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Prevalence of Intimate Partner Violence Among the Maternal-Fetal Medicine Population

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Abstract

Intimate partner violence (IPV) is increasingly understood as an important public health issue. It is well understood that intimate partner violence has many negative effects on its survivors ranging from physical to mental health conditions. The population of people who experience intimate partner violence and population of pregnant women are both vulnerable populations. Examining the two populations together demands a trauma-informed approach and an understanding of the intricacies of both pregnancy and intimate partner violence. While IPV has been studied among the pregnant population, intimate partner violence as it relates to the maternal fetal medicine (MFM) or high-risk pregnancy population is not yet well understood. The purpose of this study is to describe the prevalence and effects of IPV among the MFM population at the Methodist Perinatal Center in Omaha, NE. This study analyzed secondary data obtained through the Abuse Assessment Screen (AAS) that was incorporated into the electronic medical record (EMR) at Methodist Perinatal Center. Data were input into SPSS from which descriptive statistics and a bivariate analysis (Chi square test) were entered. This study found that 5.6% of patients at Methodist Perinatal Center have experienced IPV. Further, this study found that seven maternal and fetal health outcomes are associated with IPV including: BMI ≥25, STI, psychiatric disorder, birth weight < 2.499kg, ultrasound anomaly, non-employer-based insurance (self-pay and Medicaid), and non-married status These results show that it is important to screen for IPV in the high-risk pregnancy setting. As this study shows that IPV occurs and negatively affects women and their children, there is a need for further research on the effects of IPV and development of interventions for the high-risk pregnant population.

Chapter 1: Introduction

Research Question and Aims

The objective of this study is to determine the prevalence of intimate partner violence (IPV) among women with a high-risk pregnancy at the Methodist Perinatal Center in Omaha, NE. IPV is defined as, "physical violence, sexual violence, stalking and psychological aggression (including coercive acts) by a current or former intimate partner," (CDC, 2017b). The population being studied is the Maternal Fetal Medicine (MFM) obstetrics population. The MFM population consists of the high-risk pregnancy population. A high-risk pregnancy is "one that threatens the health or life of the woman or her fetus" (Society for Maternal Fetal Medicine, 2018). The current medical literature on IPV in pregnancy has largely focused on low to average-risk pregnancy. Since the literature on IPV in high-risk obstetrics populations is lacking, this study aims to determine just how prevalent it is for women to experience IPV during a high-risk pregnancy. Specifically, the primary research question is: what is the prevalence of IPV at the Methodist Perinatal Center? Secondary objectives for this study include examining the risk factors for IPV and whether the existing IPV is associated with adverse pregnancy outcomes and/or adverse fetal outcomes.

Significance

High risk pregnancies can be variable as some women are at an increased risk for complications before they become pregnant and some are identified as high risk as the pregnancy develops. Risk factors for high-risk pregnancy include pre-existing health conditions prior to pregnancy such as obesity, multiple gestations, HIV positive status, hypertension, teenage

pregnancy, advanced maternal age, or diabetes mellitus (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2017). The effects of IPV on pregnant women, including high-risk pregnant women, are varied and potentially life-threatening. According to the South Atlantic Association of Obstetricians and Gynecologists, IPV has many effects on a pregnant woman both physically and mentally including: bone fractures, lacerations and head trauma, sexually transmitted infections and unintended pregnancies, pain disorders, and higher rates of depression, anxiety, posttraumatic stress disorder, and suicide (Chisholm et al., 2017a). Zachor et al. (2018) also report that IPV in pregnancy is associated with sexually transmitted infections, mental health disorders, pain disorders, gastrointestinal disorders, and small for gestational age infants. Additionally, Hossieni et al. (2017) found that women who experience IPV during pregnancy are at a higher risk of fearing birth. Adverse fetal outcomes include small for gestational age, preterm birth, and low birthweight. Additionally, in several parts of the United States, IPV can lead to suicide and homicide which are leading causes of pregnancy-associated mortality (Chisholm et al., 2017a). Clearly, IPV can have very serious, and potentially fatal, consequences for a pregnant woman and the developing fetus.

