Insight into Traumatic Brain Injury from Intimate Partner Violence: A Grounded Theory Study

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Abstract

Women living with traumatic brain injuries from intimate partner violence are receiving growing attention in research but little is known about the context of their lives, the nature of abuse when they are hit in the head, and how their symptoms of brain injury impact their lives. This constructivist grounded theory study using primary and secondary data analysis (N=19) explores the lives of women who pass out from being hit in the head during intimate partner violence. A theory of being stranded at the intersection of traumatic brain injury and intimate partner violence was generated, defined as experiencing challenges with one while trying to access resources for the other. The central process of women prioritizing safety for themselves and their children was influenced by dangerous characteristics of the abusers and repeating cycles of abuse in the lives of women. This dissertation adds to the understanding of traumatic brain injury as a chronic disease process and not a one-time event model. Researchers, healthcare workers, and policy makers need to begin to address the structural violence that keeps women from obtaining the resources they need to live a happy and healthy life.

Acknowledgments

This dissertation would not be possible without women being willing to share their stories and speak up on behalf of women who cannot speak for themselves. I thank them for talking to me and am humbled by their strength and perseverance. Recruitment was a team effort and I thank everyone who helped connect me with these women.

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This dissertation is dedicated to Dr. Holly Edwards, whose light will never stop shining.

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Chapter 1: Introduction

Women who receive a traumatic brain injury (TBI) from intimate partner violence (IPV) are receiving more attention as awareness of head injury, including TBI and concussion, is growing in popular culture. However, the largest focus is on veterans and sports related concussions (Hunnicutt, Lundgren, Murray, & Olson, 2017; St. Ivany & Schminkey, 2016). While this growing attention does include female veterans (Iverson & Pogoda, 2015; Iverson, Dardis, & Pogoda, 2017) there is mounting evidence that women experience outcomes after TBI differently from men and women are underrepresented in research in this area (Cancelliere, Donovan, & Cassidy, 2016; Haag et al., 2016). Underreporting of TBI and IPV make this a difficult area of study and very little is known about barriers to receiving medical attention for the TBI, challenges to accessing women's shelters and resources for IPV, and the long term health consequences of TBI from IPV (Corrigan, Wolfe, Mysiw, Jackson, & Bogner, 2001; Davis, 2014; St. Ivany & Schminkey, 2016).

The Centers for Disease Control and Prevention (CDC) report to Congress in 2013 cited the goal of the Traumatic Brain Injury Act of 2008, "to reduce the burden or injury at the population level by preventing injuries and ensuring care and rehabilitation that maximizes the health and quality of life for injured persons," (2013, p. 1) as the foundation for the call for research to improve epidemiologic data on incidence and prevalence of TBI in the community dwelling population and in those not receiving medical care for the injury.

This study served to explore the lives of women living with TBI from IPV to guide future research and to increase knowledge to improve their lives and the lives of their children and families.

Definitions

Intimate Partner Violence

The National Intimate Partner and Sexual Violence Survey estimates that more than one in three women will experience IPV in their lifetimes, including rape. IPV is defined as behaviors

that are intended to exert power and control over another individual, including physical, sexual, verbal, emotional, and financial abuse, and or/stalking (Ballan & Freyer, 2012; Black et al., 2011). Even though men can be victims of abuse, IPV occurs more often when a man is attempting to control his female partner, whether she is a wife, girlfriend, or significant other. Additional terms used to indicate IPV include battered woman, spousal abuse, domestic violence, and interpersonal violence. For the purpose of this dissertation, IPV will be defined as intimate partner violence given that it is the most commonly used term in the current literature.

Traumatic Brain Injury

The classification of TBI is a complex and multidimensional topic (See Saatman et al., 2008 for an in-depth discussion of classification challenges) (Ponsford, 2013; Ruff et al., 2009; Saatman et al., 2008). Classification in a clinical setting is based on severity of symptoms upon presentation and the Glasgow Coma Scale (GCS) is a 15-point scale that is the most widely used clinical tool for determining the extent of neurological damage (Saatman et al., 2008). A GCS of 8 or less generally indicates a severe TBI (Ponsford, 2013; Saatman et al., 2008). The GCS is well validated for severe TBI but additional measures, such as serum biomarkers or neuropsychological tests, are needed to distinguish moderate TBIs (Ponsford, 2013; Ruff et al., 2009; Saatman et al., 2008).

Mild and moderate TBIs are estimated to make up 80% of all TBIs but are more challenging to diagnose because of the quickly resolving period of acute symptoms combined with the hesitancy of people sustaining mild TBIs to seek medical treatment (Ruff et al., 2009). The American Congress of Rehabilitation Medicine Special Interest Group lists diagnostic criteria for a *mild* TBI as “traumatically induced physiological disruption of brain function,” including loss of consciousness or memory surrounding the accident, a change in mental state, and “focal neurologic deficit(s) that may or may not be transient” (Ruff et al., 2009). If, in addition to these criteria, symptoms also include 30 minutes or more loss of consciousness, a

Glasgow Coma Scale of 13 after 30 minutes, and longer than 24 hours of "post-traumatic amnesia," then the diagnosis advances to *moderate* TBI (Ruff et al., 2009).

Women Experiencing TBI and IPV

There are overlapping challenges to understanding the incidence and prevalence of TBI and head injury from IPV. True prevalence of head injury or mild TBI in the context of IPV remains unknown given the hesitancy of women in abusive relationships to disclose abuse and to seek medical treatment unless the abuse is severe (Corrigan et al., 2001; Davis, 2014; St. Ivany & Schminkey, 2016). A literature review found the following data to support the head as a common target in IPV: (a) reports of 35%-92% of women in shelters experienced at least one head injury during a violent attack (Corrigan et al., 2001; Jackson, Philp, Nuttall, & Diller, 2002; Monahan & O'leary, 1999; Roberts & Kim, 2008), (b) a 74% prevalence rate of head injury among women in shelters or who were completing a protection order (Valera & Berenbaum, 2003), and (c) 92% of abused women in a pilot study reporting being hit in the head or face (Jackson et al., 2002). A study including women of African descent in the United States (US) and the US Virgin Islands found a 10% prevalence rate of head injury with a loss of consciousness in women experiencing IPV. Women in this study were 7 times more likely to report a head injury compared to women not experiencing IPV in the same sample [OR 7.21, (95% CI 2.79-18.61, $p < 0.001$)] (Anderson, Stockman, Sabri, Campbell, & Campbell, 2015).

There are overlapping symptoms of TBI and posttraumatic stress disorder (PTSD). Even if a woman is not diagnosed with a TBI, authors of one systematic review concluded that the symptoms such as anxiety, depression, dizziness, and headache exhibited by IPV survivors are similar to those exhibited in mild TBI, indicating that in addition to being related to stress and PTSD, these symptoms may be signs of a head injury (Kwako et al., 2011). Iverson et al. (2017) found that approximately two-thirds of female veterans who had IPV-related TBI also experienced probable PTSD compared to 17% of women with non-IPV TBI. These clinically

significant results point to a need to provide women with cognitive rehabilitation for TBI as well as cognitive behavioral therapy for PTSD.

Screening Challenges

Screening survivors of IPV for head injury is not routine and treatment interventions for abuse reduction do not incorporate rehabilitation for head injury (Jackson et al., 2002). While several head injury screening instruments do exist (Hux, Schneider, & Bennett, 2009; Jackson et al., 2002), most tools currently used were tested on young healthy males who had experienced a one-time trauma resulting from an incident such as a motor vehicle accident (Kwako et al., 2011). Evidence has shown differences in the healing time and recovery of male and female brains (Cancelliere et al., 2016; Ponsford, 2013) and the validity of these tools has not been demonstrated in women who experience frequent abuse over long periods of time (Alston, Jones, & Curtain, 2012).

Characteristics of Perpetrators

There is strong support in the literature that men who have a TBI themselves are more likely to inflict violence and perpetrate IPV (Marsh & Martinovich, 2006; Pinto, L. A., Sullivan, E. L., Rosenbaum, A., Wyngarden, N., Umhau, J. C., Miller, M. W., & Taft, C. T., 2010; Rosenbaum, A., Hoge, S. K., 1989; Rosenbaum, A., Hoge, S. K., Adelman, S. A., Warnken, W. J., Fletcher, K. E., & Kane, R. L., 1994). In the classic 1989 study, Rosenbaum and Hoge found 61% of abusers had a history of head injury and their repeat study in 1994 found 53% of abusers had a head injury. Marsh and Martinovich (2006) found 58% of abusers reporting at least one head injury. All authors of these studies stress the importance of acknowledging biological factors such as neuropsychology and neurochemistry that may influence becoming a perpetrator of IPV. None of the reviewed studies directly explored the relationship between having a head injury and inflicting a head injury and research in this area could provide avenues for earlier prevention of IPV (Hunnicutt et al., 2017).

Health Outcomes

Like other survivors of IPV, abused women who have experienced a head injury have adverse health outcomes such as decreased immune function, anxiety, asthma, depression, gastrointestinal disorders, stroke, sexually transmitted diseases, and heart disease (Ford-Gilboe, M., Varcoe, C., Wuest, J., Merritt-Gray, M., 2011; Kwako et al., 2011; Rich, 2014). In a hallmark study, Roberts and Kim (2008) asked 52 women experiencing "chronic and predictable" partner abuse to recall "their worst incidents of abuse" and discussed associated health outcomes. All 52 women had symptoms associated with mild TBI and all reported some form of head or neck injury during the abuse episodes resulting from "slapping in the mouth, beating the head with closed fists, throwing punches across the face with fists, [and] hard shoving of [the] face against the wall or hard furniture…" (Roberts & Kim, 2008, p. 39-40). Nightmares, sleeping difficulties, contusions, and flashbacks were commonly reported symptoms. One woman developed mild temporal lobe epilepsy after being hit on the back of the head with shoes and a clothes hanger and females have been shown to have a higher rate of epilepsy after a head injury (Cancelliere et al., 2016).

If a woman does seek medical care for the head injury or for another reason, she may not be ready to disclose the abuse and she might have other challenges in life (such as addiction problems or mental health challenges) that complicate utilization of resources to end the IPV. Women seeking primary care expressed a desire for IPV interventions that prioritized protecting her safety, privacy, and autonomy (Chang et al., 2005).

Outcomes of women with TBI over time

The Archives of Physical Medicine and Rehabilitation recently published a supplemental journal issue (February 2016) specifically focused on exploring the sex differences in outcomes and recovery after receiving a mild TBI. Cancelliere et al. (2016) conducted a systematic analysis of all studies primary studies in the World Health Organization and International Collaboration on Mild Traumatic Brain Injury Prognosis regarding prognosis of mild TBI for sex-stratified findings and concluded that while sex is not a strong predictor for recovery from mild

TBI, women are at a greater risk for epilepsy and suicide than men and tend to utilize health care services more than men.

Operationalization of "head injury" used in dissertation research

The marker that will be used to signify a TBI for the dissertation research is answering yes to the question, "Have you ever passed out from being hit in the head by your partner?" (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Self-reporting of a loss of consciousness is indicative of a TBI (Ruff et al., 2009), however because no medical diagnosis was made (and if it was made no checking of medical charts and records for confirmation was completed) and duration of unconsciousness is unknown, labeling the event as a TBI is problematic. To operationalize the event of "passing out from being hit in the head by a partner" for the purposes of the dissertation, the term head injury will be used.

Overview of Dissertation

This dissertation represents the synthesis of scholarship on women living with TBI from IPV. It begins with the state of the science of TBI from IPV and continues with significance, implementation and analysis of constructivist grounded theory research to explore the lives of women who are living with TBI from IPV. It is formatted according to the University of Virginia School of Nursing's "Manuscript Dissertation Option" which is different from the traditional five-chapter model. Using the manuscript option, this dissertation contains six chapters: Chapter One is the introduction; Chapter Two is an updated version of the NIH 12+1 grant proposal, which includes specific aims, study significance, a detailed research strategy, and human subjects protection; Chapter Three is a literature review and state of the science on what is known about traumatic brain injury from intimate partner violence; Chapter Four addresses the specific aim to understand the nature of and context of abuse when a head injury is inflicted using thematic analysis; Chapter Five represents the findings from the dissertation research and presents the grounded theory results of the research study; Chapter Six is the discussion and conclusion. Chapter Three was published in Family and Community Health in 2016. Chapter

Four will be submitted to Violence Against Women. Chapter Five will be submitted to Qualitative Health Research. Each chapter is written in the specific style of the requirements of the associated grant or author guidelines for the journal. The abstract, introduction, and conclusion summarize the comprehensive nature of the dissertation.

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Chapter Two: Revised Proposal

Specific Aims

The goal of the Traumatic Brain Injury (TBI) Act of 2008 (Public Law 110-206-APR. 28, 2008) is "to reduce the burden or injury at the population level by preventing injuries and ensuring care and rehabilitation that maximizes the health and quality of life for injured persons" (Centers for Disease Control and Prevention (CDC), 2015, p. 1). This goal includes improving epidemiologic surveillance of incidence and prevalence of TBI in non-hospital settings and examining trends in TBI by injury mechanism within population subgroups to help target prevention resources for populations at greatest risk for head injury (CDC, 2015). This dissertation explored a population subgroup at risk for receiving a TBI: women living with intimate partner violence (IPV). The study used a constructivist grounded theory approach to generate a theory about the social context and nature of abusive relationships when a TBI is inflicted, including barriers and facilitators to receiving support and treatment for the IPV and/or the TBI. This research directly addressed the call for more information on injury mechanism within population subgroups.

Significance of the Issue

Most research on head injury has been done on rats or athletes, especially research on repeated head injury or accumulated neurotrauma (Ling, Hardy,& Zetterberg, 2015). The CDC estimates that there are 38,000,000 women who have experienced IPV (excluding rape) in their lifetimes. Estimates range from 60% to 92% of survivors of IPV who receive facial or head injuries, including evidence of multiple strangulation attempts. Using the 60% estimation, there are 23,000,000 women in the United States living with a head injury from IPV. That is 85 times more women than Iraq and Afghanistan veterans and 37,000 times more women than National Football League players; however, little research exists on head injuries received from episodes of IPV (St. Ivany & Schminkey, 2016). After receiving a TBI there is a cascade of secondary events that affect the neuronal systems and neurons, and this cascade can be as significant or more significant in disrupting the normal function of the brain than the initial TBI. Because of

these structural and functional changes, there are short term and long-term physical, cognitive, behavioral, and/or emotional symptoms (Barkhoudarian, Hovda, & Giza, 2011). If the head injuries are not addressed for these women they may continue to have negative outcomes that will impact their lives and the lives of their children.

Research question and specific aims

The purpose of this qualitative study using both primary and secondary data was to describe the experience of community dwelling women who receive a head injury from a partner during an episode of IPV. The research question was: what is the nature and context of receiving a head injury during an episode of intimate partner violence?

Specific aims were:

1) To describe the experience and context of the lives of women who report passing out from being hit in the head during an episode of IPV,

2) To explain how receiving a head injury from IPV impacts the lives of women, both in their relationships with the abuser, their families, and in the greater social context.

The women in this study all self-reported passing out from being hit in the head by a partner, which is used as a criterion for diagnosing a mild TBI (Ruff et al., 2009). However, because there was no confirmed medical diagnosis and duration of unconsciousness was unknown, labeling the event as a TBI is problematic. For the purpose of this dissertation, the event of "passing out from being hit in the head by a partner" will be operationalized as a head injury. This knowledge is significant for nursing and other healthcare providers to begin to understand what happens during episodes of physical abuse in order to design interventions and screening tools that could lead to decreased negative health outcomes and improved quality of life for

women living with a head injury from IPV. This study was one of the first to look at head injury specifically related to IPV.

Research Strategy

a. Significance

Awareness of head injury, including traumatic brain injury (TBI) and concussion, is growing in popular culture and the media with the greatest focus on veterans returning from combat and sports related concussions (St. Ivany & Schminkey, 2016). The Centers for Disease Control and Prevention (CDC) has a goal to examine trends in head injury by injury mechanism within population subgroups. One population subgroup that has not been studied is women who are survivors of intimate partner violence (IPV). It is estimated there are 38,000,000 women who have experienced IPV in their lifetime (Black et al., 2011) and estimates range from 60% to 92% of survivors of IPV who receive facial or head injuries, including evidence of multiple strangulation attempts (Jackson, Philp, Nuttall, & Diller, 2002; Smith, Mills, & Taliaferro, 2001). Using the 60% estimation, there are 23,000,000 women in the United States living with a head injury from IPV (St. Ivany & Schminkey, 2016). However, little research exists on the health consequences of receiving a head injury from episodes of IPV. The focus of this dissertation was women who receive a head injury indicative of a TBI from an episode of IPV and the purpose was to describe the nature and context of receiving a head injury during an episode of IPV. This research adds to the growing body of knowledge that women living with IPV are at high risk for receiving a TBI and are therefore a subgroup in need of more prevention and treatment resources. It directly addressed the goals of the CDC to improve epidemiologic data and knowledge of injury mechanism to better target prevention resources for populations at great risk for currently unidentified head injury. Dissertation results can provide a solid foundation for a nursing research career dedicated to bringing risk for head injury from IPV into discussion to create appropriate resources for prevention, screening, intervention, and rehabilitation.

Definitions and Health Outcomes

Intimate Partner Violence

The National Intimate Partner and Sexual Violence Survey estimates that more than one in three women will experience IPV in their lifetimes, including rape. IPV is defined as behaviors that are intended to exert power and control over another individual and includes: physical, sexual, verbal, emotional, and financial abuse and or/stalking (Ballan & Freyer, 2012; Black et al., 2011) and has long-term negative health consequences for survivors, even after the abuse has ended (Campbell, 2002). Even though men can be victims of abuse, IPV occurs more often when a man is attempting to control his female partner, whether she is a wife, girlfriend, or significant other. Additional terms used to indicate IPV include battered woman, spousal abuse, domestic violence, and interpersonal violence. For the purpose of this dissertation, IPV was defined as intimate partner violence given that it is the most commonly used term in the current literature.

Traumatic Brain Injury

It is estimated that 2% of the American population are living with disabilities from a head injury. These numbers are underestimated because not all people who receive a head injury (specifically a mild TBI such as a concussion) seek medical treatment, making the true prevalence of associated disabilities unknown (Ruff et al., 2009). A community sample of 2000 men and women from service provider sites such as Vocational Rehabilitation offices, homeless shelters, women's shelters, and mental health referral services found 27% of people screening positive for a head injury had "sufficient severity to impact quality of life," (Hux et all., 2009, p. 1). One of the most dangerous consequences of untreated head injury is the cumulating effect of sustaining another head injury before recovery and that can lead to death (Banks, 2007).

The goal of the Traumatic Brain Injury (TBI) Act of 2008 is, "to reduce the burden or injury at the population level by preventing injuries and ensuring care and rehabilitation that

maximizes the health and quality of life for injured persons," (CDC, 2013, p. 1). This goal is cited by the CDC's report to Congress in 2013 as the foundation for the call for research to improve epidemiologic data on incidence and prevalence of TBI in the community dwelling population and in those not receiving medical care for the injury. This new research should examine mechanism of injury in the population subgroup to help target prevention resources for those who are at greatest risk for receiving a TBI. This report identified several groups that require special attention for screening for head injury: children, older adults (> 75 years), returning service men and women, rural residents, and incarcerated men and women (CDC, 2015).

The classification of TBI is a complex and multidimensional topic (See Saatman et al., 2008 for an in-depth discussion of classification challenges; Ponsford, 2013; Ruff et al., 2009; Saatman et al., 2008). Classification in a clinical setting is based on severity of symptoms upon presentation. The Glasgow Coma Scale (GCS) is a 15-point scale that is the most widely used clinical tool for determining the extent of neurological damage (Saatman et al., 2008). A GCS of 8 or less generally indicates a severe TBI (Ponsford, 2013; Saatman et al., 2008). The GCS is well validated for severe TBI but additional measures, such as serum biomarkers or neuropsychological tests, are needed to distinguish less severe TBIs (Ponsford, 2013; Ruff et al., 2009; Saatman et al., 2008).

Mild to moderate TBIs are estimated to make up 80% of all TBIs but are more challenging to diagnose because of the quickly resolving period of acute symptoms combined with the hesitancy of people sustaining mild TBIs to seek medical treatment (Ruff et al., 2009). The American Congress of Rehabilitation Medicine Special Interest Group (Ruff et al., 2009) lists diagnostic criteria for a *mild* TBI as "traumatically induced physiological disruption of brain function," including loss of consciousness or memory surrounding the accident, a change in

mental state, and “focal neurologic deficit(s) that may or may not be transient,” (p. 4). If, in addition to these criteria, symptoms also include 30 minutes or more loss of consciousness, a GCS of 13 after 30 minutes, and longer than 24 hours of post-traumatic amnesia then the diagnosis advances to *moderate* TBI. In mild to severe TBIs, there is a cascade of secondary events that affects the neuronal systems and neurons and this cascade can be as significant or more significant in disrupting the normal function of the brain than the initial TBI. Because of these structural and functional changes, there are short term and long-term physical, cognitive, behavioral, and/or emotional symptoms (Barkhoudarian, Hovda, & Giza, 2011). Another emerging term is “acquired brain injury” (ABI) and this umbrella term encompasses any type of damage done to the brain by traumatic events (such as physical assault) and non-traumatic events (such as a stroke) (Haag et al., 2016).

