating for the development of supports sensitive to this population could substantially contribute to improved service provision, reduction of stigma and isolation, and overall progress in psychosocial outcomes.

Screening and assessment remain a priority in the advancement of this field of research and practice. While a number of screening tools were used, discussed, and recommended in this review, development and validation of a specific tool is recommended as a primary directive in future research. An effective tool should take into account unique aspects of this population such as the role of sex and/or gender (e.g., hormones and/or expectations around childcare and employment), impact of socially derived stigma and shame, chronicity and form of violence, implications for personal safety, and contexts of structural violence and intersectional marginalization (Corrigan et al., 2003; Goldin et al., 2016; Iverson & Pogoda, 2015; St. Ivany & Schminkey, 2016; St. Ivany et al., 2018a, 2018b; Valera & Berenbaum, 2003). Additionally, emerging data suggest not enough is currently known about the associated risks and benefits of screening for TBI within an IPV context (Campbell et al., 2018). Current investigation by the authors of this review also revealed the potential risk of increased vulnerability to manipulative partners and potentially non-TBI sensitive legal and child welfare systems. As formal diagnosis is difficult to achieve without expensive testing largely inaccessible to IPV survivors and little-to-no supports for them exist, the immediate benefit of formal TBI
identification is not to be assumed. We concur with Campbell and colleagues’ (2018) recommendation that further investiga-
tion into the benefits and risks of screening take place, includ-
ing extensive discussion with survivors, to determine best prac-
tices.

Until standardized screening protocols have been imple-
mented, a first step toward identifying TBI in women survivors
of IPV may be in simply recognizing a cluster of diffuse symp-
toms with no originating incident reported, as the survivor may
be unwilling to disclose. This review suggests that women
exposed to IPV are unlikely or unable to report violence to
health-care workers without being directly asked (Campbell
et al., 2018; Foushee, 2017; Monohan & O’Leary, 1999; St.
Ivany et al., 2018b). Professionals may elucidate a more com-
plete history of trauma by asking if there was ever a time when
a patient felt she should have sought medical treatment for head
injury but did not (Monohan & O’Leary, 1999; St. Ivany et al.,
2018b). It is recommended to bear in mind that many survivors
may appear as “normal” leading to the exclusion of a TBI
diagnosis (Monohan & O’Leary, 1999; Valera & Berenbaum,
2003). Until we have a more nuanced understanding of the
issues at hand, it may be useful to adopt a default suspicion
of TBI in the presence of a history of IPV, particularly when
coupled with mental health and addictions comorbidities. Spe-
cific questions or lines of questioning for frontline use are
suggested (Foushee, 2017; Gagnon & DePrince, 2017; Smith
& Holmes, 2018).

In addition to documenting the symptoms and experiences
of survivors, a few authors have emphasized the value of incor-
porating more verifiable information from imaging and medi-
cal professionals about IPV-related TBI and its effects (Linton
& Perrin, 2017; Valera & Berenbaum, 2003; Wong et al.,
2014). They, and others, note the challenge in achieving such
documentation given the expense required to obtain them, the
nature of IPV episodes, and the lack of reporting by survivors.
However, by establishing and raising awareness of a physiologi-
cal basis for the sometimes diffuse somatosensory and emo-
tional symptoms experienced by people with IPV-related TBI,
we may minimize stigma and further improve disclosure rates.
Empirical studies are needed to generate reliable data on the
prevalence, experience, and needs of brain-injured survivors of
IPV to be used in health care and community settings and
inform policy decisions. As nearly all current data were gath-
ered in the United States, there is particular need for original
studies situated in contrasting social, political, and economic
contexts, and, in specific, from within a public health-care
model. It is possible a publicly funded system of health care
and social supports for women survivors of IPV and TBI may
be able to develop and implement protocols more quickly and
efficiently than one that is not.

Finally, in order to address barriers to adequate health care
and support, broader knowledge of currently unexamined con-
texts is needed. As few authors explore the intersectional com-
plexities experienced by women IPV/TBI survivors of diverse
cultural/ethnic backgrounds (Anderson et al., 2015; Campbell
et al., 2018; Linton, 2015; Linton & Kim, 2014; Linton &
Perin, 2017; Oden, 2000) and fluid gender identities (Baumann
et al., 2018; Farley et al., 2018), further research considering the
implications of the layers of marginalization experienced by
these women is critical. Additionally, capturing this issue
beyond shelter populations and emergency rooms is needed
and should include police offices, courthouses, mental health
centers, or family counseling centers, as well as the dentist
office and eye doctor, all of which are important sites of triage
for this population (Roberts & Kim, 2005).

An unexpected outcome of this review was the identifica-
tion of articles calling attention to the importance of the den-
tistry profession in the detection of IPV survivors and
advocating for vigilance in head injury screening, although the
potential for TBI was not discussed (Arosarena, Fritsch, Hseuh,
Aynehchi, & Haug, 2009; Gwinn, McClane, Shanel-Hogan, &
Strack, 2004; Lincoln & Lincoln, 2010; Mishra, 2012; Nelms,
Gutmann, Soloman, Dewald, & Campbell, 2009). Dentists rou-
tinely examine the head, face, neck, and mouth (HFNM) and
may be able to detect physiological signs of IPV, including
strangulation, potentially invisible on other medical exams
(Arosarena et al., 2009; Lincoln & Lincoln, 2010). Dentists
and dental assistants have a unique opportunity for early iden-
tification of survivors of IPV seeking routine treatment (Gwinn
et al., 2004). Furthermore, forensic odontologists play a signi-
ficant role in the investigation of violence and abuse and are
cited as appropriate multidisciplinary leaders in the training of
dentistry in the detection of HFNM injuries (Gwinn et al.,
2004; Lincoln & Lincoln, 2010). This review also returned one
article outlining a similar role for ophthalmologists detecting
injuries to the eye that indicate violence to the head, face, and
neck (Beck, Freitag, & Singer, 1996). As these professions
emerge as stakeholders in IPV/TBI survivors care, more inves-
tigation into best practices is needed.