One of the first reviews of the prevalence of IPV in pregnancy in the United States found the prevalence of IPV in pregnancy to be 0.9-20.1%; this wide range was interpreted to be due to variety in survey instrument, study population, and study methods (Gazmararian et al., 1996). Similarly, more recent estimates of the prevalence of IPV vary widely from 3-30% (Devries et al., 2010). Most studies report a range of 3.9-8.7% (Van Parys et al., 2014). More recently, a 2009-2010 survey of women in a 30-state area found that the prevalence of IPV among the non-MFM pregnant population was 3.2% (Chisholm et al., 2017a). In 2017, according to the CDC Pregnancy Risk Assessment Monitoring System (PRAMS), 2.2% of women experienced IPV

during pregnancy (CDC, 2017a). The PRAMS survey estimates IPV in pregnancy by asking two questions. Question one asks: "during your most recent pregnancy, did any of the following people push, hit, slap, kick, choke or physically hurt you in any other way?" Participants select my husband or partner, my ex-husband or ex-partner, another family member, and/or someone else. The second question asks, "during any of the following time periods, did your husband or partner threaten you, limit your activities against your will, or make you feel unsafe in any other way?" Participants are asked to indicate during the 12 months before I got pregnant, during my most recent pregnancy, and/or since my new baby was born (CDC, 2017a). Currently, there are no estimates as to the prevalence of IPV in the MFM population; this study aims to establish the prevalence at Methodist Women's Hospital in Omaha, NE to establish a baseline prevalence upon which further research will contribute.

Chapter 2: Background and Literature Review

A complete understanding of IPV requires a discussion of the prevalence of violence- particularly IPV- in the United States. According to the National Intimate Partner and Sexual Violence survey, 1 in 3 women experience violence in their lifetime including 1 in 10 women being raped and 1 in 3 being physically abused (Breiding et al., 2011). Nearly 50% of women and men experience psychological abuse from an intimate partner (Anyikwa, 2016). For pregnant women, a 2009-2010 survey of women in a 30-state area found that the prevalence of IPV among the non-MFM pregnant population was 3.2% (Chisholm et al., 2017a).

Further, women who experience IPV are exposed to trauma which occurs when maladaptive behaviors replace a person's normal ways of coping based on a person's experience of an event (Anyikwa, 2016). Therefore, when working with patients who have experienced IPV, it is important to consider trauma. The concept of a trauma-informed approach has existed in the

social work pedagogy for some time. A trauma-informed approach shifts from seeing behavior as pathological to recognizing behavior as "strengths-based" and emphasizes the resilience of survivors of IPV (Anyikwa, 2016, pg. 487). The goals of a trauma-informed approach and trauma-informed care (TIC) is to reduce symptoms and work with patients towards recovery (Anyikwa, 2016). The Substance Abuse and Mental Health Services Administration created a trauma-informed framework which operates based on four assumptions and six principles (Substance Abuse and Mental Health Services Administration, 2014). The assumptions are as follows: realization of trauma, recognition of trauma, response to trauma, and resisting re-traumatization. The principles are: emotional and physical safety of the patient; trustworthiness and transparency; peer support; collaboration and mutuality; empowerment; voice and choice; and cultural, historical and gender issues (Anyikwa, 2016). When working with patients in any capacity, it is important to keep a trauma-informed approach in mind.

Many studies have examined risk factors and predictors of IPV among pregnant women. Researchers in South Korea found several predictors of IPV such as unintended pregnancy, age, employment status, and the level of education (Lee et al., 2017). Another study found that among American women, an unplanned pregnancy and having parents with less than a high-school education (indicating a lower socioeconomic status) were risk factors for pregnant women experiencing IPV. This study found that older age and status as "married" were protective factors for IPV in pregnancy; in other words, younger women and single women are at higher risk for IPV (Yakubovich et al., 2018). According to the Behavioral Risk Factor Surveillance System, evidence exists that health disparities according to race/ethnicity, education, income, and age affect a person's risk for experiencing IPV (Chisholm et al., 2017a).