Another challenge for diagnosing and treating women with head injuries is a lack of understanding of outcomes by sex or by IPV status. The American Congress of Rehabilitation Medicine released a supplemental report focused on the differences in outcomes after brain injury for males and females to begin to address this gap in knowledge. A systematic analysis of all primary studies in the World Health Organization and International Collaboration on Mild Traumatic Brain Injury Prognosis on the prognosis of mild TBI concluded that women are at a greater risk for epilepsy and suicide than men after receiving a mild TBI (Cancelliere et al., 2016). Iverson et al. (2015) compared women veterans who self-reported a TBI from IPV (18.8%, classified as TBI from self-report using a modified version of VA TBI screening tool) to women who did not meet TBI criteria on the screening tool but were still hit in the head during an episode of IPV. Women who screened positive for TBI had significantly higher levels of depression (mean Center for Epidemiologic Studies Depression Scale score 26.6 vs 20.7, $p < 0.0001$) and PTSD (mean Posttraumatic Disorder Checklist Scores 53.2 vs. 34.1, $p < 0.0001$) and significantly lower perceptions of physical health (mean SF-12 scores 34.6 vs. 42.3, $p<$

0.01) than women who experienced trauma to the head without screening positive for a TBI using the screening tool.

Women Experiencing Head Injury and IPV

There is a small but growing body of literature showing high rates of TBI among women who are survivors of IPV. Like other survivors of IPV, abused women who have experienced a head injury have adverse health outcomes such as decreased immune function, anxiety, asthma, depression, gastrointestinal disorders, stroke, sexually transmitted diseases, and heart disease (Campbell, 2002; Ford-Gilboe, Varcoe, Wuest, & Merritt-Gray, 2011; Kwako et al., 2011; Rich, 2014). Roberts and Kim (2008) asked 52 women experiencing "chronic and predictable" partner abuse to recall the most severe episodes of IPV and discussed health outcomes from this abuse. All 52 women had symptoms associated with mild TBI and all reported some form of head or neck injury during the abuse episodes resulting from "slapping in the mouth, beating the head with closed fists, throwing punches across the face with fists, [and] hard shoving of [the] face against the wall or hard furniture…" (Roberts & Kim, 2008, p. 39-40). Nightmares, sleeping difficulties, contusions, and flashbacks were also commonly reported symptoms. One woman developed mild temporal lobe epilepsy after being hit on the back of the head with shoes and a clothes hanger and females have been shown to have a higher rate of epilepsy after a head injury (Cancelliere, Donovan, & Cassidy, 2016).

Women living with IPV are seven times more likely [OR 7.21, (95% CI 2.79-18.61, $p < 0.001$)] than women who aren't living with IPV to receive a head injury with loss of consciousness (Anderson, Stockman, Sabri, Campbell, & Campbell, 2015). The majority of abused women report injuries to the head or face during episodes of abuse (St. Ivany & Schminkey, 2016). Using National Trauma Bank data, a recent retrospective analysis found 50% of women with head injuries also experiencing IPV (N = 2751/5503, Joseph et al., 2015).

Arosarena et al. (2009) reported 42.2% of women seeking care for maxillofacial injuries had documented IPV. More research is needed to understand the number of head injuries received from IPV versus women who are living with head injuries from other sources (motor vehicle accident, sports, etc.) who end up in abusive relationships, making a head injury a risk factor for IPV.

Screening and Risk Factors

Screening survivors of IPV for head injury is not routine and treatment interventions for abuse reduction do not incorporate rehabilitation for head injury (Jackson, Philp, Nuttall, & Diller, 2002). With 60-92% of abused women reporting head or facial injuries and 50% of women with head injuries reporting IPV this is a gap that needs to be addressed (Jackson, Philp, Nuttall, & Diller, 2002; Joseph et al., 2015; St. Ivany & Schminkey, 2016). While several head injury screening instruments do exist (Hux, Schneider, & Bennett, 2009; Jackson et al., 2002) most instruments currently used for screening were tested on young healthy males who had experienced a one-time trauma resulting from an incident such as a motor vehicle accident (Kwako et al., 2011). Evidence has shown differences in the healing time and recovery of male and female brains (Cancelliere et al., 2016; Ponsford, 2013) and the validity of these tools has not been demonstrated in women who are victims of frequent abuse over long periods of time (Alston, Jones, & Curtain, 2012).

Women who experience a head injury from IPV often experience more than one attack on the head (St. Ivany, Kools, Sharps, & Bullock, manuscript in preparation) and scant research exists on the role of multiple head injuries especially if there is little time for recovery between injuries. A recent study on mice and repetitive mild TBI found an increase in “anxiety-like behavior” and “motor impairments and cognitive deficits,” (Winston et al., 2016, p. 13). Murray et al. (2016) advocate for service providers, first responders, and healthcare workers to take into

account TBI symptoms when working with women living with IPV. Modifications in safety planning with the woman, such as spending time in rooms with fewer hard surfaces and finding a safe place to recover from the impact to the head, should be considered. Women may need additional help to report the head injury events to medical providers and help developing or improving problem solving skills.

Inflictors of Head Injury and Characteristics of Perpetrators

There is strong support in the literature that men who have a head injury themselves are more likely to inflict violence and perpetrate IPV (Marsh & Martinovich, 2006; Pinto, Sullivan, Rosenbaum, Wyngarden, Umhau, Miller, & Taft, 2010; Rosenbaum & Hoge, 1989; Rosenbaum, Hoge, Adelman, Warnken, Fletcher, & Kane, 1994). Rosenbaum and Hoge (1989) found 61% of abusers reporting a history of head injury and their repeat study in 1994 found 53% of abusers living with a head injury. Marsh and Martinovich (2006) found that 58% of abusers reported at least one head injury. While these numbers demonstrate correlation and not causation, all authors stress the importance of acknowledging biological factors such as neuropsychology and neurochemistry that may influence being a perpetrator of IPV.

No studies were found that directly explored the relationship between having a head injury and inflicting a head injury. It is not known whether or not the abusers in the dissertation study have a history of head injuries, but insight will be gained into the relationships of the women with the abusers and into the context of women's lives. This new knowledge will guide future recruitment of studies to explore the relationship between having and inflicting a head injury.

Impact of Study

From completed course work, a published review of literature, and attending professional conferences on violence against women and brain injury rehabilitation, there are three major areas that were explored in my dissertation: unknown risk factors for head injury in the context of IPV, insight into the context and situations of abuse when a head injury was inflicted, and generating a theory to explain how receiving a head injury from IPV impacts the lives of women, both in their relationships with the abuser and in the greater social context.

b. Approach

A constructivist grounded theory approach was used to analyze both secondary and primary data in an emergent process to generate a theory about how a head injury from IPV impacts the lives of women, their relationships with the abuser (including the episode of IPV where the head injury is inflicted), their families, and the greater social context. Data collection and analysis occurred as an iterative process and the two were conducted simultaneously (Strauss & Corbin, 1990, Kools et al., 2002; Kools, 1997). Dimensional analysis was used as the grounded theory methodology and is the key process used "to discover the meanings of interactions observed in situations," (Kools et al., 1996, p. 316) and to explore the question, "What all is involved here?" (Schatzman, 1991). Situational analysis was used as an additional strategy for data expansion and was used to make situational maps to understand social ecologies and lay out all elements of a situation based on the Chicago School of Sociology map making (Clarke, 2005; Khaw, 2012).

The lives of women living with head injury from IPV are complex and multidimensional with have overlapping risk factors that are not well studied or understood (Murray et al., 2016; St. Ivany & Schminkey, 2016). Research is needed that can "capture complexities rather than aiming at simplifications; that elucidate processes of change in situations as well as they elucidate patterns and stabilities; that detangle agents and positions sufficiently to make

contradictions, ambivalences, and irrelevances clear," (Clarke, 2005, p. xxix). Grounded theory as a methodology has several features that make it a unique form of qualitative inquiry for researching this complex situation. The distinct feature of analyzing actions and processes instead of structures and themes (as in thematic analysis) allowed for insight into complex situations and creating conceptual categories that led to a theory formation to explain a research question. Creating and modifying an interview guide used during primary data collection allowed for category development instead of applying preconceived ideas or theories to the situation.

Clarke (2005) argues that situational analysis is needed to break down the positivist application of normal curves to understand multidimensional situations. The use of situational maps as a supplement to dimensional analysis provided representations of "lived situations" and the various complex positions and relationships that were present in the women's lives. Preliminary analysis of the interviews from a longitudinal study with pregnant and postpartum women to be used as secondary data revealed a rich data set with women discussing the course of their lives, housing situations, social relationships, perceptions and interactions with institutions such as prisons and hospitals, and facilitators and barriers to receiving care. These rich data allowed for an in-depth analysis that embraced the complexities of the lives of the women and their situations.

Design and Methods

Grounded theory has its theoretical roots in symbolic interactionism (SI) and when used together the two constitute a theory/methods package. Traditional views of SI by Blumer and Mead are founded on three basic principles: that people's actions towards things are "based on the meanings that these things have for them," that these meanings come from interactions, and that these meanings can be created and changed through interactions and interpretations of

individuals as they happen (Pawluch & Neiterman, 2010, p. 174). A postmodern, constructivist view of SI, and the one taken in this study, was SI is the way in which we all make meaning in our lives (Clarke, 2005). Doing constructivist grounded theory means studying how and why participants create meanings that lead to actions in situations (Charmaz, 2014). Constructivist grounded theory is rooted in postmodernism by believing that knowledge is based on a situation and the researcher's interpretation of that situation, rather than a positivist approach of a researcher remaining objective or describing a "reality," as posited in the original work of Glaser and Strauss and early grounded theory (Corbin, 2009). Grounded theory after the postmodern turn emphasizes partial perspectives and situated knowledge as well as knowledge that is constantly evolving with exposure to new situations (Clarke, 2005; Corbin, 2009).

Dimensional analysis is an alternative method of doing grounded theory to improve the "articulation and communication of the discovery process in qualitative research," (Kools et al., 1996, p. 314). A key concept of the dimensional analysis method is "natural analysis," which is thought of as a normal cognitive process used by people in all situations (from research to everyday interactions) to interpret and understand the experience or phenomenon (Kools, McCarthy, Durham, & Robrecht, 1996; Schatzman, 1991). Its operations are consistent with a constructivist approach by using the researcher's situated knowledge and interpretation of a situation. Theoretical sampling as a later phase of dimensional analysis allowed for the emerging theory to be fleshed out and explored by collecting data to elaborate and refine categories in theory development (Charmaz, 2014).

An additional technique for constructivist grounded theory is situational analysis, which has roots in the Chicago School of Sociology and map making to understand social ecologies to lay out all elements of a situation (Clarke, 2005; Khaw, 2012). A key tenant of situational analysis is that the situation itself is always greater than the sum of the parts and analysis of a situation will allow for capturing processes of change and stability and an understanding of complex, multidimensional processes without simplification or analysis of one dimension. Using

this approach allowed the analysis to embrace the complex and contrasting views of the data and placed the *situation* itself as the unit of analysis to begin to understand all human and nonhuman elements and their relationships when a head injury is inflicted during an episode of IPV (Clarke, 2005). Once created, these maps are visual representations of the elements involved in a phenomenon and the narratives about head injury and IPV and the relationships that exist between them (Khaw, 2012).

Using constructivist grounded theory approach as the method rooted in the postmodern theory of symbolic interactionism provided a way to address the research question: what is the nature and context of receiving a head injury during an episode of intimate partner violence?

Specific aims of the study were:

1) To describe the experience and context of the lives of women who report passing out from being hit in the head during an episode of IPV,

2) To explain how receiving a head injury from IPV impacts the lives of women, both in their relationships with the abuser, their families, and in the greater social context.

Participants and Settings

Secondary Data

Data analysis began with purposive sampling using secondary data collected in the Domestic Violence Enhanced Home Visitation Program (DOVE), a multistate randomized clinical trial (Bullock and Sharps, NIH/NINR - R01 NR009093) that evaluated the effectiveness of an empowerment protocol within home visit programs with low-income women who were victims of IPV during pregnancy and postpartum from 2006-2012 (Sharps et al., 2016). The women were recruited from a health department in an urban area on the east coast, from 12 health departments in a rural Midwestern state, and from one Nurse Family Partnership (NFP)

program in the same Midwestern state participating in the study (Sharps et al., 2013). In addition to abuse severity, many other variables were measured and the women were followed during pregnancy and for 24 months post-delivery. A group of women agreed to be part of the qualitative phase of the study and were selected to be interviewed by a research nurse at five time points and these interviews were recorded and transcribed. Questions asked during the interviews focused on episodes of IPV, interactions with health care providers, and home visiting. (See Appendix 3 for DOVE interview guide.)

Population and Sampling Plan

According to the original article published by Sharps et al. (2013), to be eligible for the study recruited women were:

- ≤ 31 weeks pregnant
- English speaking
- experiencing abuse currently or within the past year, and
- already enrolled in a perinatal home visiting program

The exclusion criteria for the study included:

- Not screening positive for current or recent IPV
- Gestation > 31 weeks
- Not enrolled in perinatal home visiting program

The reasons for this exclusion criteria involve the target population for the DOVE intervention as a way to reduce IPV and improve maternal and child outcomes. Less than 10 weeks left in pregnancy would not allow for enough time to see an effect of the intervention before delivery. The study was designed to compare enhanced home visiting with usual care, thus, the study participant needed to be connected to the resources for an existing home visiting

program. The sample was randomized differently at each location. For the urban HD, women were randomized to either DOVE group or usual care group and one research nurse that was employed by the HD provided services to all women randomized to receive the intervention. The rural sites HDs were randomized to six DOVE HDs and six usual care HDs. For the NFP program, all women received DOVE and afterwards they were matched to women in the national NFP database. 689 women were referred, 339 were eligible for randomization, 42 women refused and 239 women were randomly assigned. Before randomization there were 350 women excluded for reasons such as:

- gestation > 31 weeks (294 women, 58 women consented but did not screen positive for IPV)
- lost to follow up (34 women)
- did not want further participation in the study (22 women)

124 women were randomized into the DOVE intervention group and 115 women in the usual care group for a 71% recruitment rate. Retention rates decreased over time with 93% at time of delivery, 80% at 3 months, 76% at 6 months and 72% at 12 months and there was no difference in retention rate based on location. There were differences in demographic characteristics and the sample matched the demographics of the catchment area: the urban site had a higher percentage of African American women who were on average older than the rural sites which was predominately Caucasian. There were no statistically significant differences between sites in education level, income level, marital status, and employment status (Sharps et al., 2013).

Operationalization of "Head Injury"

The measure that will be used to signify a head injury from the DOVE women is answering yes to question 23 on the Conflict Tactics Scale (CTS) that asks, "Have you ever

passed out from being hit in the head by your partner?" (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Self-reporting of a loss of consciousness is indicative of a mild TBI (Ruff et al., 2009), however because no medical diagnosis was confirmed and duration of unconsciousness is unknown, labeling the event as a TBI is problematic. To operationalize the event of "passing out from being hit in the head by a partner" for the purposes of the dissertation, the term head injury was used. Of the 239 total women, 21 answered yes to this question at some point during the study; 16 answered yes at baseline and five answered yes during the two-year timeframe of the study. (See Table 1 for descriptive statistics of head injury group.) Nine of the 21 women with a head injury participated in the qualitative interviews that were conducted over the two-years the women were in the study. Because the constructivist grounded theory approach views the interview process as an important interaction where social bonds might be formed (Charmaz, 2014), using this unique dataset that followed women living with head injury from IPV over a prolonged period of time presented a fiscally responsible opportunity to develop a theory. A cursory look at the data showed that several participants stated they shared information during the interviews that had never been shared before, indicating that strong relationships were formed between the women and the research team. With such rich data, the DOVE interviews were used for initial coding and situational analysis map-making to provide an in-depth and detailed context of the women's lives.

Primary Data Collection

Purposive and theoretical sampling continued with primary data collection. Women were recruited for a women's health study from ads placed in Craigslist in central Virginia, including Charlottesville and Richmond, and the Baltimore/Washington, D.C. metro area. It was anticipated that 10-15 women would be recruited for primary data collection but recruitment lasted as long needed to reach saturation, which happened at 10 interviews. Secondary recruitment tactics included placing study flyers in women's shelters, community centers, bus

stops, and libraries. Eligibility criteria was women between 18-45 years of age that were English speaking. Recruitment ads included a modified question for the same marker of head injury- “Have you ever passed out from being hit in the head?” Participants who responded to the Craigslist ad or study flyers were contacted by the PI via email or phone. During this initial contact the PI asked the woman about her experiences around being hit in the head and asked if the person who hit her was a boyfriend, partner, husband, or significant other. If the answer was yes and she was interested in study participation, arrangements were made to meet at a convenient location or talk on the phone to complete the informed consent process, followed by up to two interviews lasting approximately 60-90 minutes at a future date chosen by the participant. (See Appendix 4 for a preliminary interview guide.) Snowball and convenience sampling were used for primary data collection using the same criteria.

For primary data collection, the PI and participant conducted the interview over the phone because this was preferred by the participants. Upon talking, consent was reviewed, signed by the PI, and permission to record the session was obtained. Basic demographic data, such as location (urban, suburban, or rural) was collected but no identifying information was obtained in the interviews by reminding the woman not to use any names while the recorder is turned on to protect privacy and confidentiality. Participants were given a $40 gift card upon completion of the interview. All interviews were recorded with an IRB-approved recording device and uploaded to a secure UVa server and were transcribed. The transcripts were kept electronically on a secure, password protected server. All paper documents, such as consents, printed copies of transcripts, situational maps and memos were kept in a locked filing cabinet in a locked research office. Dedoose qualitative data analysis software was used to aid analysis of text data.

Data Collection Protocol

Gathering rich data is a goal of constructivist grounded theory and rich data are able to address the questions: “Do the data reveal what lies beneath the surface? Are the data sufficient to reveal changes over time? Have I gathered data that enable me to develop analytic categories? What kinds of comparisons can I make between data? How do these comparisons generate and inform my ideas?” (Charmaz, 2014, p.33). There were two phases of data collection that took place: purposive sampling and theoretical sampling. If the research question of the nature and context of receiving a head injury is thought of as a mystery, purposive sampling is conducted with people who can help solve that mystery (Stern, 2009), which was the women themselves. Purposive sampling began with the qualitative interviews from the nine DOVE women in the head injury category. These interviews were used for initial coding for situational analysis and dimensional analysis. Purposive sampling continued with primary data collection. Theoretical sampling was used to fill gaps in knowledge and to elaborate categories and happened with primary data collection until saturation was achieved, meaning gathering new data no longer added to any of the core theoretical categories (Charmaz, 2014). Methodological and theoretical memos were created throughout the data collection and analysis process to track theoretical development and added to the rigor of the research (Kools et al., 2002).

Data Analysis

Constructivist grounded theory is emergent in nature and focuses on theory construction rather than applying existing knowledge. Data collection and analysis occured as an iterative process and the two were conducted simultaneously (Charmaz, 2014, Strauss & Corbin, 1990, Kools et al., 2003). The first step of analysis was coding, which is the process of defining and categorizing the data. Codes were used to select and sort the data and became the bones of the analysis to create the skeleton of the theory. There were three phases of coding: initial or open coding during data expansion, focused coding to begin to limit the data, and theoretical

construction to integrate the concepts and their relationships to the emerging theory (Charmaz, 2014).

Situational analysis was used to explore the data for theory construction through the multistep creation of situational maps, using the situation of receiving a head injury from IPV as the unit of analysis, rather than each individual woman. Clarke (2005) suggests creating situational maps during open coding to "open up" the data and codes are placed on a messy map to layout all of the elements that might be involved in the situation. These maps can be recreated throughout data collection and analysis and codes can be added or removed based on the analysis (Khaw, 2012). Situational maps and analysis took place as analytic exercises throughout the phases of dimensional analysis, with most emphasis placed in the initial and open coding phase. The first draft of a situational map included all human and non-human elements (or initial codes) in the context of receiving a head injury from IPV written on a page in a non-linear fashion. This map was analyzed and memos were written as categories were created from the elements. The second version of the map is the ordered/working version where categories were created (such as major issues, nonhuman elements, symbolic elements, individual human elements, etc.). Positional maps were created from the ordered version using narratives from the data to discover sites of silence to guide future data collection. Both primary and secondary data were used for situational analysis (Clarke, 2005; Khaw, 2012).