Conclusion

This review was conducted to update and continue the discus-
sion on the link between IPV and TBI, systematically capturing
and synthesizing all of the available current literature exploring
this intersection. We also seek to amend the interprofessional
approach recommended by the literature by highlighting
unique roles and perspectives in this developing field of study.
More research is needed including exploration of head injuries
and mental health disorder outcomes, efficacy of neuropsycho-
logical assessment, strategies for access to appropriate care,
establishing premorbid functioning, and the role of dentistry
and ophthalmology in identification of IPV-related TBI. Other
frontiers for future work include determining what is under-
stood about IPV/TBI among frontline workers in nonmedical
settings, motivations/deterrents for disclosure, and strategies
for fostering interprofessional alliances in support of survivors
across community and health-care settings.

Research generating accurate prevalence figures may lead to
a greater understanding of the impact of this issue and inform
approaches to detection and care, leading to fewer overall
repeated episodes of IPV, appropriate medical intervention,
and ongoing support. While development and/or validation of a TBI screening tool, sensitive to the IPV context is critical, further research into the risks and benefits of screening should be undertaken. Cross-sector collaboration is essential to develop appropriate processes and programming for this unique population. It is our hope that with increased research and awareness, fewer women will be at risk of TBI as a result of IPV.

**Key Findings**

- IPV can cause brain injury resulting in fatigue, depression, memory loss, confusion, impaired judgment, and difficulty with tasks that may impair ability to leave an abuser.
- Presenting with an obvious injury to the head, face, or neck, and suspected IPV does not always lead to a TBI diagnosis.
- Survivors of IPV-related TBI may initially present with addiction and/or mental health issues rather than an obvious trauma potentially masking TBI symptoms.
- Disclosure is a key step in the care of this population. Women survivors of IPV are unlikely to report violence to frontline workers unless directly asked.
- A wide range of prevalence estimates are published based on diverse samples.
- It is critical that IPV survivors with TBI are identified and supported at the earliest possible point of contact to avoid repetitive trauma to the brain and related outcomes.

**Implications for Practice, Policy, and Research**

- Professionals offering direct services to women survivors of IPV (e.g., police, health care, counseling, shelter staff) should adopt a default suspicion of brain injury in the presence of a history of intimate violence, particularly when coupled with diffuse physical symptoms, somatic complaints, and/or mental health and addictions comorbidities.
- TBI-specific IPV supports may improve psychosocial outcomes.
- Investigation into the benefits and risks of screening for IPV-related TBI is needed.
- Development and/or validation of a TBI screening tool for an IPV context is critical.
- Empirical studies using larger sample sizes and diverse populations are needed.

**Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The current study was directly supported by funds from the Women’s College Hospital Women’s Xchange Grant program and the Canadian Institutes of Health Research. Neither organization had any practical role in the study whatsoever. Halina (Lin) Haag was also supported by a doctoral fellowship from the Social Sciences and Humanities Research Council of Canada and the Ontario Women’s Health Scholar Award from the Ontario Ministry of Health and Long-Term Care and Dr. Angela Colantonio was supported by a research chair in Gender, Work and Health from the Canadian Institutes of Health Research Institute of Gender and Health (grant no. CGW-126580).

**ORCID iD**

Halina (Lin) Haag https://orcid.org/0000-0003-3256-6992

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Author Biographies

Halina (Lin) Haag, MSW, RSW, is a PhD student in social work at Wilfrid Laurier University in Waterloo, Canada. Her research interest is in the areas of disability studies and traumatic brain injury. Her work focuses on women survivors of intimate partner violence with resultant brain injury, exploring factors influencing mental health, return to work, and social inclusion.

Dayna Jones, MScOT, is an occupational therapist working in acute care in Victoria, BC. She brings her commitment to women’s health issues and underserved vulnerable populations to her daily practice and hopes to contribute to awareness of intimate partner violence-related traumatic brain injury on the frontlines of public health care in Canada.

Tracey Joseph, MScOT, completed her masters in occupational therapy at the University of Toronto under the supervision of Dr. Angela Colantonio. Her interest in women’s experiences of traumatic brain injury and intimate partner violence led her to contribute to the ongoing work in this area of the Acquired Brain Injury Research Lab.

Angela Colantonio, PhD, OT Reg. (Ont.), FCAHS, FACRM is the director of the Rehabilitation Sciences Institute at the University of Toronto and a professor in the Department of Occupational Science and Occupational Therapy, Dalla Lana School of Public Health. She is also a senior research scientist at the Toronto Rehabilitation Institute-University Health Network where she was the inaugural Saunders Family Chair in Acquired Brain Injury Research and is currently leading the acquired brain injury and society team.