Further, a meta-analysis examining multiple studies of IPV in pregnancy identified seven victim risk factors often examined in studies including: lifetime exposure to violence, alcohol abuse, abuse prior to pregnancy, single status, lower educational attainment, unwanted pregnancy, and low socioeconomic status (James et al., 2013). Five of the studies examined by the meta-analysis found additional risk factors for IPV in pregnancy including lack of social support, drug abuse, and race (James et al., 2013). The meta-analysis also identified two main perpetrator risk factors among the studies which included unintended pregnancy and alcohol abuse (James et al., 2013). One study examined past experiences of family violence with regard to future risk of experiencing IPV in pregnancy and found that women who experience violence perpetrated by their family members are at high risk for IPV during their pregnancy (Ludermir et al., 2017). As such, there is strong evidence in the literature that there are many risk factors for IPV in pregnancy as well as some evidence of risk factors for perpetrators of IPV.

An important subset of the literature surrounding IPV in pregnancy focuses on screening for IPV. Studies often examine what screening methods are most appropriate for IPV in pregnancy. According to *The American Journal for Obstetrics and Gynecologists*, screening is a method to identify a disease that has not yet been diagnosed in patients with no signs or symptoms (Chisholm et al., 2017b). In the pregnant population, the value of screening for IPV is emphasized to improve patient quality of life by way of reducing future violence and improving pregnancy outcomes (Chisholm et al., 2017b). All major health organizations that work in women's health including the WHO, ACOG, the IOM, and the USPSTF recommend screening for IPV in pregnancy (Chisholm et al., 2017b).

There are several screening methods for IPV including the HITS, Woman Abuse Screening Tool, HARK tool, and Abuse Assessment Screen, all of which have been used in

pregnant women (Chisholm et al., 2017b). The HITS survey was developed for outpatient clinical settings; HITS is an acronym standing for hits, insults, threatens, and screams. There are four questions which are answered on a five-point scale in while one equals never and five equals frequently. The survey asks: since you were pregnant, has a partner or ex-partner physically hurt you, insulted you fairly often, threatened you, or screamed at you fairly often? (Bailey, 2010). The Women Abuse Screening Tool (WAST) is an eight-question survey that address emotional, physical, and sexual abuse; each question has three possible responses scored 0-2 with 0 being no tension, no difficult, never and 2 being a lot of tension, great difficulty, or often. A score of ≥4 suggests exposure to IPV (Brown et al., 1996; Fletcher et al, 2016). The HARK screen was adapted from the AAS and consists of 4 questions of self-report (yes or no) relating to IPV. There is no pregnancy-specific question in the HARK tool (Sohal et al., 2007; Fletcher et al., 2016).

Moreover, one study examined training of nurses to recognize IPV on an antepartum unit. This particular study showed that after training nurses to recognize IPV, knowledge of IPV and the protocol to follow increased and was well-received by the nursing staff (Bermele et al., 2018). In another study, a training program for primary care providers was analyzed and showed that compared to no training, training providers about IPV increased provider communication about IPV (Zachor et al., 2018). Therefore, the literature reveals that training programs for all health care providers is effective and can increase screening for IPV in pregnancy.

Effects of Intimate Partner Violence

The literature has established a myriad of effects of IPV on pregnant women. One study found that patients who experienced IPV during pregnancy were more likely to experience poor birth outcomes including preterm deliveries, low birth weight infants, and infants needing NICU

care (Chen et al., 2017). Another study among women in Ethiopia found an association between IPV and low birth weight of the infant (Laelago et al., 2017). Yet another study on the effects of IPV on breastfeeding found that women who reported IPV during pregnancy were less likely to continue to breastfeed more than six weeks postpartum (Miller- Graff et al., 2018). Overall, it is clear from the studies reviewed that several forms of poor birth outcomes are associated with IPV during pregnancy, further bolstering the need to screen for and prevent IPV in pregnancy.