Dimensional analysis methodology, a subset of constructivist grounded theory, was used to guide data analysis and to create designation, which is the process of "naming or labeling of dimensions and properties observed in the data," (Kools et al., 1996, p. 316). The first phase of dimensional analysis is data expansion to explore the depth of possibilities in the interviews. This phase happened with initial or open coding of the secondary data DOVE interviews and continued with purposive sampling of primary interviews. Initial coding was conducted line-by-

line, chunk-by-chunk of the interview transcripts and stuck closely to the data. Codes were words that reflected action to build in actions and sequences with coding (Glaser, 1978; Charmaz, 2014). The analysis from initial coding of the DOVE interviews added to the questions asked during primary data collection and helped to identify early theoretical direction.

After this initial or open coding to expand the data, focused coding of the primary and secondary data began to limit the data via categorization. Once a critical mass of dimensions was assembled from the focused coding, dimensions that explained the situation began to emerge and led to the next phase of analysis, the use of the explanatory matrix (Kools et al., 1996). The explanatory matrix was created and refined until the most salient dimension was found that provides the clearest perspective on the data; and then all other dimensions were categorized into the conceptual components of context, conditions, processes, and consequences. During this iterative process of data collection and analysis, memos were written on the process to track development of the explanatory matrix and guide theoretical development.

The final step of dimensional analysis is integration or novel reintegration of dimensions within the explanatory matrix and their relationships in the developing theory. The grounded theory was created from this perspective and "the matrix is used as a pragmatic device to translate the theory into a clear, narrative version," (Kools et al., 1996, p. 319). When there were high levels of consistency and redundancy in the data, data saturation was achieved and no additional new data was collected (Kools et al., 2003).

During qualitative research it is important to achieve rigor. Strategies to improve rigor for the study were to have a research team with regular meetings to review interviews and coding, memos, explanatory matrix configuration, and final theoretical integration; an IPV expert and a

methods expert on the dissertation committee; using multiple sources of data and methods of data collection; and being certain high levels of consistency were achieved across the data to achieve saturation. The process and products of analysis were systematically documented to produce an audit trail from raw data to theory construction to enable evaluation by outside members of the research team (Kools, 2003). Several IPV experts were used to provide theoretical verification in lieu of member checking to decrease the burden on the participants.

C. Potential Limitations

The nature of secondary data analysis is limiting because no follow up questions can be asked of women and their outcomes from being hit in the head. This limitation was addressed by the primary data collection that allowed the experience of receiving a head injury from IPV to be explored. Initial analysis of the DOVE interviews revealed that all women who answered "yes" to passing out from being hit in the head did describe an episode of abuse where they were hit in the head so this marker of head injury has been verified. Even with the limiting nature of secondary data analysis it was important to include the DOVE interviews because they are such a rich data set from a large study of a vulnerable population. There was no chart confirmation of a diagnosis of TBI, but because the majority of people who receive mild TBIs do not seek medical treatment this study provided important insight into reasons why women do not seek medical treatment after passing out. Recruiting participants via Craigslist is a newer recruiting strategy but was important to capture the full spectrum of women's experiences, from living in the community with a history of IPV to experiencing current IPV and staying in the women's shelter. It is important to interview women who have left the abusive relationship to begin to understand effective strategies for leaving abusive situations.

D. Time Line

12-Month Time Frame/Schedule Of Activities

Activity	Winter 2017	Spring 2017	Summer 2017	Fall 2017
Submission to IRB	**X**			
Data Analysis	**X**	**X**	**X**	
Recruitment of additional participants		**X**	**X**	
Dissertation writing			**X**	**X**
Publication of results			**X**	**X**

Protection Of Human Subjects

Risk to Subjects. There were two phases to this dissertation. The secondary data phase met the requirements for being exempt since it is de-identified data. The dissertation's target population for primary data collection was community dwelling women ages 18-45 that speak English and had experienced passing out after being hit in the head by their partner. There were potential for risks for women participating in this study and women had the right to refuse to participate in the study, to skip answering questions during the interview, and to withdraw at any time. The study was not identified as a study on head injury from IPV but it was possible that IPV perpetrators could find out that women participated in the study. Every attempt was made by the study team to keep women's participation in the study secure and confidential. Interviews were conducted at a time and place deemed safe by the participant or over the phone if meeting in person is not possible. If the situation arose where a participant was at risk

from IPV the PI could provide access to resources for IPV such as the National Domestic Violence Hotline and contact information for the local women's shelter. At the beginning of the interview, the participants were told that the PI is a mandatory reporter for any disclosures of child abuse and neglect, any serious injury to adults (including plans to seriously harm herself), and threats with a weapon. A potential risk was emotional distress from discussing the episode of IPV when the head injury was inflicted. The PI used therapeutic communication learned from previous research and experiences with women living with IPV. Another potential risk was the women thinking that because they participated in a study about head injury, they have a diagnosis of TBI. The study was always described as a study about head injury and did not use TBI in any written recruitment materials or the consent.

Adequacy of Protection against Risks. The safety protocol for research for women and children experiencing IPV, which has been used by Dr. Bullock as a part of the DOVE study, was implemented as another strategy for protecting the study participants. The study was submitted to the University of Virginia Institutional Review Board for approval. Once approval was obtained, the PI proceeded with secondary data analysis and posting of Craigslist advertisement and study flyers for primary data recruitment. Contact was made with women who responded to the Craigslist ad or study flyers but no solicitous emails were sent. Participants who responded to the Craigslist ad or flyer were contacted by the PI via email or phone to arrange a time to meet to discuss their interest in the study. During that conversation the PI asked the woman about her experiences with being hit in the head and if the person who hit her was a boyfriend, girlfriend, partner, husband, or significant other. If she was interested in study participation, arrangements were made to complete the informed consent process followed by an interview lasting approximately 30-60 minutes. For snowball and convenience sampling, the PI gave contact information to the participant to pass for recruitment. Basic demographic data, defined as age and location (urban, suburban, or rural) was collected but no

identifying information was obtained in the interviews to protect confidentiality. Signed consent forms were stored in a locked file cabinet. All electronic data were stored on a secured computer and on a secured server at the University of Virginia.

Potential Benefits of the Proposed Research to the Subjects and Others. The only direct benefit to participating in this study was a $40 gift card. Some participants might have felt that they were contributing to research that might provide help to women living with a head injury from IPV. Therapeutic communications during interviews might have helped women feel empowered or helped her seek support or treatment for IPV or head injury.

Importance Of Knowledge To Be Gained

IPV and head injuries have been linked to poor health outcomes for women but most research has focused on young, healthy men or rats. There is a gap in knowledge about the consequences of head injury from IPV and very few studies on the facilitators and barriers to receiving treatment for the head injury. This study directly addressed the goal of the CDC to improve knowledge about head injury in population subgroups that are understudied.

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Table 1. Descriptive Statistics Of DOVE Head Injury* Group

Race	Black = 10	White = 11	
Location	Urban = 10	Rural = 11	
Age	Mean, SD 23, 4.6	Min 17	Max 33
Education, highest level completed 1=1st-6th grade, 2=7th-9th grade, 3=10th-12th grade, 4=high school grad/GED, 5=some college or trade school	Mean, SD 3, 1.8	Min 1	Max 5

* Head injury status measured by answering “yes” to CTS23 question “Have you ever passed out from being hit in the head by your partner?”

Appendix 2. Budget Sheet

Description	**Cost per**	**Frequency**	**Total**	**Notes/Budget Justification**
Participant Incentives	$40	20	$800	Maximum number of projected interviews needed for saturation
Transcriptions for 20 interviews at one hour each	$50/hour	20x4x50	$4,000	Vendor: Golden Transcriptions. Cost is $50/hour. Each one-hour interview is expected to take 4 hours to transcribe.
Digital recorder	$200	1	$200	To record interviews (Olympus V414151BUOO Linear Pcm LS-P2 Voice Recorder)
Rental of Community Meeting Space	$30/hour	10	$300	Reservation of community space (e. g. community center, YMCA, library rooms) for interviews if needed
Dedoose software license	$10.99 monthly fee	6	$66	QSR price for student license for 12 months http://www.qsrinternational.com/
Total Projected Costs			$5,366	

Appendix 3. DOVE Qualitative Interview Outline

Purpose (Time 1 Interview @ Baseline)

"You were asked questions about your family and home life during the first interview session. This meeting is an opportunity to get to know you better and to gain a clearer understanding of your situation—from your perspective. I want to talk with you about your relationships with people who are important to you as children, family members, intimate partner(s), and friends. Some of these people may be currently living with you or, now, living in other homes.

Your safety, health, and protection of your children are important to us. You need to know that I am required to report child abuse and neglect and any serious injury to adults. To promote the safety and well being of you and your children, knowledge of child abuse and neglect and a plan to seriously harm yourself or another person, and threats with a weapon will be reported to the right agency. In the event a report must be made, I will ask you to work together—with me in making the report. If physical care or mental health services are needed, I will help you in locating and receiving necessary treatment."

I. INTRODUCTORY QUESTIONS—GETTING THE STORY

(Getting to know the participant, her children and family, and establish rapport)

"First, I would like to ask a few questions to get to know you better."

A. Can you tell me a little bit about yourself and your family?

Probes:

1. *Who is currently living in your home (adults and children)?*
2. *How long have you lived together?*
3. *Is this a new living situation or new move?*

B. How do you feel about your current living situation?

Probes: Have there been changes recently in your living situation?

C. Sometimes women find it hard to be a parent in the context of the abuse in their lives. What is it like for you?

Probes:

1. *How does the abuse affect the way you parent? Are there things that you would like to do as a parent but are unable to do because of the abuse?*
2. *Are there things that you do as a parent BECAUSE OF THE ABUSE?*
3. *How does abuse in your life affect the parenting role? What are your concerns about being a parent with regard to your relationship with your partner?*

II. INTIMATE PARTNER VIOLENCE (IPV) EXPERIENCES

"We've talked about you and your family. Now I would like understand better what your relationship is like with your partner, especially when you or he gets angry. "

A. Everyone gets mad sometimes. Can you tell me what happens when either of you gets mad.?

Probes:

1. *What are your partner's usual behaviors when angry?*
2. *What are your usual behaviors when angry?*
3. *What is it like for you?*

B. Sometimes when a couple fights, someone gets hurt (might need to add: "by hurt, I mean…) What is that like for you? It might help to think of a time when you got hurt or thought you were going to get hurt and we can talk about that.

Probes:

1. *How did you feel at the time...and after?*
2. *What are your thoughts about that now?*
3. *Is this episode the same or different from other fights with your partner?*

C. What do you do when your partner abuses you?

Probes:

1. *What would you like to do?*
2. *What do you think you should do?*
3. *Do you think that you have a choice?*
4. *How do you decide what to do?*
5. *Did anyone help you in making different choices?*

D. Sometimes women have gotten hurt by more than one person or even, hurt many times by the same person. What has your situation been like?

Probes:

1. *Have you been hurt by someone other than your partner?*
2. *How often does this occur?*
3. *How does getting hurt like this affect you?*
4. *How have you been dealing with it?*

III. PREGNANCY RELATED INTIMATE PARTNER VIOLENCE (IPV)

Thank you for sharing that with me. It can be hard to talk about it. Now I would like to talk with you about your pregnancy and your relationship with your partner while you are pregnant.

A. First, tell me about the pregnancy and what kind of pregnancy you had.

Probes:

1. *How did you feel about being pregnant?*
2. *What was your partner's response when you told him that you were pregnant?*
3. *How did you partner react to you while you were pregnant?*
4. *Did your partner go with you to the prenatal visits?*

B. Other women have reported abuse by their partner while pregnant. Is this something that has ever happened to you? What was that like for you?

Probes:

1. *What was happening at the time?*
2. *Were there times during your pregnancy that abuse occurred and more frequently or reduced? Please describe when and how you were injured. Did the abuse occur around certain events during the week (as payday)?*

C. It will help me understand your situation better if you could describe the events that take place before and after the abuse takes place. Again, it might be helpful to think of one particular time that you were abused and we can talk about that.

D. What about the relationship in the year before you were pregnant? What was it like then?

Probes:

1. *Same or different as when pregnant?*
2. *Partner same or different towards you?*

IV. FAMILY CONTEXT OF ABUSE

I am interested in knowing more about your child(ren) or other family members might be aware of what goes on between you and your partner. Would you be willing to talk about how they react to what is going on?

Probes:

1. *Is anyone else in your family being hurt that was not hurt before? Please tell me about that.*
2. *Have your children experienced or witnessed the violence at home?*

V. RESPONSE TO ABUSE (FORMAL AND INFORMAL SUPPORT)

A. Women who are in abusive relationships have different reactions to the abuse and who they go to for support. Can you share with me what you think and how you feel about the abuse in terms of getting help?

Probes:

1. *How severe do you think your situation is compared to other women?*
2. *Have you tried to get help from anyone? Tell me about that (Shelter, church, employer, hotline, mental health counselor).*

B. Some women call the police and others do not. (Protection order, filed criminal charges)

C. How comfortable are you in asking for help from family members when abused?

D. Who do you go to for help and support?

VI. RESOURCES AND BARRIERS OF THE SETTING

I would like to talk now about things that might make it easy or hard to get help here in (Baltimore/Missouri).

A. Let's start by talking about where you live (big city or small town). Sometimes that might make a difference in your response to the abuse, because of the available help in your community. What is that like for you?

Probes:

1. *How easy or hard is it to get help from healthcare providers? Anyone else?*
2. *Has anyone ever asked you about being in an abusive relationship?*

VII. Some women have reported losing the custody of their child/children. What is it like for you? (Be specific about which baby was lost, probe as per the conversation goes).

1. Were there things beyond your control that led to losing the custody of your child/children, if so what were those?
2. What do you think are the reasons for losing the custody of your child/children?
3. What role did violence play with regard to losing the custody of your child/children?
4. How does abuse continue to hinder with regard to regaining the custody of your child/children?

Now I would ask you a few additional questions

VII: COPING WITH THE ABUSE

There are some ways women use to protect themselves, their children and the unborn child when there is violence. You were asked on the questionnaires about ways that you tried to protect yourself. Was there anything about those strategies that you think we should know.

A. What are some of the ways you keep yourself safe? Your children—particularly your unborn or newborn?
(If needed probes: *Hiding house or car keys, changing locks, developing a code, hiding weapons*).

B. What are the ways you resist the violence?
Probes:
1. Fought back physically/verbally?
2. Slept separately
3. Refused to do what he said
4. Used/threatened to use weapon against him
5. Left home to get away from him
6. Ended (or tried to end) relationship.

C. What are the ways you try to pacify your intimate partner to prevent the violence?
(Probes: Do you keep things quiet for him or try to avoid him?)

D. What are the reasons for using these ways of protection, safety, resistance, pacifying and support?

E. How did you cope with the abuse?

1. Here you can give examples (like women have said, watching movies, cleaning, fishing, smoking)
2. What do you feel and how do you manage those feelings when the abuse is happening and when it is not happening? (ask them how they handle their emotions such as fear, being overwhelmed, etc).
3. What goes on in your head all the time, when you were pregnant, and were facing abuse?

F. Are there other things that you wanted to use, but you weren't able to use?
1*. What are the reasons for not being able to use them?*

G. How does pregnancy influence the coping skills you discussed?
H. How does the unborn child influence the coping skills you discussed?
I. What advice would you give to other pregnant women who face intimate partner violence?
J. What advice would you give to the health care professionals working with pregnant women facing intimate partner violence?

VIII. CLOSING REMARKS

A. We have talked a lot today about your relationship with your partner and especially about the time that you are pregnant. Is there anything about you situation that we haven't talked about, that you think I should know?
B. Thank you for sharing your personal experiences with us today.

QUALITATIVE INTERVIEW GUIDE FOR SUBSEQUENT VISITS
TIME-TWO-TO-TIME FIVE

Purpose (Subsequent interview schedule for Time 2 at 3 months; Time 3 at 6 months; Time 4 at 12 months; and Time 5 at 24 months)

"This interview is another opportunity to get to know you better, to gain more information about meaningful relationships with your infant, other children, family members, and intimate partners, and to clarify any unclear information. We will also talk about any changes in your life since our last meeting and the affect those changes have had on you and your loved ones. A few questions will also be about what it is like for you to be in the study. I reviewed the notes from the last time we met and now I want to talk with you more about a few key points to make sure that I understand your situation."

"Your safety and the protection of your children and family members are important to the study team. When we met before, I told you that I am required to report child abuse-and-neglect and serious injuries to adults. Because I need to support your overall safety, anything I hear or see about child abuse and-neglect, a plan to seriously harm yourself or another person, and threats with a weapon will have to be reported to the right agency. In the event a report must be made, I will ask you to work together—with me in making the report. If physical or mental healthcare is needed, I will help you in the referral process to obtain necessary care."

I. Since the last time we spoke, what has changed in your life?

1. Living situation
2. Partner

II .Intimate Partner Violence (IPV) Experiences
(If the violence has stopped, ask her the story, what helped to stop the violence?)

A. We also talked last time about the problems you had then with your partner. Please tell me about your relationship with your partner now and how is it same or different? If she has a new partner probe about her relationship with her new partner. (Don't ask the probes below if they don't apply to her).

Probes:

1. *How do you and your partner deal with problems now?*
2. *What happens when your partner gets mad?*
3. *How do you and your partner express anger to each other?*

B. I would like you to think about a time since we last talked when you might have gotten hurt by your partner. Tell me about what happened.

Probes:

1. *What are your thoughts about that now? How bad did you think that was?*
2. *Is this episode the same or different from other episodes?*
3. *Is there an episode of abuse that you particularly remember as being different or worse?*

C. As I mentioned before, sometimes women have been hurt by more than one person, or they have been hurt many times by the same person. What has your personal situation been like since our first interview?

Probes:

1. *Have you been hurt or abused by someone other than your partner? What was going on at the time?*
2. *How often does the abuse occur?*
3. *How does the abuse affect you physically and mentally?*
4. *How severe do you think the abuse is?*

D. We talked about this the last time, so I would like to know if anything has changed. When your partner abuses you, what do you usually do?

Probes:

1. *What would you like to do?*
2. *What do you think you should do (if not what you did)?*
3. *If you felt you had choices, how did you choose what you do?*
4. *How is it the same or different from three/six months ago?*

III. Post-Natal Experience

A. Tell me about how things have been going with you and the baby [*use "toddler" if 24 mo. interview*] since (s)he was born.

Probes:

1. Does your baby [toddler]sleep through the night?
2. Did you breast feed? How long did you breastfeed your baby?
3. Has your baby [toddler] been sick? What was the illness and when did it occur?

B. Sometimes women find it hard to be a parent in the context of the abuse in their lives. What is it like for you?

Probes:

1. How does the abuse affect the way you parent? Are there things that you would like to do as a parent but are unable to do because of the abuse?
2. Are there things that you do as a parent BECAUSE OF THE ABUSE?
3..How does abuse in your life affect the parenting role? What are your concerns about being a parent with regard to your relationship with your partner?

A. How have things been between you and your partner since the baby was born.

Probes:

1. *After the birth of your child, when did you resume sexual relations with your partner?*
2. *Did you feel pressured into having sex with your partner?*

IV. FAMILY CONTEXT OF ABUSE—INCLUDING CHILDREN

I am interested in knowing more about your child(ren) or other family members might be aware of what goes on between you and your partner. Would you be willing to talk about how they react to what is going on?

Probes:

1. Is anyone else in your family being hurt that was not hurt before? Please tell me about that.

2. Have your children experienced or witnessed the violence at home?

V. RESPONSE TO ABUSE (FORMAL AND INFORMAL SUPPORT)

You might remember that last time I said women who are in abusive relationship often have very different reactions to the abuse. Please tell me what you think about your personal situation now—compared to before—and how you respond.

Probes:

1. *How severe do you think your situation is compared to other women?*
2. *Have you tried to get help from anyone? Tell me about that (shelter, church, employer, hotline, mental health counselor).*
3. *How comfortable are you in seeking help from family members when the abuse occurs? Is this the same or different from the first interview?*
4. *Any new sources of support?*

VI. RESOURCES AND BARRIERS OF THE SETTING

I would like to talk now about things that might make it <u>easy</u> or <u>hard</u> to get help here in (Baltimore/Missouri).

A. Let's start by talking about where you live (big city or small town). Sometimes that might make a difference in your response to the abuse, because of the available help in your community. What is that like for you?

Probes:

1. How easy or hard is it to get help from healthcare providers?
2. Has anyone ever asked you about being in an abusive relationship?

VII. Some women have reported losing the custody of their child/children. What is it like for you? (Be specific about which baby was lost, probe as per the conversation goes).

5. Were there things beyond your control that led to losing the custody of your child/children, if so what were those?
6. What do you think are the reasons for losing the custody of your child/children?
7. What role did violence play with regard to losing the custody of your child/children?
8. How does abuse continue to hinder with regard to regaining the custody of your child/children?