There is conclusive evidence that IPV during pregnancy is a very serious phenomenon affecting many women worldwide. Not only has research identified IPV in pregnancy as an issue worthy of further research, but there is also adequate evidence that there are many well-identified negative effects of IPV in pregnancy (Chisholm et al., 2017a; Zachor et al., 2018; Chen et al., 2017; Laelago et al, 2017). It has been shown that standardized, routine clinical assessment is important to intervene in current abuse and, potentially, prevent future abuse (McFarlane et al., 1992). Additionally, there is evidence that screening for IPV in pregnancy is beneficial and that there are several tools available for effective screening of IPV in pregnancy (Chisholm et al., 2017b; Macfarlane et al., 1992; Van Parys et al., 2017; Webster et al., 2017; O'Reilly et al., 2010). Furthermore, several training programs have provided increased screening for IPV in pregnancy by all members of the health care team. Finally, there have been many studies examining the negative birth outcomes related to IPV during pregnancy.

However, further research is needed to determine how common the issue of IPV is among the high-risk obstetrics population as current medical research on IPV among the MFM population is lacking. It is reasonable to hypothesize that the addition of another risk factor for adverse pregnancy outcomes such as IPV to an already high-risk pregnancy would likely increase that high-risk pregnancy's risk for adverse outcomes. Unfortunately, the medical

literature has yet to examine this hypothesis in depth. This study aims to fill this gap in the literature.

This project will most benefit women, pregnant women, and high-risk obstetrics populations. The accumulation of these populations would account for almost every woman during her lifetime should she decide to or be able to reproduce. The population estimate of Omaha, NE during the study was 468, 262. As such, this study could potentially affect approximately 50% of the population in Omaha or approximately 230,000 women (United States Census Bureau, 2017). More specifically this study focuses on pregnant women. According to Life Course Theory, any study involving women, such as this one, has the ability to be interpreted through a wide lens. Life Course Theory "refers to the sequence of events and roles- age-graded, socially defined, and nested within historical time and place- that forms our individual biographies," (Kotch, 2013, pg. 68). There are three key concepts in life course theory: trajectories, transitions, and turning points. Trajectories describe health and well-being for a substantial period of a person's life. Transitions are phases that are often associated with a change in health status and often occur over a brief time period. Turning points are changes in trajectories through changes in behavior or situation (Kotch, 2013). Pregnancy is a very common transition in a person's life that can positively or negatively alter that person's trajectory. From a life course perspective, the impact of this study is quite broad as the principle of life span development takes into account the cumulative effect of health over a person's lifetime as well as generational effects (Kotch, 2013). Additionally, this study's findings impact the entire population as a whole as pregnant women generate the next generation of a society.

The primary goal of this study is to estimate baseline data on the prevalence of IPV in a high-risk obstetrics population. A literature review was performed in PubMed, EBSCO, and Google

Scholar searching for the prevalence of IPV in the MFM population using the search terms "intimate partner violence" and "maternal fetal medicine" and "high-risk pregnancy" and yielded no results; based on a search of the current literature, there are no current estimates of the prevalence of IPV in the MFM population. The secondary aim is to determine whether the IPV that exists causes adverse pregnancy outcomes and/or poor birth outcomes. The long-term goal would be to determine the adverse effects of IPV on high-risk pregnant women and finally how to intervene and prevent women from experiencing IPV in pregnancy or how to intervene as IPV is occurring. Only then could intervention efforts be undertaken. Indeed, research has shown empowerment intervention to be evidence-based in decreasing violence among the pregnant population over time (Chisholm et al., 2017b). This study will provide valuable knowledge about a vulnerable population, high-risk obstetrics, that will inform future scholarship that will lead to lasting change regarding the prevalence of IPV. Specifically, the questions for this study are:

Research Question 1: What is the prevalence of IPV in a high-risk obstetrics population?

Research Question 2: Is IPV associated with adverse pregnancy outcomes and/or poor birth outcomes?

Chapter 3: Data and Methods

Study Design, Setting, and Study Population

This study is a retrospective cross-sectional study. A cross-sectional study fits this research question best as the study seeks to determine how many women are affected by IPV at one hospital in Omaha, NE. The Methodist Perinatal Center started screening every patient at their first obstetrics visit for IPV in January 2019 using the Abuse Assessment Screen. The population of this study was the Maternal Fetal Medicine (MFM) obstetrics population at the Methodist Perinatal Center at Methodist Women's Hospital. The population for the current study

consists of 1,069 patients who presented for their first obstetrics visit at Methodist Women's Hospital in Omaha, NE from January 2, 2019 to July 31, 2019.