Now I would ask you a few additional questions

VIII. COPING WITH ABUSE

The purpose of this section is to know how you have coped with your situation since the last interview and the role of your [toddler] in your coping. (Depending on every woman, if she had used some strategies that she mentioned in the last interview, then follow them up in this interview. Ask her if she did anything new).

There are some ways women use to protect themselves, and their children when there is violence in the home. You were asked on the questionnaires about ways that you tried to protect yourself. Was there anything about those strategies that you think we should know now?

A. What are some of the ways you keep yourself safe? Your children?
(Probes: *Hiding house or car keys, documents, weapons, changing locks, developing a code*).

B. What are the ways you resist the violence?
Probes:
1. Fought back physically/verbally?
2. Slept separately
3. Refused to do what he said
4. Used/threatened to use weapon against him
5. Left home to get away from him
6. Ended (or tried to end) relationship.

C. What are the ways you try to pacify your intimate partner to prevent the violence?
(Probes: Do you keep things quiet for him or try to avoid him?)

D. What are the reasons for using these ways of protection, safety, resistance, pacifying and support?

E. How did you cope with the abuse?
Probes:
1. Here you can give examples (like women have said, watching movies, cleaning, fishing, smoking)
2. What do you feel and how do you manage those feelings when the abuse is happening and when it is not happening? (ask them how they handle their emotions such as fear, being overwhelmed, etc).
3. What goes on in your head all the time, when you were pregnant, and were facing abuse/ now?

F. Are there other things that you wanted to use, but you weren't able to use?
1. *What are the reasons for not being able to use them?*

G. How does [your toddler] the new born baby influence the coping skills you discussed?
H. What advice would you give to other women with young children who face intimate partner violence?
I. What advice would you give to the health care professionals working with women with young children facing intimate partner violence?

IX. You've likely heard about the Health Care Reform Bill in the news recently. As I understand there will be some changes in prenatal home visitation programs, one change is, home visitors will now be required to screen women for intimate partner violence. So because of this, I have a few questions for you about your opinion on how a home visitor should go about screening a client for intimate partner violence.…..

1. First of all, I would like you to think about yourself or any other abused woman when answering these questions. When do you think your home visitor should ask you about

abuse? How would you feel about her asking the first time she sees you, the first visit? Do you think it would be better for it to be a later visit, after she's met with you at least one time? Or should she ask you every time she sees you?

2. Next, I 'd like you to think about the kind of questions that would help you feel comfortable in telling the home visitor about abuse. These are the questions we used, how would you feel about these questions? (Show her the AAS and WEB) What are your thoughts?

3. Can you remember a time when someone else may have asked you about abuse using different questions? If so, how did that feel that to you?

4. How would you like the home visitor to begin asking the questions? Should she start out general with something like "do you feel safe in your home?"OR should she start asking the questions right out? "Whether your partner has screamed, yelled, threatened, hit, kicked, made you feel scared, etc?" Do you think the home visitor will miss out on cases of abuse if she just asked about physical violence and /or physical/emotional violence?

5. How would you like the questions to be presented? (i.e in a written form, face-to face verbally, or give you a computer to listen to questions and you touch the screen with answers on it).

6. Do you think it would put yourself or any other woman at risk to tell the home visitor about abuse in your life? Do you worry anything bad might happen or you and your children or family might not be safe by telling the home visitor? If so, what could the home visitor do to minimize the risk?

7. What would you like to say to the home visitor about screening women for abuse? Or design a perfect way for home visitor

8. If when your home visitor asked you about abuse and you admitted to it, what would you like your home visitor to do? Such as give you numbers of shelters, what would you like your home visitor not to do?

QUESTIONS FOR PARTICIPANTS FROM INTERVENTION COUNTY

General Questions

1. When you were asked to be part of this study, what did you think would happen? Probes:
    a. *If this is what happened, what was it like for you to be in the study?*
    b. *If it was not what you expected, how did you feel about that?*

2. There are many different parts to the study. Is there anything that stands out in your mind as especially hard or easy for you to understand or do? Probe:
    a. *What was it like for you to work with the home visitor on a scheduled basis?*

3. What did you think about the forms *we helped you* to fill out?

Probes:

    a. *Easy or hard*

   b. *Made sense to you/were confusing*
   c. *Ade you think about abuse in a different way*

4. *There were a lot of phone calls and home visits from the study staff with this study. Can you tell me about your reaction to those?*

Probe:

   a. Did you want more or less home visits from study staff members? Please explain.
   b. Did you want more or less telephone contacts from study staff members?

5. Do you now do anything differently to keep yourself safe, your infant, other children?

6. Since the beginning of the study, has anything changed in your relationships *with your partner* because of being in the study? *Probe: what about the abuse? Do you think that has changed since you have been in the study?*

7. *Has anything about your parenting changed during the course of the study?*
   a. *Probe: your thoughts about how good a parent you are*

1. What was most helpful to you during the study?

What was least helpful to you during the study?

2. What are your thoughts about the DOVE brochure?

3. What did you learn about partner abuse that you did not know before the study?

QUESTIONS FOR PARTICIPANTS FROM CONTROL COUNTY

1. When you were asked to be a part of this study, what did you think would happen?

2. Think back to when you joined the study and then think of how your life is now. What is different or not?

3. What has changed, if anything, because of you being in the study?

The pattern of partner abuse you experienced in the past and now?

The resources you deal with and receive care?

4. Tell me about your thoughts and feelings about being a parent and how they might have changed during the course of the study?

5. Let's talk about events, other than the study, that have occurred in your life in the last year that made a difference in how your life is now. Please talk about a few of the most memorable events.

6. Did you get any brochures on domestic violence from the health department? Did the home visitor give you any brochures?

Appendix 4. Primary data collection interview guides (modified from DOVE)

This meeting is an opportunity to get to know you better and to gain a clearer understanding of your situation—from your perspective. I want to talk with you about times you have passed out from being hit in the head or gotten a concussion. I know that we might be discussing some things that are difficult to talk about and I want you to know that your safety, health, and the protection of your children are important to me. You need to know that I am required to report child abuse and neglect and any serious injury to adults, including plans to seriously harm yourself, and threats with a weapon. If something needs to be reported, you and I will work together to make the report to the right agency. If physical care or mental health services are needed, I will help you in locating and receiving necessary treatment.

First, I would like to ask a few questions to get to know you better. Can you tell me a little bit about yourself, your family, and what your life was like growing up? What about your life now? How is it similar or different from your life growing up?

Thank you for sharing. Now I would like to talk some times when you might have passed out from being hit in the head by someone you considered to be your boyfriend/girlfriend/partner/spouse. Can you describe to me a situation when this happened to you? Has it happened more than once?

What about any other times you might have hit your head on something (like falling down or being in a car accident) that made you pass out? Were there things that made it easy or hard to get medical help (like going to the hospital or calling an ambulance) after you passed out?

Sometimes women have gotten hurt by more than one person or even hurt many times by the same person. What has your situation been like? How do you react in these situations? What are some things that you do to keep yourself and your family safe?

[Ask about abuser's history of head injury or TBI if known?]

Lastly, let's talk about changes you may or may not have noticed in yourself after you passed out. These could be any short-term changes or long-term changes. Are there changes that other people have noticed in you? Do you have any suggestions of ways to help women who are in similar situations?

Chapter Three: Review of the Literature

Intimate Partner Violence and Traumatic Brain Injury: State of the Science and Next Steps

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Abstract

Women who receive traumatic brain injuries (TBI) from intimate partner violence (IPV) are gaining attention but this area is lacking in research. A review of literature conducted on TBI from IPV found prevalence of 60-92% of abused women obtaining a TBI directly correlated with IPV. Adverse overlapping health outcomes are associated with both TBI and IPV. Genetic predisposition and epigenetic changes can occur after TBI and add increased vulnerability to receiving and inflicting a TBI. Healthcare providers and community health workers need awareness of the link between IPV/TBI to provide appropriate treatment and improve the health of women and families.

Key words: TBI; IPV; violence; screening; battered woman

Introduction

Concussion and traumatic brain injuries are receiving growing attention in the United States media, most notably the number of professional football players with concussions and the number of veterans returning from Iraq and Afghanistan with traumatic brain injury (TBI). [1,2] According to Frontline Concussion watch, there were 123 reported concussions in the NFL in the 2014 season, down from 228 in 2013 and 261 in 2012. [3] The military reported approximately 270,000 veterans returning from Iraq and Afghanistan with a mild traumatic brain injury since 2002. [4] These numbers are not insignificant but there is a larger group of people living with undiagnosed traumatic brain injury- women who are survivors of intimate partner violence (IPV). [5] IPV is defined as "behaviors intended to exert power and control over another individual, including physical, sexual, verbal, emotional, and financial abuse." [6(p 1084)] Even though men can be victims of abuse, IPV occurs more often when a man is attempting to control his female partner, whether she is a wife, girlfriend, or significant other. [7]

The Centers for Disease Control and Prevention estimates that there are 38,000,000 women who have experienced intimate partner violence (excluding rape) in their lifetimes. [7] Estimates range from 60% to 92% of survivors of IPV who receive facial or head injuries, including evidence of multiple strangulation attempts. [8,9]

Using the 60% estimation, there are 23,000,000 women in the United States living with a TBI from IPV. That is 85 times more women than Iraq and Afghanistan veterans and 37,000 times more women than NFL players; however, little research exists on TBIs received from episodes of IPV.

A high prevalence of TBI in survivors of IPV combined with a lack of appropriate screening tools can lead to increased risk of poor health outcomes, lack of employment, and

problems with care giving. Furthermore, even mild neurotrauma following a TBI could compromise cognitive functioning, diminishing the woman's capacity for self-care, self-assertion, and her capacity to care for others, especially her children. This may also increase the likelihood that she will remain in abusive relationships. [10] Other increased risks related to TBI from IPV include drug abuse, [11] child abuse and maltreatment, [12,13] and increased need of psychiatric care for children of a parent with TBI. [14] Healthcare providers and public health professionals working with IPV survivors should be aware of increased risk for TBI. Screening for a mild TBI and modifying interventions to include rehabilitation for head injury beyond treatment for trauma from IPV may significantly improve outcomes for these women and their families. [15] Likewise, women who report symptoms consistent with head injury should be screened for IPV.

As this paper will demonstrate, the literature strongly suggests that TBI and IPV are often related. Recognizing this pattern will afford opportunities for providing optimal care in these situations. To maximize safety and to promote well-being in families affected by violence, psychosocial interventions are critically important and public health professionals are pivotal links in the provision of care for women who experience mild TBI associated with IPV.

Prevalence Of Head Injury In IPV

Current literature is inconsistent regarding prevalence rates for TBI in IPV. A literature review on violence against women (using search terms domestic violence, strangled, abusive relationship, battered women, spousal abuse, and intimate partner violence) combined with TBI found 15 articles about TBI and IPV, and nine examined head injury in the presence of IPV. [5,9,10,16-20] References from selected articles were manually retrieved and reviewed. These articles

used loss of consciousness, [5,10] blunt head trauma from abuse, [9,18,20] post concussive syndrome, [17] TBI, [16] and strangulation [19] as classification for head injury.

True prevalence of TBI in the context of IPV remains unknown given the hesitancy of women in abusive relationships to disclose abuse and to seek medical treatment unless the abuse is severe. [5] However, based on this review of literature, data supporting the head as a common target in IPV assaults include: (a) reports of 35%-92% of women in shelters experienced at least one head injury during a violent attack, [5,9,10,18] (b) a 74% prevalence rate of TBI among women who were in shelters or who were completing a protection order, [19] and (c) 92% of abused women in a pilot study reporting being hit in the head or face. [9] A study comparing women of African descent in the US to the US Virgin Islands found that abused women were 7 times more likely to report a head injury with loss of consciousness than non-abused women in the same study sample [OR 7.21, (95% CI 2.79-18.61, $p < 0.001$)]. [11] Authors of one systematic review concluded that symptoms such as anxiety, depression, dizziness, and headache exhibited by IPV survivors are similar to those exhibited in post concussive syndrome (or symptoms of lingering mild TBI), indicating that in addition to being related to stress and posttraumatic stress disorder (PTSD) these symptoms may be signs of a brain injury. [17]

Neuroanatomy

Among the many neural structures that can be injured in a TBI, there are four structures that are known to have significant roles in post-TBI behavior and decision-making: the prefrontal cortex, hypothalamus, amygdala and hippocampus. Environmental conditions and situations are appraised, processed and responded to through complex mechanisms within and among these structures. The prefrontal cortex is involved in cognitive behaviors, personality and decision-making. [21] Within the hypothalamus, the control center for both the autonomic nervous system

and the neuroendocrine system, the paraventricular nucleus is critical to the management of stress responses.[22] The amygdala and hippocampus, located in the temporal lobe structures in the brain, are both highly involved in the processing of memory. The amygdala participates in the processing of memories, specifically those involving emotion.[23] This role is particularly important for learning that occurs in social contexts involving strong emotion and appears to shape and govern fear responses.[24,25] The amygdala also organizes behavioral and mood responses to threats or environmental stresses, providing input to the hypothalamus that directs both autonomic nervous system and hypothalamic-pituitary-adrenal responses.[26] The hippocampus regulates emotional processing that affects interpretation of events and thus influences behavior.[27] In an uninjured brain, this appears to be accomplished by securing representations of new memories in ways that help a person flexibly respond to their environment.[27,28] Thus, altered hippocampal functioning can lead to dysfunctional and inappropriate behavior.

These structures all have the capacity to reorder themselves as part of normal neurodevelopment or in response to injury, a process known as neuroplasticity. Although this reordering typically occurs to help the individual adapt to changes in environmental conditions (both internal and external), it can also lead to maladaptive behaviors and decision-making. When a brain is healing, it may heal in ways that do not help the brain function normally. Just like scar tissue can make skin inflexible, the neuroplasticity may not lead to fully functional, optimal cognitive functioning- it might be maladaptive, leading to poor judgment or responding inappropriately.[29]

Women who have experienced IPV report symptoms suggesting injury to these neurologic structures including problems with memory, concentration, dizziness, and headaches.

[5,9,16,19] In the study of the relationship between partner abuse severity and cognitive functioning Valera and Berenbaum [19] found that abuse severity was negatively correlated with cognitive function and positively correlated with brain injury. While the focus of the research was not on neuroanatomical changes, this correlation of symptoms promotes the supposition that IPV and TBI are linked. Two recent literature reviews outline neuroanatomical changes associated with abuse, such as reduced hippocampal volume, [30] but the authors were unable to conclude whether those anatomical alterations were related to abuse, depression, or PTSD. The study also points to confounding variables for neuroanatomical changes such as dose-response rate of IPV and prior childhood abuse. [17,31]

Classification of Traumatic Brain Injuries

The classification of TBI is a complex and multidimensional topic (See Saatman et al., 2008 for an in-depth discussion of classification challenges). [32-34] Classification in a clinical setting is based on severity of symptoms upon presentation and the Glasgow Coma Scale (GCS) is a 15-point scale that is the most widely used clinical tool for determining the extent of neurological damage. [32] A GCS of 8 or less generally indicates a severe TBI. [32,33] The GCS is well validated for severe TBI but additional measures, such as serum biomarkers or neuropsychological tests, are needed to distinguish moderate TBIs. [32-34]

Mild and moderate TBIs are estimated to make up 80% of all TBIs, which are more challenging to diagnose because of the quickly resolving period of acute symptoms combined with the hesitancy of people sustaining mild TBIs to seek medical treatment. [34] The American Congress of Rehabilitation Medicine Special Interest Group lists diagnostic criteria for a *mild* TBI as "traumatically induced physiological disruption of brain function" [34(p 4)] including loss of consciousness or memory surrounding the accident, a change in mental state, and "focal

neurologic deficit(s) that may or may not be transient." [34(p 4)] If, in addition to these criteria, symptoms also include 30 minutes or more loss of consciousness, a Glasgow Coma Scale of 13 after 30 minutes and longer than 24 hours of "post-traumatic amnesia," [34(p 4)] then the diagnosis advances to *moderate* TBI.

Another cluster of symptoms are described as *post-concussive syndrome* (PCS), defined as a state that includes symptoms such as headaches, dizziness, disturbed sleep, apathy, personality changes, irritability, and becoming easily fatigued. These symptoms must still be present at least 3 months after the head injury. [17] PCS also refers to the state of lingering mild TBI symptoms one year after injury. [35]

Outcomes Associated With IPV And TBI

Physical issues

The Functional Independence Measure (FIM) assesses activities of daily living, including mobility and ability to provide self-care, and measures disability after TBI. Estimates range from one-third to one-quarter of people living with TBI who experience physical disability. [36] Because of the quick resolution of acute symptoms or a lack of physical symptoms associated with mild TBI, [34] physical disability is not one of the largest concerns for people with mild TBI. Still, people with moderate TBIs have reported poorer physical health after receiving the TBI, which may be related to absence of any rehabilitation following their injuries. [36]

Survivors of IPV are known to have multiple health issues such as chronic pain, sleep problems, hypertension, substance abuse, acute physical injuries, gastrointestinal disease, and risk of sexually transmitted diseases.[16, 37] In a study of survivors of IPV who sought emergency care, 27.6% of women experiencing 2 or more events of abuse reported medical problems associated with the abuse. [8]

Like other survivors of IPV, abused women who have experienced a TBI have adverse health outcomes such as decreased immune function, anxiety, asthma, depression, gastrointestinal disorders, stroke, sexually transmitted diseases, and heart disease. [17,38,39] These health issues were discussed in a 2008 hallmark study by Roberts and Kim [18] who asked 52 women experiencing "chronic and predictable" IPV to recall the worst incidents of abuse. All 52 women had symptoms associated with mild TBI and all reported some form of head or neck injury during the abuse episodes resulting from "slapping in the mouth, beating the head with closed fists, throwing punches across the face with fists, [and] hard shoving of [the] face against the wall or hard furniture…" [18(p 39-40)] Nightmares, sleeping difficulties, contusions, and flashbacks were commonly reported symptoms of neurotrauma. One woman developed mild temporal lobe epilepsy after being hit on the back of the head with shoes and a clothes hanger. Another woman reported hearing loss in her left ear after being hit on the head with a kitchen chair.

Genomic variations affecting outcomes

Genomic research currently underway will provide future avenues for assisting with screening and rehabilitation in relation to TBI. Wide variations exist among victims of abuse in recovery trajectory following TBI, even after stratifying for severity of the initial event causing the injury. [40] This wide range of outcomes appears to be shaped by the form and activity of genes (referred to as genomics) that are associated with recovery. How well a person recovers from TBI is partially determined by the particular genetic variations present in that individual. Epigenetics is the field that describes how genes can be modified (turned on or off) based upon environmental cues, leading to heritable changes in genetic regulation and expression. This

epigenetic consideration provides additional explanations in variation in response and recovery from TBI. [41]

Single nucleotide polymorphism (SNP) is one type of genetic variation studied extensively in relation to TBI recovery. SNP results from a substitution, deletion, or insertion of a base in the genetic code. [42-46] The two most studied types of epigenetic changes that influence recovery from TBI (often in animal models) involves methylation, when a molecule of DNA is capped by a methyl group that prevents transcription (essentially turning the gene "off"). Emerging research on combat veterans associates PTSD with decreased amounts of methylation (hypomethylation) on the promoter region of glucocorticoid receptor genes, although there was no controlling for the confounding variable of TBI in this sample. [47] These genes operate the Hypothalamic-Pituitary-Adrenal axis and are involved in stress processing and threat assessment, meaning hypomethylation at these sites predisposes a person to exaggerated responses to threats and stress. Interestingly, prenatal exposure to IPV is associated with increased methylation of these genes, the opposite effect, suggesting that the offspring's stress responses will be blunted. [48] While this could be protective in an abusive environment, making the child less likely to respond to threats, in the long term the child may be at increased risk for injury because of this reduced response to environmental threats.

The other well-studied SNP is histone modification, when a usually sheltered area of genes is essentially held open facilitating gene expression (turning the gene "on"). [49-51] Research on animal models provides evidence that histone modifications occurring after TBI result in altered hippocampal functioning. This can be manifested as impairment in the ability to flexibly and appropriately respond to social situations or to achieve novel solutions to problems and may present as deficits in executive functioning, or memory after experiencing IPV-related TBI. [49,52]

Research into SNPs on specific genes believed to be related to neuroinflammation and healing is ongoing. The most studied gene to date, *ApoE,* is on Chromosome 19. [53-55] Particular SNPs of *ApoE* appear to predict worse outcomes following neurologic injury. [53,55] Similarly, polymorphisms in the ANKK1 gene are correlated with cognitive deficit after TBI. [54,55] In addition, SNPs on a serotonin transporter gene (5-HTT) have been associated with depression following TBI [56] and have been related to aggression and violence in perpetrators. [57,58] Although this remains an emerging field of research, genetic constitution appears to influence tendency toward violence and ease of recovery from neurologic injury.

Genomic research relating to recovery from TBI is salient to this discussion because of the potential predictive value of these variations regarding prognosis and response to treatment and rehabilitation. Differences in both preexisting genomics and the potential for wide-ranging epigenetic modifications in response to TBI may account for variations in recovery. These differences may also be useful in determining who is most vulnerable to sustaining brain injuries and is an important emerging area of study that has yet to be considered in IPV research.

Cognitive changes and mental health associated with TBI and IPV

Survivors of IPV frequently report symptoms consistent with PTSD such as sleep disturbances, memory loss, irritability, fatigue, and dizziness; all symptoms that overlap with mild TBI, making it difficult to determine a differential diagnosis. [17] Research has shown that different forms of therapy used with people experiencing PTSD can also decrease negative outcomes from IPV. [8,15,17,19,31,61] Functional MRIs showed that administering cognitive trauma therapy to IPV survivors who experience PTSD was successful at controlling emotional reactions to events. [61] Research conducted using mixed methods suggests that, to capture the complexity of

problems experienced by IPV survivors, treatment should include more than just treatment for the acute trauma. [15]

Two interesting findings from a qualitative study of women who experienced TBI outside of the context of IPV relate to cognitive and mental health issues for public health professionals to bear in mind. [62] First, these women tried to disguise their injuries in an attempt to appear "normal." [62] Second, these women found themselves in a "disempowered position" and were "unable to resist dominance and oppression by significant others," [62(p 50)] demonstrating how living with a TBI makes women more vulnerable to abuse even if the TBI does not result from IPV.

Parenting outcomes associated with TBI and IPV

The area of study of stress, parenting, and coping among women experiencing IPV is relatively new. Mothers currently experiencing IPV compared to mothers without a history of IPV showed equal parenting behavior but it was found that mothers experiencing IPV directed more positive behaviors toward older children than younger children. [63] Parenting after experiencing a TBI is better studied than parenting after IPV, although not well understood. A Danish study looked at outcomes of children from families with one parent having a brain injury and found a relationship between higher stress levels of the "healthy" (no brain injury) parent and higher stress levels of the child. [64]

A qualitative study on the siblings of someone with a TBI observed that worry about the TBI affected sibling's ability to maintain healthy parenting relationships and poor parenting skills was a common theme. [65] One participant said her sister with a TBI had "no 'real' emotional, nurturing bond with any of [her children]- and I also fear for the children…I am fearful and sad for her children's well-being." [46 (p 247)]

As previously noted, mothers who have a TBI are also at greater risk for child abuse, with one study finding a TBI rate in mothers at-risk for child abuse three times higher than the general population. [13] 59% of these mothers with TBI reported receiving their first TBI before the age of 16 and most of the TBIs were received from car accidents. [13] Because this study relied on self-report of head injury, it can be assumed that there were some head injuries that were not disclosed. [6,31]

Parental TBI has been linked by Niemelä et. al [14] with increased risk for psychiatric care use in children. A child whose mother had a mild TBI was twice as likely to use psychiatric care [OR 2.15, 95% CI 1.64-2.80, p <0.001] and with a severe TBI was 1.5 times more likely [OR 1.55, 1.06-2.27, p = 0.025] compared to children in the general population. The odds ratio for having a father with mild or severe TBI was 1.34-1.63, showing that maternal head injury has a greater impact on child well-being than paternal head injury. The authors conclude that children of mothers with head injury need additional support and child-centered care to protect their welfare. [14] With such a large number of undiagnosed TBI in families experiencing IPV, these children are not receiving this improved supportive care and may grow up using an increased rate of psychiatric services.

Screening Issues

Screening survivors of IPV for TBI is not routine and treatment interventions for abuse reduction do not incorporate rehabilitation for head injury. [9] While several TBI screening instruments do exist [9,16] most tools currently used for diagnosis were tested on young healthy males who had experienced a one-time trauma resulting from an incident such as a motor vehicle accident. [17] Evidence has shown differences in the healing time of male and female brains [33] and the validity of these tools has not been demonstrated in women who are victims of frequent

abuse over long periods of time.[62] Monahan and O'Leary[10] argue that it is also important to obtain standardized baseline neurologic functioning on women who seek treatment for abuse to monitor cognitive functioning over time to track progress on sustained head injuries.

The *HELPS Screening Tool,* created in 1991 by the International Center for the Disabled, contains a series of questions about being hit in the head, losing consciousness, or experiencing new problems in daily life since the event. A positive screen using this tool does not provide a diagnosis of a TBI but is an indication that more medical treatment is needed.[16] *HELPS* is a generic screening tool for mild TBI and is not specific to abused women. This is the best available initial screening tool, even though its psychometric properties are not known and it relies on self-report,[9] and it should be considered as an initial screen for all women known to have experienced abuse.

The *Total Symptom Severity Index* (TSSI) created by Jackson et al.[9] is an additional screening tool to quantify the severity of symptoms if a woman screened positive for TBI with the *HELPS* screening tool and also relies on self-report of symptoms. When administered to a group of 53 abused women the TSSI had a Cronbach Alpha coefficient of .89, indicating high reliability for capturing increased abuse severity. Although designed more than a decade ago, this tool has been underutilized and was not cited in any other articles in the literature review.

Screening for both IPV and TBI is important because of under diagnosis of both and the overlapping relationship. A positive screen for either IPV or TBI should lead to a screen for the other. Women experiencing abuse experience several types of stigma,[66] which contributes to difficulty in revealing abuse when screened.[67] Acknowledging symptoms of a mild TBI may be less stigmatizing and lead to earlier intervention. This could lead to a more trusting relationship; and once trust has been established with a community health professional, it is more likely that

an abused woman might feel comfortable discussing abuse, either former or current. [68] However, it is important to emphasize that professionals providing screening for TBI need to be trained on how to response to a positive screen for more serious TBI, similar to responding to a positive screen for depression or suicidal ideation, and know when to refer a woman to appropriate medical treatment.

Correlations Between TBI And IPV In Abusers

There is another egregious correlation between TBI and IPV. A single episode of TBI from any source can result in epigenetic and neuroplastic changes that increase the risk of the injured person perpetrating abuse on someone because of changes in executive functioning, emotional control and problems with memory. Thus, a person who has experienced a TBI is at increased risk for committing abuse. Between 53% and 61% of IPV perpetrators have a personal history of closed head injury. [69-71] Women who received a TBI as a child are more likely to commit child abuse as mothers. [13] These data imply that people living with a TBI acquired at any point in time are at risk of perpetrating violence against their partners or their children. Family members of a person recovering from a TBI can be at risk for experiencing a physical injury themselves, including TBI, in addition to potential emotional trauma or epigenetic changes that compromise their ability to assess environmental threats.[38] Public health professionals caring for families in which one member is living with a TBI should be watchful for this potential of abuse towards other family members.

Implications Of Missed TBI Diagnosis Among Women Experiencing IPV

The failure to link problems frequently experienced by survivors of IPV such as memory loss, headache, and functional impairments with TBI can lead to inappropriate diagnosis (e.g., PTSD), inadequate intervention, and insufficient treatments. [16] Potential dangers of this missed

TBI diagnosis include loss of employment and underemployment, [5,10] increased abuse severity with compromised judgment from TBI, [9] and increased risk of permanent damage to the brain if a second injury occurs before the first injury has healed, which can eventually lead to death. [20]

Parents often experience changes after a TBI, such as difficulties with coping and parenting. [64] Missing this diagnosis is also a missed opportunity for intervention to improve parenting and to prevent the negative outcomes associated with parenting after head injury, including child abuse [12] and increased risk of needing psychiatric care. [14]

After correctly identifying TBI related to IPV interventions need to address safety planning in response to the IPV and to include appropriate interventions aimed at addressing physical, cognitive, and psychosocial aspects of rehabilitation. [9] Until there is a multi-disciplinary approach to address this complex problem, women and families will continue to experience unnecessary adverse outcomes.

Recommendations For Future Research

A reliable and valid screening tool is needed to assess IPV survivors for TBI to provide appropriate interventions by healthcare professionals and community health workers to lead to improved health outcomes in this population of abused women and their children. At the present time, the available self-reporting tools to detect head injury, such as *HELPS,* are used infrequently. In addition, neurologic changes experienced by women experiencing IPV, including problems with comprehension, memory, and concentration, argue for not relying on self-report alone to learn about past head injury during episodes of violence. [9,16,31]

It is well documented across disciplines that people experiencing a mild TBI frequently do not present to a hospital, or have a delayed response if they do seek medical care. More research is needed outside of the clinical setting to begin to understand the true prevalence of

unreported TBI among IPV survivors and the impact on their the lives. Increasing knowledge and training of community health professionals around TBI response and implementing screening among IPV survivors can help expand the scope of research beyond moderate to severe TBI recovery in a clinical setting to the prevention and documentation of mild TBIs among a population that is currently being untreated and undiagnosed.

Implications for Community Health

IPV and TBI are overlapping issues that will always require multidimensional interventions but research is emerging that shows it is not neurological scans or medical interventions that are needed to address this problem. Community health professionals are well placed to implement changes around the prevention and treatment for IPV and TBI. To an outsider, leaving an abusive situation may seem like a straightforward process, but a woman's decision to leave an abusive situation can be complicated even without the cognitive challenges posed by mild TBIs.

Public health professionals can capitalize on emerging research showing that psychosocial treatment is more efficacious than medical treatment in women who experience IPV and have less severe head injuries. [33,71] While clinical research is important and necessary, the public health response is arguably more important to connect these women with interventions that are community based and will address psychosocial outcomes as well as physical trauma.

Screening for TBI and IPV by public health professionals must be a continuous practice. Disclosure of IPV is a staged process that is seldom divulged in a single session, and the risk of TBI exists as long as the woman remains in an abusive relationship. Until there are more TBI instruments that have been validated among IPV survivors, professionals working with survivors

of IPV can start by asking basic questions about problems with memory, headaches, and changes in cognitive function.

If a woman does screen positive for a mild TBI from IPV, therapeutic interventions focused on psychosocial outcomes and coping may be critical to her recovery. Psychosocial outcomes of a positive screen for mild TBI should be considered at the point of first contact and during recovery. Howell et al. [72] demonstrated that women living with IPV felt more empowered and improved their parenting practices after participating in a group intervention for parenting. A focus on improving skills and adaptive behaviors is an important shift away from victim blaming or simply asking the woman why she doesn't leave the relationship. Helping abused women feel empowered through therapy or intervention for TBI may eventually lead to leaving the relationship, but it is more important to help her make good decisions that keep herself and her children safe.

Changing Healthcare Workers' Assumptions About Abuse

It is time to include TBI in the list of risk factors associated with IPV and other types of family violence. If survivors of IPV are not considered at risk for head injury, then that risk is not screened for, diagnosed, or treated appropriately. The data here strongly suggests that TBI screening should be included in screening for IPV and should be anticipated as an outcome from IPV. The purpose of screening for TBI among IPV survivors is to provide psychosocial interventions to improve safety and to provide support for the woman and her children. TBI screening and intervention will give providers tangible ways to help and to stay engaged with families at risk for and experiencing abuse.

Conclusion

Public health practitioners and community health workers already play a critical role in identifying women at risk for experiencing abuse. Risk of TBI must also be considered when working with these women. Screening for TBI and providing supportive care related to head injury are concrete ways that practitioners can address health issues and quality of life for these women and their children.

There is a twofold risk of TBI and violence in intimate relationships, which is a deadly combination. Sufficient evidence exists showing that head injury is quite prevalent in abused women and that it causes neuroanatomical, genetic, and epigenetic changes that can affect multiple generations. Further research that examines supportive interventions for this population is warranted. Community responders to IPV need to be aware of the increased risk of TBI in this population and familiarize themselves with warning signs and indicators of head injury. Caring for these families requires a well-rounded approach to fully address the complex problems. Routine, concomitant screening for IPV and TBI should become more prominent in community health and acute care settings and the relationship between these two issues, including causative factors, must be addressed.

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Chapter Four: Context of abuse and lives of women
(to be submitted to Violence Against Women)

"My head was all hurt:" Insight into Head Injury from Intimate Partner Violence

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Abstract
It is estimated that 60% to 92% of survivors of intimate partner violence receive facial or head trauma during the abuse. Little research exists about the episodes of abuse when women receive the head injury or why they are unable to seek medical care. Interviews collected during a longitudinal, multi-site randomized controlled trial from women who reported passing out from being hit in the head were analyzed using thematic analysis. Salient themes of extreme control, subterfuge, manipulation, the abusers creating a perception of being indispensable, and fear of losing children emerged. Women were not able to seek medical care for the head injury because the abuser often used forced sex immediately after head injury to instill fear and authority. Healthcare providers, social workers, researchers, and survivor advocates should be conscious of the link between forced sex and head injury and the extreme control of abusers who inflict head injuries during intimate partner violence.

Key words: intimate partner violence, head injury, forced sex, extreme control, women's health, violence prevention

Roughly 2% of the American population are living with disabilities from a head injury but these numbers are underestimated because not all people who receive a head injury, specifically a mild traumatic brain injury (TBI, such as a concussion), seek medical treatment which makes the true prevalence unknown (Ruff et al., 2009). The Centers for Disease Control and Prevention (CDC) Report to United States Congress identified several groups that require special attention for screening for TBI: children (ages 3-17), older adults (> 75 years), returning service men and women, rural residents, and incarcerated men and women (CDC, 2015). There is a small but growing body of literature showing high prevalence rates among another population in need of increased screening for TBI: women who are survivors of intimate partner violence (IPV). IPV survivors are seven times more likely (OR 7.21, CI 2.79-18.61, $p < 0.001$) than women who are not abused to receive a TBI with loss of consciousness (Anderson, Stockman, Sabri, Campbell, & Campbell, 2015) and estimates range from 60-92% of women reporting injuries to the head or face during episodes of IPV (St. Ivany & Schminkey, 2016). A recent study with 208 women in domestic violence and homeless shelters found 88% of women living with more than one brain injury, 80% experiencing a loss of consciousness with the injury, but only 21% getting medical care for those injuries (Zieman, Bridwell, & Cardenas, 2017).

Head Injury and IPV

Both head injuries and IPV are underreported because of hesitancy to seek medical care after experiencing a TBI (Ruff et al., 2009) and not all women report incidents of IPV (Corrigan, Wolfe, Mysiw, Jackson, & Bogner, 2001; Davis, 2014; St. Ivany & Schminkey, 2016). Other challenges to understanding true incidence and prevalence of TBI from IPV include lack of a specific screening tool and difficulties with classification and diagnosis of mild TBI when

women do seek medical care (for greater discussion on TBI screening difficulties see Goldin, Haag, & Trott, 2016 and Saatman et al., 2008).

Recent literature reviews (St. Ivany & Schminkey, 2016; Murray, Lundgren, Olson, & Hunnicutt, 2015) report 35% to 92% of women in shelters experiencing at least one head injury during a violent attack (Corrigan et al., 2001; Jackson, Philp, Nuttall, & Diller, 2002; Monahan & O'Leary, 1999; Roberts & Kim, 2008, Valera & Berenbaum, 2003) and 92% of abused women in a pilot study who were screened when entering a women's shelter reported being hit in the head or face (Jackson et al., 2002). In another study of women who sought medical attention for IPV, 45% of reported passing out from an injury during IPV and 46% reported multiple injuries to the head (Mechanic, Weaver, & Resick, 2008).

Survivors of IPV have adverse physical health outcomes that lead to chronic conditions: decreased immune function, anxiety, asthma, depression, gastrointestinal disorders, stroke, sexually transmitted diseases, and hypertension (Campbell, 2002; Ford-Gilboe, Varcoe, Wuest, & Merritt-Gray, 2011; Iverson, & Pogoda, 2015; Kwako et al., 2011; Rich, 2014). Recent studies on TBI from IPV found women living with additional mental health and neurological symptoms: headaches, memory loss, problems sleeping, pain, tiredness, sadness, post traumatic stress disorder, and poor perceptions of physical health (Iverson et al., 2017; Zieman et al., 2017). If women do seek medical treatment for a head injury from IPV, rehabilitation strategies used for mild TBI can be used such as interventions to help with memory problems, cognitive problem solving, and emotional regulation (Banks, 2007). Most research on outcomes after TBI has been done on males and more research on the differences in recovery by sex is needed, including expanding studies to include people with more severe TBIs to fully understand the

experiences of living with TBI (Ponsford, 2013; Cancelliere, Donovan, & Cassidy, 2016; Paterson & Scott-Findlay, 2002).

With many unknowns in the relationship between TBI and IPV, it is important to explore individual and systems factors that can make women more prone to experiencing this severe forms of violence. The purpose of this study was to understand the context of the lives of women who experience a TBI from IPV and the reasons why they are unable to seek medical treatment.

Method

Sample

The study was conducted as a secondary data analysis from an existing data set and IRB approval was obtained for the original study and the secondary data analysis. The parent study for the secondary data analysis was the Domestic Violence Home Visitation (DOVE) study; a large, multi-state, mixed methods randomized controlled trial (RCT; R01 NR009093) that evaluated the effectiveness of an empowerment protocol (DOVE) within home visit programs with low-income women who were victims of IPV during pregnancy and postpartum (Sharps et al., 2016). Low-income women from both rural and urban settings who were eligible to participate in a perinatal home visiting program were recruited from health departments' perinatal home visiting programs from 2006-2012. To be eligible for the DOVE study women had to be in a current abusive relationship or have been in an abusive relationship within the past year. Quantitative data were collected up to seven times with women ranging from pregnancy through two-years post delivery. A subset of women agreed to participate in up to five qualitative interviews over the course of the study. Research nurses conducted all interviews at times and locations that were convenient for the women. During the qualitative interviews open-

ended questions were asked leading up to the question "tell me about your worst instance of abuse." (See Sharps et al., 2013 for full description of DOVE study.)

The sample for this secondary analysis of qualitative interviews included all women who answered yes to question 23 on the Conflict Tactics Scale (CTS), "Have you ever passed out from being hit in the head by your partner?" (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Self-reporting of a loss of consciousness is indicative of a TBI (Ruff et al., 2009), however, because no medical diagnosis was confirmed in the study, labeling the event as a TBI is problematic. To operationalize the event of "passing out from being hit in the head by a partner," the term head injury is being used instead of TBI.

Of the 239 women in the parent study, 21 answered yes to CTS 23 at some point during the study (see Table 1 for demographics of women who answered yes). Sixteen women answered yes at baseline and five answered yes during the two-year timeframe of the study, meaning that 16 women entered the study with a prior history of head injury from IPV and five women experienced a head injury during the post-partum follow up period. Of these 21 women, nine women had one to five qualitative interviews for a total of 21 interviews included in this qualitative analysis. Electronic copies of these 21 de-identified interviews were transferred to the first author for coding and analysis.

Analysis

Thematic analysis (Braun & Clarke, 2006) was used to analyze interview data from the interviews selected for this study. Six phases of analysis were used to code and categorize the data. First, a deep read of initial interviews was conducted as a means to become familiar with the data. Second, interviews were coded using line-by-line coding and a code list was created. Third, codes were categorized into preliminary themes that characterized the context of IPV and

women's experiences with head injury. In vivo coding (coding in a participant's own words) was also used to capture evocative descriptions of women's experiences. Fourth, preliminary themes were reviewed with substantive (IPV) and methodological (qualitative research) experts. Fifth, final labels were given to the refined themes and each was conceptually defined and discussed in a thematic memo. Final themes were of two major types: themes about context (experiences common to women regardless of rural or urban residence) and themes about receiving a head injury. Sixth, the themes were integrated into a final report to communicate study findings. Rigor was achieved by using iterative memos read by members of the research team, code lists were categorized into themes, and reflexivity was included in memoing.

Findings

Analysis of nine women living with head injury from IPV revealed themes around instability and extreme control of the abusers. The interactions of instability and extreme control created an environment that made these women prone to vulnerability and extreme abuse that led to inflicting a head injury and an increased risk of death.

Context of the Lives of Women

Despite the different rural and urban geographic locations, there were many similarities in the context of the lives of the women: instability, incarceration, intergenerational substance use, low employment or unemployment, and police response to episodes of IPV (see Table 2 for description and connections). The overarching theme was instability, defined as living with a lack of permanence and safety. This environment of instability allowed the abuser to maintain an element of control because he was often the only thing in her life that was constant. Facets of instability ranged from not having control and agency over basic needs such as housing to experiencing cycles of incarceration and drug use. Women discussed many elements

encompassing instability: uncertain housing situations (living with family members, transitional housing, unable to make rent and being evicted, multiple people living in the same house), having multiple partners during the course of the study (the father of the baby was often not her current partner during the study), and multiple children from multiple partners.