The study sample was obtained by convenience sampling due to the sensitive nature of the issue and the care health care workers must take when approaching the subject of IPV with participants. It would be unwise if not unethical to screen participants for IPV in a less structured environment with no access to resources. Specifically, since this is a clinical study, privacy and HIPAA laws were followed. Further, according to the CDC Pregnancy Risk Assessment Monitoring System (PRAMS), 2.2% of women experience IPV during pregnancy (CDC, 2017a). For a sample size of 1,281 patients, the confidence interval is +/- 0.08 meaning that we expected to find 1.4-3% of the patients included in this study to report positive for IPV.

A survey has been chosen as the measurement instrument as it provides more data in a shorter amount of time than other instruments, such as qualitative interviews. The incorporation of the screening into the normal clinic flow created access to as many participants as possible. The method is also in line with past scholarship that has shown that a clinical provider performing a simple screen with no partner present is effective in identifying patients who have experienced IPV (McFarlane et al., 1992).

Variables and Operational Definitions

The primary outcome variable studied is intimate partner violence (IPV). The independent variables include insurance provider, race, ethnicity, socioeconomic status, and marital status. All of these factors could potentially affect a person's risk for experiencing IPV. Additionally, the control variable is age which restricted the study to patients age 19 and above. In the state of Nebraska, the age of majority is 19; restricting children as study participants

simplifies study design. The study population was restricted to patients at Methodist Women's Perinatal Center as that is the hospital where the survey was be administered.

Next, a potential confounding variable is participant understanding of "abuse" in the first question of the survey: "Have you ever been physically or emotionally abused by your partner or someone important to you?" The word abuse itself is open to interpretation as there was no definition of abuse provided for the patient in the survey. The rest of the questions only focused on physical abuse and behavior. Patients' determination on whether or not they had experienced IPV may have been influenced by these limitations. A last difficulty of this type of screening is that staff were not trained specifically on how to ask questions and to respond to patients if they had questions about the survey. If participants had questions, the responses they received might have varied according to the ability level of staff.

Inclusion criteria included: women over the age of 19 and patients presenting for a first obstetrics visit at the clinic. Exclusion criteria included patients under the age of 19, patients with a triplet birth, and patients screened with the previously-used one-question screen. Patients under age 19 were excluded as they are minors in Nebraska and this study was focused on adult high-risk obstetrics patients. Patients with triplet births were excluded as their outcomes are very different from singleton and twin births. Patients screened with the previously-used one-question screen were excluded as that was not the survey instrument being used in this study.

Data Sources and Measurement

The dependent variable, IPV, was measured by the Abuse Assessment Screen (AAS). The Abuse Assessment Screen has been used widely in the pregnant population to screen for IPV and is the standard survey method for IPV in the field of obstetrics (Chisholm et al., 2017a). The AAS has a sensitivity and specificity of 93-94% and 55-99%, respectively (Chisholm et al.,

2017b; Zachor et al., 2018). The AAS is a confidential, anonymous five-question survey that was developed by McFarlane et al. (1992) to screen for IPV among the pregnant population. The questions are as follows:

Question 1: “Have you ever been emotionally or physically abused by your partner or someone important to you?”

Question 2: “Within the last year, have you been hit, slapped, kicked, or otherwise physically hurt by someone?”

If the answer to question 2 is yes, the participant is prompted to select who the perpetrator of violence is such as a husband, ex-husband, boyfriend, stranger, other, or multiple and then how many times that violence occurred.

Question 3: “Since you’ve been pregnant, have you been hit, slapped, kicked, or otherwise physically hurt by someone?”

If the answer to question 3 is yes, the participant is again prompted to select what relationship they had to the perpetrator and how many times that violence occurred, to mark the area of injury on a body map, and to score each incident using a 1-6 scale of severity with ‘one’ being threats of abuse including the use of a weapon and ‘six’ being use of a weapon or wound from a weapon.

Question 4: “Within the last year, has anyone forced you to have sexual activities?”

Patients are asked to specify by whom and how many times the forced sexual activities occurred.