There was an element of fear of having children taken away or having social services called, which added an additional level of instability. All women expressed fear of losing children because they did not have a stable place to live or the space was full of other people who might put her children at risk. Some women were not even sure they would be able to bring their babies home once they were born. Salient dimensions of instability include incarceration and housing instability, substance use, low employment or unemployment, and variations in level of protection from the police response.

Incarceration. The cycle and constant threat of incarceration were common experiences that contributed to a feeling of instability and vulnerability. Women experienced incarceration of themselves, their partners, and family members. Some women had served time for charges related to self-defense against her abusive partner or drug related charges. Current partners and/or abusers were in and out of incarceration, parents were incarcerated during the woman's childhood, and sometimes the women were on probation and this would be used as a way to control them. The cycle of here/not here added instability due to the uncertainty of when the abuser might be released and begin stalking her and therefore never being sure of the threat of danger. The instability arising from having parents and family members incarcerated throughout her life took away the feeling of stability from her social and family support, making her more likely to stay with the abuser.

Abusers would also use the threat of incarceration to increase her feelings of vulnerability. One of the participants had been in a halfway house and ran away, meeting her abuser through a friend after she left. He offered her a place to stay to hide from the authorities. He then proceeded to lock her up in a small apartment and forbid her to see anyone or to leave, saying that if she disobeyed him he would turn her in and tell stories about how she had been stealing from him. She lived as a captive in an abusive relationship in this apartment for almost three years because she was afraid of being re-incarcerated.

Intergenerational substance use. Drug and alcohol use was a common theme in the lives of all the women and did not vary across location, although the type of drugs used did vary. In urban settings, heroin and cocaine were more commonly used and in rural settings the women discussed prescription painkillers and crystal methamphetamine used by themselves and others. One woman described her abusive partner forcing her to do meth with him.

> He went over [for drugs and] came back extremely, extremely messed up off of methamphetamine, came back home, had some, got mad cause I wouldn't do it [use meth with him], started hitting me for not wanting to do it, yelling at me… He ended up basically telling me do it or, you know, "I hurt you." Despite, despite me not wanting to I ended up having to do some with him…

Alcohol was a constant presence in the lives of women even though many of them did not drink. While women were not specifically asked for reasons why they used drugs or alcohol several discussed living with chronic pain and a need to escape reality.

Money spent on drugs by abusers was a common element of the substance use. Paychecks for the entire month were spent in an afternoon on drugs, which added to the element of instability for women and their children. In addition to the financial instability, there was an element of emotional instability that comes with substance use and having cycles of IPV linked with cycles of drug use.

Low employment or unemployment. A common experience of these women was extreme difficulty finding a job because of incarceration record, lack of transportation, the abuser being unwilling to allow her to work outside of the home, and lack of childcare. Only one woman was working full time and she owned her own business. Several women had part time jobs but most were unemployed or underemployed. The abusers made it very clear that they were capable of physical harm and had inculcated a strong sense of fear that harm would come to her children if she left them with someone else.

Police response. Almost all women in this sample had called the police related to IPV and the police response was varied. Some officers would show up, listen to a lie from the abuser about what was really happening, judge the situation as inconsequential, and leave. Other officers would respond in a more helpful manner, including encouraging the women to keep calling during every episode so they could build a file on the abuser for future use. One participant who was raped by her abuser at age 12 described a police officer taking her away from the chaotic situation to talk to her about what had happened. This mixed police response added an element of instability because the women were not sure if calling the police would add protection but it almost always placed her at greater risk for violence and retaliation from the abuser.

Themes Around Head Injury from IPV

All women described the abuser who inflicted the head injury (called the alpha abuser for the purposes of analysis) as very dangerous and it was not uncommon for women to be in a new relationship (often also abusive) to serve as a protector from the alpha abuser. The alpha abusers were frequently in and out of incarceration and exhibited threatening behaviors such as stalking, rape, and arson. The episode of physical violence when a head injury was inflicted was often

followed by forced sex which women described as the lowest form of denigration. Themes of extreme control from the alpha abuser, historical control from incarceration and/or foster care, and fear of losing children emerged regardless of urban or rural location.

Extreme control. The alpha abusers were described as exhibiting multiple, overlapping dimensions of control that would culminate in an episode of physical abuse where she was hit in the head and forced to have sex with him. The two major dimensions to the theme of extreme control were mental/emotional control and physical control. As each dimension grows more complex it overlaps with the other dimension of control. For example, two forms of mental control such as threatening her children and t stalking can eventually lead to physical violence and control.

Mental/emotional control. Mental and emotional control can be defined as the myriad ways the alpha abuser controls the woman that do not involve physical abuse. Many times the alpha abuser would use physical abuse to reinforce mental and emotional control, such as inflicting violence and then using the threat of violence to get her to do what he wants. There were classic signs of emotional abuse: name calling, creating a feeling worthlessness, being cut off from friends and family. "The only way I felt normal [was] because he would bring me down so much and that's where I was used to being, and that was normal for me."

The alpha abusers went beyond these forms of emotional abuse and exhibited signs of subterfuge to control the woman, even after she left him. These codes included stalking, pretending to be someone else to find out her personal information, lying, and cheating. One urban woman had an early delivery and the abuser would threaten to come to the hospital and take the baby, or he would lie to the hospital staff and say they were together and come threaten the woman in the hospital. Alpha abusers would call the women's therapists, social workers,

doctors, and hospitals and pretend to be someone else and ask for information on the woman such as medical condition or phone number.

> He would call my prenatal clinic, lie and say he was a homicide detective from downtown. He called my therapist, told her the same lie…because he wanted to know where I was because he didn't know where I was and nobody would tell him.

The extreme abuse would continue after she had left the alpha abuser. He would refuse to accept this and would threaten her by saying things like, "If I can't have you no one can have you" and "I've got papers on you [marriage certificate]" and express extreme forms of ownership, even though the couple was never married or had been divorced for several years. One rural woman said even though she was now married and he was dating other people he would always stalk her and find her to abuse her because they had been together for seven years and he couldn't let go.

These cunning and unpredictable behaviors create a form of extreme control because it makes her feel that she cannot trust anyone or ever know that she is safe from the alpha abuser, especially if she has already left him and he is using extreme forms of subterfuge to find her. Women expressed the sentiment that it only took one friend to give away a new telephone number, or one naïve receptionist. A commonly expressed feeling was to completely cut off all friendships in order to completely escape the abuser.

> He's the type of person who watches everything everybody, someone does, and then he'll use it against you. He's very conniving…he can manipulate his way into anything.

Physical control and denial of medical attention. The alpha abusers used physical violence and subsequent denial of medical attention to inculcate fear as a way to get the women to do what they wanted. Episodes of IPV that included being hit in the head were used as the most severe forms of abuse and control. Some women reported only being hit in the head once while others reported passing out from hitting her head after being shoved down the stairs,

having her head slammed into a piece of furniture, or being punched multiple times in the head and face.

The stories of physical injury and being hit in the head were often accompanied by forced sex. "He like to hit me in the head…he was forceful if I didn't want to have sex." One woman describes being hit so hard in the head that she passed out and when she regained consciousness her alpha abuser was raping her.

> He proceeded to get angry again, smacked me around. I do believe that for a moment I ended up blacking out cause there is just so much of an area that I don't remember, and I woke up to him going ahead and just doing what he pleased with me as I was not awake.

Another woman described being hit in the head as the most threatening way to force her into sex, which all women described as the worst kind of abuse. Their ability to consent to sex was described as so precious, and the one thing that they should be able to control, but it was taken from them.

> Him actually being able to do it [sex] and him supposed to be the person that's supposed to be protecting me now, and then him being the one to do it always hit me really hard…it's just kind of difficult to say, you know, I was raped this many times by this man that I loved and lived with, you know… it made me fear him even more from taking that, that power, the authority from me to actually give permission for that and basically be, you know, told "I don't need it. It's mine anyways. I'll just take it."

One rural woman, after she left the alpha abuser and he had served his probation time, was confronted by him in her new place of residence (which was her mom's apartment). She answered the door because she thought it was her sister's friend and was scared when it was her abuser. She discusses the incident in two different interviews, but it is not until a later interview that she opens up about allowing him to have sex with her because he said he would take it either way and she didn't want her face and head to be bloodied.

Denying the medical attention needed for the head and other injuries was also an extreme form of control. Women were not allowed to call 911, saying that any medical attention would

discover the violence. In one episode of extreme IPV, the alpha abuser was threatening to kill the woman. To show that she wasn't afraid of dying, she grabbed what she thought was a dull butter knife and held it to her wrist when in reality it was a filet knife and she cut herself deeply. She was not allowed to go to the hospital and gave herself four stitches using a fishing hook and fishing line. This is an extreme form of control because it shows that he is the one in charge of whether or not she lives or dies and how much pain she should suffer. This same woman described a different morning, where after throwing her down the stairs and out a three-story window, the alpha abuser brought her ice, Tylenol, and Ace Bandages. These actions made the woman feel more confused and question her judgment and her perception of reality.

> I didn't understand how he could be so kind but then so evil at the same time, and how I could still love him regardless, so. It was just very confusing for me; I didn't really, I didn't get it for a very long time that it wasn't, it just wasn't love. It just flat out wasn't love. And I, I think the reason why I didn't realize it was because I think that I actually had to stop loving him for me to actually realize that he really didn't love me.

Discussion

This study is one of the first to explore the lives of women who self-report passing out from being hit in the head during IPV. These women's contexts make them more vulnerable and susceptible to extreme abuse. Women in the study had common experiences of drug use (heroin in the urban location, methamphetamine in the rural), alcohol use, history of sexual abuse in childhood, institutionalization (foster care, incarceration, or both), housing instability, and low employment. These factors combine to create fluctuating vulnerability that allows the alpha abuser to enter the woman's life and begin to manipulate the situation, starting with safety in the form of housing and ending with extreme control that she may never escape.

The findings of increased mental and emotional control by the alpha abuser expand and challenge existing knowledge. In the study of female veterans, Iverson & Pogoda (2015) found

no statistically significant difference in past year severe psychological IPV between women with IPV related TBI and women without TBI from IPV. This study is one of the first to explore the role of mental and emotional control from the abuser who inflicts a head injury during IPV. Future research should focus on the relationship between TBI and psychological abuse.

The findings of increased sexual violence with head injury is unique to this study but supports a growing body of literature linking sexual violence to head injury. Female veterans screening positive for TBI from IPV showed an increase in sexual abuse in the past year compared to women without a history of TBI from IPV (46.4% compared to 13.0%, $p < 0.001$, Iverson et al., 2017). Findings around the relationship between police involvement and increased sexual abuse are supported by Messing et al. (2014) study describing characteristics of women experiencing IPV with police involvement: increased sexual abuse, physical abuse, miscarriages related to abuse, increased rates of stalking and strangulation. Future research should focus on interventions based on rape survivorship and sexual assault as well as head injury.

While it is known that not all people do not get medical treatment after TBI, it is surprising that no women in the study were able to get medical care for their head trauma. This study provides an understanding that hitting her in the head is not just about physical abuse; it is about exerting dominance and creating an environment of extreme control. Inflicting a head injury was the epitome of extreme control and was used to take away her ability to consent for sex and her ability to seek medical attention, showing that he is in control of all aspects of her life. This is an important finding because getting medical attention for the head injury might not be enough to address the complex situation. Nurses and healthcare providers should be aware of the relationship between forced sex and head injury and the situation could be a barrier to reporting because women do not want to disclose the sexual abuse that is associated with the

head injury. A woman presenting with head injury from IPV is an important clinical indication for conducting a lethality assessment. These assessments, such as the Danger Assessment (www.dangerassessment.org), can help women understand the risk of escalating violence (Campbell, Webster, & Glass, 2009).

Goldin et al. (2016) discuss the need for a theoretically based framework to create or modify a screening tool for TBI from IPV including the need to routinely screen for TBI in IPV related settings. Findings from our study suggest that a screening tool should also ask about increased sexual abuse, stalking, police involvement, and increased emotional abuse and isolation. Future research could focus on creating a screening tool for prevention of TBI to assess risk of receiving a head injury from IPV if she is experiencing other elements of abuse women discussed in this study.

Because of the nature of a secondary data analysis, no follow up questions or theoretical sampling were completed around head injury and IPV. In the interviews, no women reported receiving medical treatment for the head injury, however this was not specifically asked. Also, it is unknown if the women had more than one head injury or a previous head injury unrelated to IPV from car accident, trauma, or child abuse. Future research should focus on the way the woman's health or perceptions of health change after receiving a head injury and lifetime accumulation of head injury. Another limitation to this study is that all women were pregnant and many had other children. The study cannot be generalized to women without children whose responses to getting health care after a head injury due to IPV may be different.

Only a small number (8.8% of total DOVE sample) reported passing out from being hit in the head by a partner. This is higher than the national average of people living with head injuries but lower than other reports of IPV survivors. Possible reasons for this lower prevalence

include: the women in the DOVE study were living in the community and not in a shelter so it was not such a concentrated sample of women experiencing more severe forms of IPV, women misunderstanding the meaning of the word "hit" and not answering "yes" if they had head trauma from being hit by objects or being kicked or thrown down, and whether or not women remember passing out from being hit in the head during IPV. Future research should explore women's recollections of abuse and ability to self-report passing out, especially if they have symptoms of head injury but cannot specifically remember passing out from a blow to the head. A consideration of expansion of the current TBI screening tools is needed to account for the variety of ways women might experience any form of trauma to the head that could cause disruption in brain functioning, such as choking, kicking, or having her head slammed into a wall.

An important strength of the study, however, was that despite the instability found in the lives of these women, they were able to build trust with the research team during the 24 month course of the study. It is very difficult to interview and reach out to women during episodes of extreme violence. Because of the retrospective nature of the question "tell me about your worst episode of abuse," women were able to describe events where they were not able to seek medical help. This insight is something very rarely seen in research, especially in women living in the community and not in a shelter. During the final two-year interview many woman said they had shared experiences and information with the interviewer that had never been shared before. This demonstrates a large amount of trust that was developed over time.

> I've spoke with you guys more than I've spoke with anybody else. I, after talking to you guys through this whole situation and everything, I've actually been able to open up and talk to my husband about my past, and I've talked to my best friend about what was really going on in certain situations.

This model of building trust and demonstrating stability can be used as an example of a way to counter instability and to guide future studies.

Conclusion

This study demonstrates the complex nature of researching head injury from IPV: the underreporting of both head injuries and IPV; the inability of women to get medical treatment after being hit in the head; and a lack of effective screening tools for head injury from IPV. Nurses and community health workers who work with survivors of IPV can make an immediate difference by asking focused questions in a trauma history about times that she might have been hit in the head during abuse, asking about sexual abuse and rape, and connecting women to resources for head injuries that might be easier to access than getting medical care. The organization brainline.org has sections called "For people with a TBI" and "Research Updates" that can be given to women as a resource. Pink Concussions (pinkconcussions.com) is an advocacy group dedicated to women and head injuries and has Facebook support groups available for women to join. While it may not be possible for women to get medical treatment immediately after receiving an IPV related head injury, taking small steps to identify lingering symptoms of TBI and introducing resources could help women understand changes in themselves that could be related to head injury and seek more resources to help improve their lives and the lives of their children.

The authors declare that there is no conflict of interest.

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Table 1. Descriptive statistics of head injury* group

Race	Black = 10	White = 11
Location	Urban = 10	Rural = 11
Age Mean= 23 SD= 4.6	Min 17	Max 33

* Head injury status measured by answering "yes" to CTS23 question "Have you ever passed out from being hit in the head by your partner?"

Table 2. Context of women living with head injury from IPV

Concept and definition	Examples	Manifested As	Related to
Instability- lack of permanence and safety	Unstable housing, multiple partners, multiple children, fear of losing children.	living with family members, unable to pay rent and being evicted, calling social services used as threat.	Systematic control, historical control, incarceration.
Incarceration- of women themselves, their partners, or family members	Women on probation, partners in and out of incarceration, woman's parents were incarcerated while she was growing up.	Abuser locking up woman in isolation for 3 years and threatening to call her probation officer if she left, stalking from abuser when he was out of jail, woman growing up in foster homes because her parents were incarcerated.	Instability, vulnerability, systematic control, foster care.
Intergenerational Substance Abuse- women themselves, their partners, family members or friends	In urban location, heroin and cocaine were used more frequently. In rural locations, crystal meth and prescription pain killers were the most common. Alcohol was present in both.	Women using drugs as a way to escape reality, abusers spending rent money on drugs, emotional instability related to substance abuse, abuser forcing woman to do drugs with him.	Financial instability, incarceration.
Low employment/ unemployment- of women and their partners	1 in 13 women had full time job, all others underemployed. Abusers exerting extreme control by keeping women at home and financially dependent.	Abusers unwilling to drive woman to work, lack of childcare options, women afraid of leaving children alone because abuser may harm them.	Extreme control, incarceration, instability.

Chapter Five: Rethinking survivorship: Stranded at the intersection of Traumatic Brain Injury and Intimate Partner Violence

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Introduction: There is increasing evidence that women experiencing intimate partner violence are receiving traumatic brain injuries during the violence but little is known about the context of their lives, the nature of abuse when they are hit in the head, and how their symptoms of brain injury impact their lives.

Methods: This qualitative, constructivist grounded theory study explores women who pass out from being hit in the head during intimate partner violence using primary and secondary data analysis (N=19). Forty-one interviews were analyzed using situational analysis and dimensional analysis with an iterative process of coding and analysis.

Findings: A grounded theory of being stranded at the intersection of traumatic brain injury and intimate partner violence was generated, defined as experiencing challenges with one while trying to access resources for the other. The central process of women prioritizing safety for themselves and their children was influenced by dangerous characteristics of the abusers and repeating cycles of abuse in the lives of women. Women described enduring symptoms of brain injury such as headaches, light sensitivity, trouble concentrating, and increased depression that affected their ability to maintain stable employment to address the instability of their lives. They experience structural violence of systems designed to keep them safe while trying to access resources and are afraid of having their children taken from them.

Discussion: Researchers, healthcare workers, and policy makers need to begin to break down silos of resources to create institutional relationships. Women should feel safe when accessing systems designed to help them achieve their full potential. Future research should begin to move to a population level and away from an individual behavior model.

Traumatic brain injury (TBI) from intimate partner violence (IPV) in women is an area of growing research and attention. These women experience two under-reported events that are described as a "health crisis" (IPV) (Zieman, Bridwell, & Cardenas, 2017) and a "silent epidemic" (TBI) (Heim et al., 2017). It is estimated that there could be as many as 35 million women living with a TBI from IPV (St. Ivany & Schminkey, 2016). Some consequences of TBI include: reduced life expectancy, epilepsy and seizure disorders (Masel & DeWitt, 2010); depression and lack of hope leading to disability (Oyesanya & Ward, 2016); low perceptions of physical health (Iverson & Pogoda, 2015); postconcussive syndrome (Kwako et al., 2011); and cognitive deficits (Heim et al., 2017; Winston et al., 2016).

The National Intimate Partner and Sexual Violence Survey estimates that more than one in three women will experience IPV in their lifetimes. Intimate partner violence is defined as behaviors that are intended to exert power and control over another individual and includes: physical, sexual, verbal, emotional, and financial abuse and or/stalking. Men can be victims of abuse, but IPV occurs more often when a man is attempting to control his female partner, whether she is a wife, girlfriend, or significant other (Black et al., 2011). IPV has long-term negative health consequences for survivors, even after the abuse has ended (Campbell, 2002). Little is known about why women do not get medical treatment for TBI from IPV, although fear of the abuser and feeling judged from healthcare providers are some possible reasons (Chang et al., 2005; Feder, Hutson, Ramsay, & Taket, 2006).

Women living with IPV are seven times more likely [OR 7.21, (95% CI 2.79-18.61, $p < 0.001$)] than women who aren't living with IPV to receive a head injury with loss of consciousness (Anderson, Stockman, Sabri, Campbell, & Campbell, 2015). Many women experience more than one attack on the head during IPV (St. Ivany & Schminkey, 2016). 88% of

women who received medical treatment for TBI from IPV reported more than one head injury with 81% reporting a history of loss of consciousness associated with their injuries, but only 21% sought medical help at the time of injury. 60% of these women who were abused as children went on to be abused as adults (Zieman et al., 2017).

There is strong support in the literature that men who have a head injury themselves are more likely to inflict violence and perpetrate IPV (Marsh & Martinovich, 2006; Pinto, Sullivan, Rosenbaum, Wyngarden, Umhau, Miller, & Taft, 2010; Rosenbaum & Hoge, 1989; Rosenbaum, Hoge, Adelman, Warnken, Fletcher, & Kane, 1994). Rosenbaum and Hoge (1989) found 61% of abusers reporting a history of head injury and their repeat study in 1994 found 53% of abusers living with a head injury. Marsh and Martinovich (2006) found that 58% of abusers reported at least one head injury. While these numbers suggest correlation, authors of these studies stress the importance of acknowledging biological factors such as neuropsychology and neurochemistry that may influence becoming a perpetrator of IPV.

Intersectionality

Intersectionality is "the critical insight that race, class, gender, sexuality, ethnicity, nation, ability, and age operate not as unitary, mutually exclusive entities, but as reciprocally constructing phenomena that in turn shape complex social inequalities," (Collins, 2015, p. 2). It is an important public health concept to aide in understanding how social identities interact and overlap to produce health inequalities (Bowleg, 2012).

Theoretical Underpinnings

Kelly (2011) defines feminist intersectionality as a body of knowledge that seeks to explore how the characteristics of individuals and groups in various social positions interact to result in inequitable access to resources that have negative effects on health and well-being (p.

E43). A feminist intersectional perspective guided this study to think about how the multiple social identities in the lives of women overlapped to create challenges and barriers in help-seeking resources.

Structural Violence

The term "structural violence" was coined in the 1960s by Galtung et al. and has grown in usage and scope and is related to other terms such as structural determinants of health and patient engagement (Galtung, 1969, Fleming et al., 2017). Farmer (2006) expands the original definition to talk about structural violence as "social arrangements that put individuals and populations in harm's way" (p. e449). For the purposes of this research, the concept of structural violence was used to describe the ways that women are kept from achieving their full potential, especially when there are resources available that could help. Intersectionality relates to structural violence when considering how multiple social identities can overlap to prevent someone from receiving the resources he or she needs to achieve optimum health.

It is well documented that not all people seek medical attention after a TBI (Heim et al., 2017; Ruff et al., 2009) but there is very little research exploring women with TBI from IPV and what factors and systems are in place that might influence help seeking behaviors, such as getting medical attention or accessing resources to address the IPV. The purpose of this study was to explore the nature and context of women's lives who are living with a head injury from IPV and to gain insight into how it impacts their lives and relationships with their families and abuser(s). Specific aims of the study were: 1) to describe the experience and context of the lives of women who report passing out from being hit in the head during an episode of IPV, and 2) to explain how receiving a head injury from IPV impacts the lives of women, both in their relationships with the abuser, their families, and in the greater social context.

Materials and Methods

Design

We used a constructivist grounded theory approach that focuses on knowledge construction rather than applying existing knowledge to explore a problem. Secondary and primary data were analyzed in an emergent process to explore multiple meanings of actions taken in given situations and to explore the full range of variations in processes and experiences related to how women's lives are impacted by experiencing a head injury during IPV (Charmaz, 2014; Clarke, Friese, & Washburn, 2017).

Participants

Data used for the study included primary and secondary data and IRB approval was given for the collection of both primary and secondary data. Purposive sampling included secondary data from the Domestic Violence Enhanced Home Visitation Program (DOVE), a multistate randomized clinical trial conducted between 2006-2012 (Bullock and Sharps, NIH/NINR - R01 NR009093) that evaluated the effectiveness of an empowerment protocol within home visit programs with low-income women who were victims of IPV during pregnancy and postpartum. (For a full description of the purpose and sample of the DOVE study, see Sharps et al., 2013.) Of the 239 total women, 21 answered yes to the question "Have you ever passed out from being hit in the head by your partner?" at some point during the study; 16 answered yes at baseline and five answered yes during the two-year timeframe of the study. Nine of the 21 women participated in qualitative interviews over the two-year study duration for a total of 29 interviews and these interviews formed the database for secondary analysis.

Additional women were recruited for primary data to explore the breadth and variations of symptoms women experience from being hit in the head by asking focused questions around

how these symptoms affect her life. Primary data collection occurred in mid-Atlantic region of the United States and flyers were placed in women's shelters, at bus stops and grocery stores, as well as ads posted on Craigslist. Recruiting criteria were women between the ages of 18-45 who self-reported passing out from being hit in the head. Thirty-one women responded to the recruitment ads and snowball sampling but 21 were ineligible because of head injury from a source that wasn't IPV, such as car accident or sports. Ten women met eligibility criteria of head injury from IPV and agreed to participate in the study.

Data Collection

Twenty-nine transcribed, de-identified interviews were transferred to the PI for analysis and coding of secondary data analysis. The focus of the DOVE interviews was to understand her current life situation, family context of abuse, IPV experiences (including during pregnancy), and resources and barriers to getting help.

For primary data collection, one on one interviews were conducted by telephone because this was the participants' preferred method rather than meeting in person. These new interviews queried women about symptoms of head injury, a lifetime history of head injury, why they did or did not get medical treatment for the head injury, relationships with doctors and medical providers, and challenges of staying in a women's shelter. After verbal consent, the interview was recorded and transcribed verbatim. Two women participated in follow up interviews for a total of 12 primary interviews. No demographic data were collected to protect the safety and confidentiality of the women. After each interview the first author wrote a memo including notes from the interview, reflexivity, developing concepts, and questions for future interviews. As analysis proceeded, theoretical verification during interviews included asking women to describe ways their symptoms of head injury impacted their daily lives and help-seeking

behaviors, such as staying in a women's shelter. Dedoose software was used for data management and organization.

Analysis

Data collection and analysis occur as an iterative process and the two are conducted simultaneously in constructivist grounded theory (Charmaz, 2014, Strauss & Corbin, 1990). The first step of analysis is coding, which is the process of defining and categorizing the data that helps the researcher explore and define what is happening in the data. Codes are used to select and sort the data and become the bones of the analysis to create the skeleton of the theory. There are three phases of coding: initial or open coding during data expansion, axial coding to begin to limit the data, and theoretical coding to integrate the concepts and their relationships to the emerging theory (Charmaz, 2014).

The first phase of open coding used situational analysis, which treats the situation itself as the unit of analysis to understand the elements and relationships between the elements (Clarke et al., 2017). Situational maps were created early in the analytic process and revised after presenting at workshops and consultations with methods experts. Situational maps use the situation of receiving a head injury from IPV as the unit of analysis, rather than each individual woman. Situational maps were used during open coding to "open up" the data with codes placed on a messy map to layout all of the elements that might be involved in the situation. The first draft of a situational map included all human and non-human elements in the context of receiving a head injury from IPV written on a page in a non-linear fashion. These codes and labels were placed on a "messy map" as an analytic tool to expand the data (See Figure 1 for messy map of head injury from IPV). Memos were written after each mapping session to track analytic progress.

The second phase of open coding merged codes to place them into categories while remaining open to developing concepts that emerged from the data and explored other analytic ideas in the data collection and analysis process (Charmaz, 2014). The first author coded four interviews line by line or in small sections and generated open and in vivo codes (direct quotes), including: “I was a magnet for abusive men,” “I know I’m not normal,” and “I survived but I wish I hadn’t.” During this phase the concept of intersectionality was identified as women described challenges to utilizing resources to keep herself and her children safe. For example, women described personal characteristics such as sensitivity to bright lights that made it more difficult for them to be in the women’s shelter than other women. This concept of intersectionality guided future interview questions to fully expand the conceptual category.

Axial coding categorized the more salient codes and connected categories to make relationships. For example, growing up with instability, experiencing multiple forms of head trauma, wanting to protect her children and family, and making her safety a priority were important categories. Using these initial categories, the data were coded and compared to previously coded data as well as data that were not yet coded. The interview guide was modified to challenge, verify, and enrich the categories during future interviews, including questions on trusting doctors, ways to make it easier to get medical care from the women’s shelter, and the process of pressing charges. Getting overwhelmed in situations, having an unsolvable mystery, and treating feelings beyond the pain were collapsed into the category of “enduring the consequences of head injury.” Abusers moving on to another woman to control, forcing her to steal, and hating women were categorized as “embodying patriarchy.” Groups within the sample, such as women with children and women without children, were compared and contrasted to identify salient themes.

Theoretical coding organized conceptual codes and in vivo codes into a coherent analysis. Theoretical codes were grounded in the data and each was auditioned as central to the organization of an explanatory matrix that structured the salient categories as context, conditions, actions/interactions and consequences (Kools et al., 1996). The explanatory matrix that best fit the story of the data was selected to narrate the theory developed from the analysis (See Figure 2 for Explanatory Matrix.)

Theoretical sampling was complete when the conceptual categories created could be fully described and used to provide a comprehensive understanding of the research area of head injury from IPV. Theoretical verification included the first author presenting early results on the concept of intersectionality at a women's shelter and incorporating feedback from shelter workers and observations at the shelter into memos and analysis. Findings presented here offer a theoretical depiction of "stranded at the intersection of TBI and IPV" and how experiencing a lifetime of abuse, control from institutions, and structural violence influence the way that women prioritize safety and must live with the consequences of TBI.

Rigor and Reflexivity

Analytic and theoretical memos were written throughout data collection and analysis to track conceptual development. Qualitative peer debriefing was used through research groups and regular meetings with methods experts and content experts.

Findings

Sample Characteristics

Forty-one interviews from 19 participants were analyzed to explore the nature and context of how living with a head injury from IPV impacts their lives and relationships with their families and abuser(s). Participant ages ranged from 18-44. Fifteen women were from urban

and suburban areas of East Coast cities. Four women were from a Midwestern state. Three women were employed full time; the rest were unemployed or underemployed. During the interviews, some women described experiencing IPV from a dating like relationship or from cohabitating with the abuser and being afraid or unable to get medical care. In three instances, an episode of probable TBI from IPV was the trigger for the women leaving the relationship to go to the women's shelter.

Explanatory Matrix

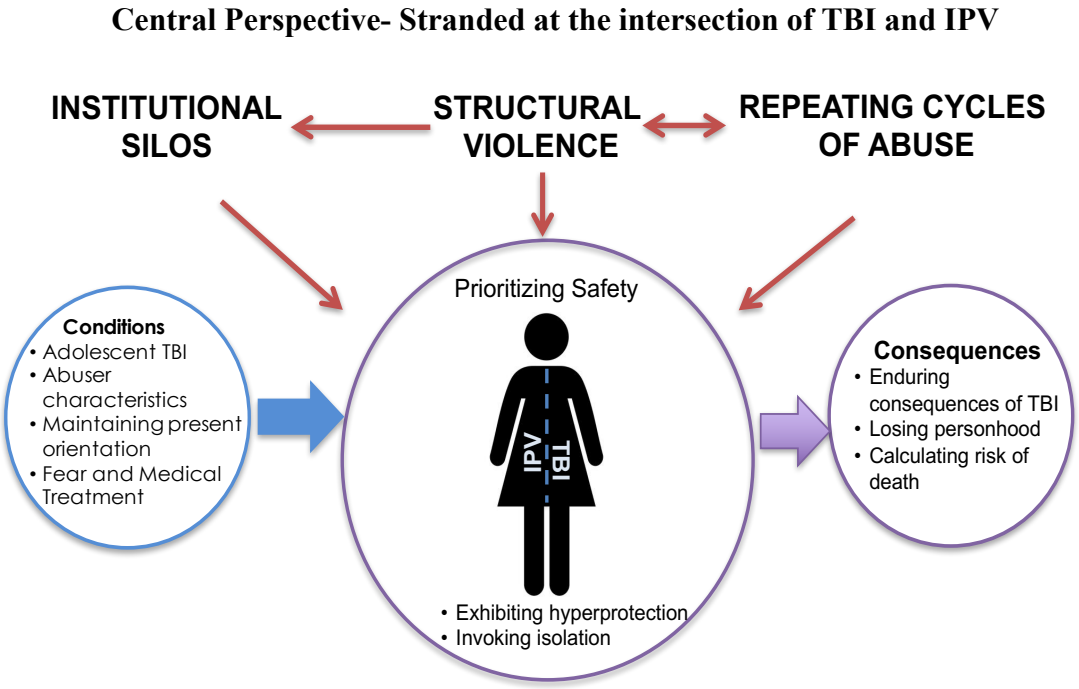

Figure 2. Explanatory Matrix

The participants represented a broad spectrum of women and life situations. The concept of being stranded at the intersection of TBI and IPV was generated as the overarching theme of analysis, defined as experiencing challenges related to one while trying to access care for the other and navigating systems that aren't designed for both. Other salient themes included

recognizing losses in herself and others from repeated head injuries and making the safety of herself and her children a priority.

Context

The context can be defined as the elements that encompass the lives of the women in the study and factors that are outside of her control. To understand the context of the lives of women, each interview started with the question "describe your life when you were growing up and how it is similar to or different from your life now." Women talked about interrelated components of experiencing instability in childhood, historical control from institutions such as foster care, structural violence, and repeated cycles of abuse throughout their lives. When women decided to get help, such as medical care or women's shelter, they would weigh risks and benefits of options but were unable to get resources that addressed both TBI and IPV.

The concept of "growing up with instability" was developed as women described feeling neglected in childhood, having an abusive father, missing out on having a mother- ranging from a mother struggling with mental illness to experiencing extreme child abuse and neglect and being placed in foster care. They described their childhoods and adolescence as "rough" or "being something that no kid should experience." Many were still experiencing unstable lives and trying to provide their children with a stable upbringing. A culture of drug and alcohol use was woven through their stories and included being forced to buy, sell, or use drugs.

Women talked about growing up in abusive homes, watching their fathers abuse their mothers, being abused by their fathers, and going on to enter relationships with men who had been abused by their parents and continued the cycle of abuse with them. Two different 39-year-old women describe their upbringing:

> My dad beat my mom, and then they got a divorce, then I lost a brother, and then I… ran away with [the abuser] and he used to beat me and he used to hit me in my head.

> I was taken from my mom because she abused me. She didn't feed me. When I was taken at the age of 8 I weighed 40 pounds. So I had a rough upbringing. When I was taken I was in and out of foster homes, just switched all around. I never stayed in one place for more than a month so school was hard on me.

There was an element of historical control present, defined as interacting with systems and organizations with rules that took away their autonomy in the form of imposing protection: foster care, child protective services, the police, jail, the military, and "shelter hopping." One 36-year-old woman describes growing up in foster care. "We were born through foster homes. Me and my sisters, siblings… we were placed in shelters stuff like that and there was a lot of violence."

Structural violence of healthcare system. Even though they did not use the term, women described the structural violence of the healthcare system. Several women talked about not trusting doctors or not being sure the doctors would do what is best for them. One woman described her lifetime experiences with doctors:

> I don't trust any doctors really…Cuz I feel like I'm wasting my time. That's how they make me feel. I mean I've been in and out of hospitals my whole life, I've been seeing psychiatrists my whole life, and I'm 39 years old and I'm still the same. Living in fear.

Several women discussed feeling judged and stigmatized for IPV and experienced victim blaming in some interactions with medical professionals, police and first responders. Other women said they did not disclose abuse because they didn't want everyone to know their business. They expressed wanting to know that their safety was a priority if they got medical treatment. Women had long-term relationships with therapists, caseworkers, social workers, and psychiatrists. Some described good relationships with a therapist or a caseworker who were invested in their success, but most had experiences with therapists who just gave them a

prescription for medication or described case workers who they perceived as trying to break up their families.

Structural violence and the legal system. Because most of these women grew up in foster care or unstable home situations, they described wanting to provide stability for their children and recognized that pressing charges or getting medical care and having social services involved could result in losing their children. They all had mixed experiences with police involvement and felt like they couldn't be guaranteed safety if they pressed charges.

Women filled out protective orders and described it as "easy" but no women had pressed charges; saying they didn't have time, they couldn't or didn't want to find him, they felt sorry for him. One woman describes the police response when she was getting stitches after an episode of dating violence.

> The police were like, well if you want to press charges, you have to go to courthouse yourself, I'm like you know what "XXXX you". Excuse my language. I'm like yeah okay. Right after my 20 stitches, I'll go – go into the courthouse, okay. I'll put it on my to-do list, gotcha. That just made me feel like they weren't really taking me seriously.

Some women were afraid of what would happen to them if they pressed charges. In several cases, the abusers had previously served sentences for domestic violence or femicide and started abusing the women when they were released. This made women feel that if they pressed charges and the abusers went to jail, they would retaliate when released. Even the women who had filed protective orders didn't feel safe because the penalty for violation was not very severe and it only takes one violation to inflict serious harm.

Lack of overlapping resources for TBI from IPV. From an institutional level, women expressed frustration that women's shelters don't provide screening upon admission or referrals for head injury. One 22-year-old woman suggests increasing awareness of TBI from IPV during shelter admissions.

> Ask them questions about how the fights went. Did they get hit in the head? Did they get stomped in the head; did they have any head trauma? And depending on how the person answers then some of them need a referral for a CAT scan and…some people don't.

If they did get healthcare and disclose abuse, doctors and nurses "just gave them a number" but didn't connect them to resources, which made them feel like they were navigating the process alone.

Conditions

The conditions can be described as the collective individual level characteristics of the women and their abusers that contribute to the central process of prioritizing safety. The abusers were described as dangerous men who inculcated a sense of fear that influenced her ability to access resources. These abuser characteristics contribute to the action of "exhibiting hyperprotection of her children." Maintaining a present orientation contributes to the consequence of "calculating risk of death" because getting medical treatment won't prevent her from getting hit in the head again and getting medical treatment isn't guaranteed to keep her safe but almost always is perceived to put her at risk from the abuser.

Getting a TBI in adolescence. Women in the primary data interviews all described experiencing some form of TBI in youth or adolescence from sports, abuse, or car accident that precipitated their TBI from IPV. A 20-year-old woman describes her abusive father who would repeatedly hit her in the head. "My father used to hit me in the head all the time…he would take his fist and punch me in my head, or slap me in the back of head and stuff like that." Another woman described getting in a car accident when she was in high school and going through three months of hospitalization followed by three months of rehab and having to relearn basic skills, such as talking.

Abuser characteristics. The characteristics of the abusers play a large role in influencing her actions and interactions. The theme of "embodying patriarchy" was developed to capture the depth and complexity of these men and how they regarded women. They were portrayed as deriving a valued identity from being dangerous men, expressing hypermasculinity, and previously killing or injuring other women. Several were members of biker gangs and many had served time in jail for assault. They were described as large and dangerous men who instilled fear and had inflicted violence on many people.

A 36-year-old woman describes how she still lives with fear from her episode of dating violence:

> He forced me into things that I didn't want to do…punched me on my head, like I can still see it, I can still remember it with the pain, like I can't even lay my head on the pillow because he punched me so many times in my head and pulled my hair. The thing is, it's really like, it's still stuck in my...it's like, I wish, I'm getting medical treatment for it and like I'm scared to be around people.

Women described multiple episodes of IPV where he would hit her in the head:

> I was trying to get away… he pulled me back in the house and started beating me even more. He was stomping me in my head, kicking me in my face, punching me, slapping me, choking me, everything. It was just awful.

> Three years ago… he took my head and kept hitting it on the wall, hitting it on the floor, hitting it on the wall, hitting it on the floor. And he just kept taking my head by the hair and hitting on the head, I mean hitting it on the floor.

These men were also described as coming from abusive homes, growing up on the streets, serving in the military, and having a suspected history of TBI. A 39-year-old woman who recently left her second abuser that hit her in the head describes both of them:

> Their fathers both abused them as a child. My husband was hit so hard in the head, I think he was 3 years old; he was put in the hospital for a week 'cause he had a concussion. So he was brought up in an abusive home as well as my son's father.

Women needed a physical barrier to feel safe from these men and would call the police to intervene during a fight or move away to create physical distance. Some women felt safer when the abusers were in jail but were scared about when they would be released. One woman described her abuser as "getting what was coming to him" when he was murdered on the streets.

Maintaining a present orientation. Maintaining a present orientation is defined as elements in her daily life that force her to remain focused on the present and not able to plan for or envision the future. The context of growing up with instability continued to adulthood for many women and they discussed difficulties finding stable employment and housing and having to give up previous jobs because their abusers could find them. Women experiencing extreme IPV or who had recently left were living in fear of the abusers and making decisions that impact their safety and well-being on a day-by-day basis. They discussed a desire to live a happy life, defined as having a steady job, stable housing, and being a good mother but this often felt unachievable with their daily struggles, including mental health problems and headaches. One woman describes how her poor mental health impacts her ability to be the mother she wants to be:

> 'Cause I can't do much for my kids…that I would like to do. And besides all of the mental health things I got going on it just makes me real depressed. I feel real depressed.

Fear and medical treatment. Women talked about being afraid to get medical treatment which has several dimensions: being afraid of the abusers' actions, knowing something is wrong with them and not wanting to learn this truth, and feeling judged by healthcare workers. Because these abusers were dangerous men capable of inflicting harm, women were afraid that he would find them in the hospital or were afraid of retaliation if she got medical care:

> If I was just to go out and say look, [my man] did this and this, if I ever did that he would definitely…come back and try to either just get rid of me… I didn't want the chance that [they would] find me dead in the woods or something like that.

The other element of fear and medical treatment that women discussed was knowing that something is wrong with not wanting to learn about permanent damage and disability when they went to the doctor.

> I'm scared for somebody to tell me, "Oh I have blood clots, my head inside is swollen," or stuff like that… That's why I never really told anybody in the shelter, or went to the doctor's even though when I went to the shelter they knew about it. They told me I needed to go to the doctor's right away but I never went because they might tell me something I don't want to hear because I know there's something wrong with me. I know I'm not normal after that. I know there's something wrong with my head or my hearing. I don't want them to tell me I'm going deaf or anything like that, you know.

Because of the broad spectrum of women's experiences included in the study, a facilitating factor identified to getting medical treatment was having witnesses to the TBI from IPV (such as friends or spectators in a public place) and barriers to getting medical treatment included perceived compromising of the safety of herself and/or her children to get medical treatment.

Processes

In response to the conditions described, the central process that women engaged in was prioritizing safety. "Safety" in this sense means more than safety from the abuser; it is safety to keep her family together, providing her children with food and shelter, trying to control and manage the influence of the institutions that would remove her control (CPS) and navigating the pieces of the legal system that she feels provide safety without introducing additional harm.

Exhibiting hyperprotection of her children. Women made the choice to protect their children in the immediate moment to keep themselves and their children safe. Sometimes this manifested as not getting medical treatment to stay with the children and other times it meant taking the children and going to the women's shelter. The abusers exhibited dangerous behavior such as stalking, arson, threatening to harm children, and forced sex to make women afraid

which sometimes resulted in making protecting children a priority over getting care. This is related to maintaining a present orientation and keeping themselves safe in the moment and not thinking about the long-term consequences. Women recognized loss of autonomy when they entered into systems controlled by forces beyond their control and perceive that these systems cannot keep them safe.

Invoking isolation as protection. Using isolation as a form of protection is another action women used to prioritize safety. Women talked about losing trust in men and cutting themselves off from friends and social circles and feeling like no one understands them. They might not disclose abuse to family members to avoid being cut off or placing their families at risk of harm from the abusers. They talked about not wanting to open themselves up to being abused again and the best way to do that was to keep everyone out. They were single mothers who were working very hard to give their children a good life. A 44-year-old woman describes trying to end the cycle of abuse:

> I was just like finding myself going back into the same circle of things…I had to stop a lot of things and just get my life back on track. And I just had to remove myself from a lot of people and delete a lot of people from my buddy list. I just had to clean house and [shift] my priority for myself and my kids.

Consequences

The consequences of being stranded at the intersection of TBI and IPV are: enduring the consequences of head injury, losing personhood, and calculating risk of death. It is difficult to get help for the TBI and the IPV at the same time so they must make a choice and then live with the consequences. Because of the dangerous nature of the abusers, women prioritized their safety in the moment and either stayed with the abuser because it is too dangerous to leave and/or they wanted to protect their children from being harmed. If women decide it is time to

leave the relationship after getting hit in the head during IPV, they were more likely to go to the women's shelter and not the hospital, even if the shelter recommended going to the hospital.

Enduring the consequences of head injury. Because women made safety a priority, this sometimes meant they would not get medical attention or treatment for their probable TBIs. Even if they did get medical treatment, women still talked about living with neurological and mental health symptoms of TBI. They would survive extreme episodes of physical and sexual violence, prioritize their safety by going to the women's shelter instead of the hospital, and then have to deal with the consequences of making that decision. This is best summarized by the in vivo code "I survived for this?" Women described migraines lasting for days or months, unrelenting pain in their bodies (head, face, teeth, hands), insomnia followed by hyper somnolence, anxiety and depression that was heightened and intensified after the head trauma, problems with memory, and difficulty finding or keeping a job. During several interviews, some women said they realized they needed to see a neurologist to address their symptoms.

Losing personhood. Losing personhood has two dimensions: recognizing losses in themselves and in others related to repeated head injuries and being made to feel like objects to control by the abusers. Women said they felt damaged, not normal, and recognized their lost potential. Some described lost cognitive abilities such as feeling less smart and having trouble with memory and task management that was impacting their ability to keep a job. They discussed specific damaged parts, such as cracked teeth or scars on forehead, which would always impact people's first impression of them in a negative way. These sentiments contribute to low feelings of self-esteem and self-worth, and hopelessness. Happiness was something that other people could experience but not them:

> At 44 I can honestly say I…see all these happy couples and it hurts me because what makes them so special? [starting to cry] What do they have that I don't? Why do I have

> to be abused? And it hurts! So I just, [crying] I just can't, and I work every day and I don't know what it means to be happy.

Many women said they were speaking up on behalf of other women who can't speak for themselves, describing other women they know as "being so damaged their minds are gone" or telling the story of a friend who went to sleep after getting hit in the head and never waking up. They wanted their stories shared so other women wouldn't make the same mistakes or would see warning signs in dangerous relationships early enough to get out before permanent damage or death.

The abusers made the women feel as if they were objects to control and expressed extreme views of ownership. They felt replaceable when the abusers would move on to other women immediately. These abusers exhibited persistent forms of stalking and subterfuge including showing up at women's homes, family's houses, or using other friends to track them down; calling hospitals and pretending to be someone else to get her information; and finding the women's shelter and hiding outside to wait for her when she left.

Calculating risk of death. This consequence is related to the condition of maintaining a present orientation because they recognize that he could have killed them and are still capable of hurting or killing them. One 20-year-old woman describes the abuse the night she took her kids and went to the shelter:

> It's like he tried to kill me. He would take his fists and –and take his feet and keep kicking me and stomping me in my head. The reason why I ended up in the shelter is because he almost killed me. I actually blacked out for a little over an hour. I didn't really remember anything. When I woke up there was blood all over the place just from [my] face…Blood all over the place because he stomped me in my head, in my face, everything.

Women recognize their abusers as dangerous and considered this when deciding if they should get medical treatment. They calculated their risk of death in many interactions and have

faced their mortality in a very concrete way, saying "he almost killed me" or he could have killed me if he wanted to. A woman who has been in multiple abusive relationships and received probable TBIs from different abusers describes her fear of death.

> I've had concussions. [The doctors] told me if I get hit again in my head really hard I could die. Because that's how many concussions I've had over my lifetime. I don't want to go back to my husband because I'm scared of him. I'm scared I'm going to just end up dead, period. If I get hit in the head again, you know...I just don't know what to do.

Discussion

It is important to understand the complex situation of TBI from IPV and how women decide which actions to take based on elements of the entire situation. This is one of the first studies that explores the context of women's lives when they are living with a probable TBI from IPV and the theory of being stranded at the intersection of TBI and IPV describes how this intersectionality influences the ability to seek resources to achieve optimal health for the women in the study. Calculating risk of death and maintaining a present orientation, experiencing housing instability, and being constantly afraid of the abuser finding her again (or staying with him if she did not leave) forced the women to make decisions on a day-by-day basis. The combination of neurological symptoms, mental health challenges, and using isolation as protection make it difficult to get and keep a job to bring the stability to her life that she needs. Women expressed experiencing structural violence by not trusting the doctors, feeling like there isn't medical treatment that can help her anyway, and not receiving the resources she needs when she does seek medical care. Women in this study struggle with the intersectionality of TBI and IPV as they access resources to address one or the other in systems that are not designed to handle both.

Individual Characteristics

Abusers are described as dangerous men who have experienced incarceration and could possibly have a history of TBI. This adds to previous research on men with TBIs linked to abusing behavior (Marsh & Martinovich, 2006; Pinto, Sullivan, Rosenbaum, Wyngarden, Umhau, Miller, & Taft, 2010; Rosenbaum & Hoge, 1989; Rosenbaum, Hoge, Adelman, Warnken, Fletcher, & Kane, 1994). Findings from this study are not strong enough to establish a relationship but do suggest this as an area of future research.

Many women in the study endorsed some form of fear around healthcare providers and getting medical treatment; ranging from feeling judged for experiencing IPV to being afraid of learning about permanent disability from the abuse. This expands on the qualitative meta-analysis by Feder et al., (2006) that found that women want nonjudgmental healthcare providers who respect their decisions around interventions and actions to address the IPV. However, women included in those reviewed studies were women who were already receiving healthcare and understanding what prevents women from getting healthcare is an important concept to explore.

The key process described in the study is prioritizing safety. Women discussed multiple layers of safety that involved the physical environment, such as finding stable housing, and wanting to feel safe if they received medical treatment. It is important to understand reasons why women might not get healthcare and what can be done to make them feel safe if they do. Future research in this area will address the CDC's call to begin to understand what prevents subpopulations living with TBI from seeking medical attention.

Stranded at the Intersection

A recent comparison of TBI hospital admissions (Taylor et al., 2017) found higher age-adjusted rates of TBI-hospitalizations and deaths in males and cites the greatest increase in TBIs

in older adults and falling. These results formed the foundation for a new policy and public campaign to decrease falls in older adults. Contrast this to the increasing public awareness of the dangers of concussion and sports: concussion checklists and ad campaigns aimed at helping the public to understand that concussions are a problem. This is an example of how women experiencing TBI from IPV are invisible in the national research agenda. Women will continue to experience negative outcomes related to TBI screening and diagnosis if more research isn't conducted to begin to understand the challenges of their complex situations.

Expanding Intersectionality

Crenshaw (1991) calls for intersectionality that goes beyond race/class/gender to explore intragroup differences. This study explores the way that living with the consequences of TBI influences women's lives and ability to access resources to end IPV, or the converse, the way they prioritize ending IPV over seeking resources to address their head injuries. The findings fit with the definition of intersectional analysis by rethinking work and family identity (Collins, 2015). These women are experiencing symptoms of probable TBI that interfere with their ability to get and keep a job and if they have a job, they might have to give it up because the abusers exhibit extreme stalking behavior and could find her. By invoking isolation as protection, the women are redefining family identity and support (or lack of) from their family and friends. Individual characteristics, such as problems with recall and memory, may be interfering with the legal process of pressing charges or applying for custody, complicating two of the traditional avenues available for protection.

Limitations

To fully embrace the concept of intersectionality it is important to think of the women who were excluded from the study (Nash, 2008). First, only women who were abused by men

and spoke English were included in the study. Second, to participate in the study women needed access to a phone with minutes available to do a 40-minute interview. Third, no women described physical disabilities but women living with disabilities might not be able to access the shelter or be able to accomplish a phone call without assistance, which could have placed them at greater risk for abuse. The women in the study talked about their friends who had died from getting hit in the head and about the women in the shelter who had been hit so many times in the head that "their minds are gone." They were recognizing women like them who were excluded. The sample was representative of women who were unemployed or underemployed and an important area of future research is exploring how women in a higher social status experience TBI from IPV.

The intersectionality of TBI and IPV moves beyond the concept of Black women as the quintessential intersection subjects (Nash, 2008) but intersectionality does not exist outside of race. True to method, findings were guided by themes and categories that emerged from analysis with a focus on the situation of IPV and not specifically on race. While several women did talk about race, more women talked about feeling stigmatized for IPV and this guided the emerging theory to address the research question and aims.

Implications for Healthcare Providers

It is important to think about ways to break down the silos of resources to create relationships between shelters and healthcare access to make it easier for women to access resources for both TBI and IPV. Outpatient concussion clinics could start doing outreach with women's shelters to build relationships. Service providers, such as women's shelters and homeless shelters, should consider having low stimulation areas available for all people living with TBIs.

Implication for Future Research

Instead of focusing on immediate, acute treatment for TBI from IPV future research could focus on lingering symptoms of TBI (which also overlap with PTSD), including symptoms that prevent women from getting and keeping a job (such as decreased cognitive and executive function, problems with sleep, and depression). An important question for future prevention of IPV is whether or not young girls who receive a head injury in adolescence, such as concussion from sports or TBI with hospitalization and rehabilitation, are at increased risk of entering into an abusive relationship.

If a woman is pregnant when she is hit in the head, it is possible that her children will have epigenetic changes that will make them more susceptible to abuse by a blunted trauma response (St. Ivany & Schminkey, 2016). As genomic understanding grows it will be important to include TBIs in this area of research to understand how individual changes might lead to epigenetic changes at a population level. Future interdisciplinary research should focus on women living with TBI from IPV to improve long term health; develop and test interventions to address lingering symptoms of TBI; and help healthcare providers understand how structural violence might impact women's ability to feel safe while getting care.

Conclusion

This is one of the first studies to explore how structural violence might influence the lives of women with TBI from IPV. The definition of structural violence used in this study opens up new pathways to create structural interventions. With an expanded definition of violence, this is the beginning of creating an expanded definition of safety. Research should move beyond an individual level to look at TBI from IPV on a community level, incorporating structural violence, race, and community level risk factors for receiving a TBI.

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Figure 1. Messy map of Head Injury from IPV

Chapter Six: Discussion and Conclusion

This chapter provides a summary of key findings, limitations, and implications for future research. The first phase of the dissertation research used thematic analysis of secondary data interviews from women in the DOVE study to understand the context of the lives of women who report passing out from being hit in the head during IPV. These findings were used as a foundation for the second phase of analysis using constructivist grounded theory. Situational analysis and dimensional analysis were used with primary and secondary data to generate the theory of "stranded at the intersection of TBI from IPV" to describe how women experience challenges related to one while trying to access resources for the other. To unify concepts from the three manuscripts, this chapter will be structured into three sections: contributions to the state of the science on TBI from IPV, implications for working with survivors, implications for policy, lessons learned, and future research.

Contributions to the state of the science on TBI from IPV

Findings from this dissertation support previous knowledge and add depth to the understanding of the cycles of repeating abuse in women with TBI from IPV. A recent study with 208 women in domestic violence and homeless shelters found 88% of women living with more than one brain injury, 80% experiencing a loss of consciousness with the injury, but only 21% getting medical care for those injuries (Zieman, Bridwell, & Cardenas, 2017). Women were recruited for primary data collection in this dissertation by experiencing a loss of consciousness and > 90% of these women experienced more than one probable TBI. Women in primary data

collection described many other times they were hit in the head or experienced head trauma without getting medical care.

Women with TBI from IPV report increased rates of sexual abuse (Iverson et al., 2017). The secondary data analysis of the DOVE women supported the relationship of TBI and increased sexual violence associated with head injury although this was not something that all women in the primary data collection endorsed. A possible explanation is that all women in the DOVE study were pregnant and many had other children where the primary data source had both women with and without children. This will be discussed more in the limitations.

Women described complex situations of IPV that could prevent them from getting medical attention for the probable TBI, which addresses an important gap in the literature around why many people do not get medical treatment after a head injury. There were several factors related to why a woman might not get medical care in the acute phase of probable TBI: being forced to have sex with the abuser, afraid of retaliation from the abuser, does not want to leave the kids alone with him, or choosing to go to the women's shelter. However, as her symptoms of TBI become chronic in nature, she still might not get medical treatment for the lingering symptoms of TBI because she is worried about her ability to keep herself and her children safe. Introducing the concept of structural violence and lack of trust with healthcare providers adds to existing knowledge around barriers to receiving care.

This dissertation expands the concept of intersectionality by exploring the ways that living with the consequences of head injury influence a woman's life and ability to access resources to end IPV, or the converse, the way she prioritizes ending IPV over

accessing resources to address the probable TBI. This discussion around systems of power and thinking about safety as it relates to power, stigma, and the process of getting healthcare is an important concept to include in future research to better understand what women want to feel safe when getting healthcare.

Implications for working with survivors

All women interviewed for primary data were very passionate about sharing their story to help other women and wanted to speak up for women who couldn't speak for themselves. They felt better after hearing that other women have similar symptoms after getting hit in the head. There are several key concepts from the interviews regarding interventions to improve their lives.

For the women with children, they all wanted to be a good mother and it is important to recognize how their backgrounds can shape their ability to be the mother they want to be (growing up without a mother, in an abusive home, and/or in foster care). Having multiple head injuries might impact her ability to parent and she is trying to control involvement of institutions that might try to take her children while living with injuries that could be impacting her executive functioning. Women described neurological symptoms, including severe depression, and were forced to live in the present moment to manage symptoms and to keep herself and her children safe. When they did get medical care, women felt judged for the IPV, which could make it difficult to disclose abuse in a healthcare setting.

Women want the instability in their lives addressed. They want to feel safe, to be happy, and to have stable and safe housing but there are many factors that contribute to their chronic instability. Many grew up on the streets or in foster care and do not

have strong social support networks, especially if they are isolating themselves to stay safe from the abuser. They struggle to build a trusting relationship with a healthcare provider or to keep a steady job because they keep moving so the abuser won't find them. They want their children to have a loving and stable home and will do whatever it takes to keep their children safe.

Policy Implications

It is important to think about ways to break down the silos of resources: to create relationships between shelters and healthcare access, to increase research with women living with TBI from IPV, to create and research interventions that relieve their symptoms, and to help healthcare providers understand how structural violence might impact women's ability to feel safe while getting care. Instead of focusing on immediate acute treatment for TBI from IPV perhaps the focus should shift to lingering symptoms of TBI (which also overlap with PTSD), including symptoms that prevent her from getting and keeping a job (such as decreased cognitive and executive function, problems with sleep, and depression) and contribute to her continued instability. Outpatient concussion clinics could start doing outreach with women's shelters to build relationships.

There are important policy implications for women's shelters. What are some easy ways for women to get medical treatment without leaving the shelter, like programs that use telemedicine to treat patients who have had a stroke? Incorporating forms of healthcare from the shelter could increase the risk of disclosure of the shelter location but it could also bring benefits to women in the shelter and begin to provide overlapping resources to address TBI and IPV. Creating an area in the shelter with low

stimulation for women who are extremely sensitive to light and noise could help relieve symptoms of TBI and decrease anxiety. This could be as simple as turning the light down for a few hours in the evening, which might have added benefit for many residents and staff in the shelter.

Findings revealing how women experience structural violence in the healthcare system are important to begin to understand how not trusting doctors can influence women's decisions about getting care that could impact her long term health. Considering structural violence in future research does not have to only focus on women, it can include how healthcare providers understand barriers to getting care and implications of communication styles.

Limitations and Lessons Learned

Both the secondary data and the primary data had their limitations but using interviews from both strengthened the study. A limitation of the secondary data was being unable to ask follow up questions about symptoms from the head injury and a limitation of the primary data was only having one or two interviews and not being able to go in-depth about the nature of the IPV. The recruitment criteria for the DOVE study focusing on pregnant women could influence the sample of women who experienced forms of sexual violence as it related to reproductive coercion and her ability to consent for sex and control her reproductive health.

Even though recruitment materials were placed in visible places in Charlottesville and central Virginia, there were only two women who responded and neither met criteria (one TBI not related to IPV, the other was above the age limit). Therefore, all women in the primary data collection were from large metropolitan areas and several had recently

been in a shelter. No interviews were conducted in person, all were done over the phone, but this may have been a strength of the study. One woman commented that the anonymity of the phone made her more comfortable and after the two follow up interviews were complete, both women said they wished they could meet in person. This suggests that future research should incorporate building relationships with women over several interviews.

The wording of the recruitment ad of "being hit in the head" was confusing and limiting to women and service providers. A common question was, "Does it have to be hit? Could it be kicked, or slammed into a wall," etc. Future recruitment should include wording about being struck by an object or having some kind of impact to the head.

Implications for future research

Women in the study made prioritizing safety a central process in their lives, so how can we rethink safety and protection from TBI from IPV? Future research should begin to incorporate the context of the lives of women and the repeating cycles of abuse and control. How do institutions and systems such as foster care and incarceration interact to uphold themselves, and how do women choose to keep themselves, their children, and their partners from entering the institutional cycle? Structural violence findings point to research and interventions at a structural level and an expanded definition of violence needs an expanded definition of safety.

Another very important question generated in the grounded theory analysis is can someone be more at risk for entering into an abusive relationship after getting a TBI? How does getting a TBI impact decision-making and judgment and make

someone more likely to get a second TBI? Future research should focus on ways that women experience a lifetime accumulation of TBI and explore connections with IPV.

Moving from an individual behavior model to a population health model can expand discussions around the role of neighborhoods and violence in relationship to the spread of TBI. Future research using the population health model should include the role of an abuser's lifetime exposure to abuse and TBI.

There are obvious points of screening for TBI, such as women's shelter, but screening won't help unless referrals are made with resources available to address the symptoms of TBI. What if women aren't going to the shelter because they are afraid of having symptoms triggered (such as a migraine) and rendering them unable to care for their children? If women are isolating themselves for protection from the abuser, how can her cognition, memory, and decision making skills be monitored? Research should focus on creating a definition for TBI related to IPV specific for women who experience the overlapping negative health consequences of TBI and IPV to guide prevention and intervention efforts.

Conclusion

This study adds to the small but growing body of research on women living with TBI from IPV. It explores complexities in the lives of women and begins to discover the ways that structural violence and a lifetime of institutional involvement might influence their help seeking behavior. The theory of being stranded at the intersection of TBI and IPV can be used in future studies to improve the health delivery to these women, protect their children from epigenetic changes, form a more stable family unit, and ultimately improve the health of families affected by violence.