Question 5: “Are you afraid of your partner or anyone you listed above?” (McFarlane et al., 1992, p. 3177)

If a patient answers yes to any of the five questions, their response is recorded as positive for IPV. The AAS is relatively short, thereby reducing survey fatigue. The survey also utilizes non-

judgmental language which is a key tenet of trauma-informed care. In addition to the AAS, deidentified demographic data from the electronic medical record was included in the data review. This additional data included maternal health outcomes, fetal health outcomes, insurance status (individual private pay, self-pay, or Medicare/Medicaid), employment status, age, language, race, ethnicity, and marital status.

Furthermore, research question two asked: is IPV associated with adverse pregnancy outcomes and/or poor birth outcomes? To answer research question two, the maternal health outcomes that were examined were: preterm bleeding (PTB), maternal infection, preterm labor (PTL), mode of delivery, progress of labor, premature rupture of membranes (PROM), preterm premature rupture of membranes (PPROM), hospitalization before delivery, body mass index (BMI), anemia, bone fracture, laceration, head trauma, sexually transmitted infection (STI), pain disorder (chronic pain disorder, fibromyalgia, and endometriosis), and psychiatric disorder (depression, anxiety, panic disorder, and PTSD). Fetal outcomes that were examined are birth weight, gestational age, admission to a neonatal intensive care unit (NICU), APGAR scores at one and five minutes after birth, and breastfeeding status. Birth weight was recorded as birth weight A and B as twin births were included. For singleton births, birth weight A represents the birth weight of the single neonate. For twin births, birth weight A and B represented birth weight for baby A and baby B, respectively. Pregnancy conditions that were examined were: high risk pregnancy (HRP), ultrasound abnormality (polyhydramnios and oligohydramnios), fetal anomaly (chromosomal/genetic abnormalities, congenital heart disease), intrauterine growth restriction (IUGR), gestational diabetes mellitus (GDM), intrauterine fetal demise (IUFD), spontaneous abortion (SAB), hypertensive disorders of pregnancy (HTN DOP), history of SAB, history of IUFD, history of HTN DOP, history of cesarean delivery (CD), other substance use (alcohol and

illicit drug use), tobacco use, clotting disorder, seizure disorder, cardiac disease, renal disease, thyroid disease, chronic hypertension (HTN), and diabetes mellitus (DM) which includes both Type 1 and Type 2 diabetes.

Table of Abbreviations

PTB	Preterm bleeding
PTL	Preterm labor
PROM	Premature rupture of membranes
PPROM	Preterm premature rupture of membranes
BMI	Body mass index
STI	Sexually transmitted infection
NICU	Neonatal intensive care unit
HRP	High risk pregnancy
IUGR	Intrauterine growth restriction
GDM	Gestational diabetes mellitus
IUFD	Intrauterine fetal demise
SAB	Spontaneous abortion
HTN DOP	Hypertensive disorders of pregnancy
CD	Cesarean delivery
HTN	Hypertension
DM	Diabetes mellitus

Sample Size

The size of the population of interest was 1,069. The sample size consisted of 967 patients who met initial inclusion criteria. Then, 218 patients with missing delivery data were excluded. Missing delivery data is defined as patients who delivered elsewhere, had not yet delivered, and/or patients with incomplete delivery data in the EMR. After exclusion, the sample size was 749. Convenience sampling was achieved by collecting data from only one clinic. This also limited time and personnel constrains as including other hospitals would require the participation and cooperation from multiple departments and personnel, which is currently not feasible. As this study is estimating prevalence among all patients who fulfilled the inclusion criteria, it was not necessary to perform a power analysis.

Data Collection

IRB approval was obtained from Methodist Women's Hospital August 29, 2019, and from UNMC on September 20, 2019. Every new patient presenting to the maternal fetal medicine clinic at Methodist Women's Hospital in Omaha, NE for a first trimester obstetrics visit was screened for IPV using the Abuse Assessment Screen survey. The AAS was integrated into the electronic medical record and administered by nursing staff in a separate intake room at the Methodist Perinatal Center starting January 1, 2019 and continuing until July 31, 2019. Clinic staff asked the five AAS questions at the time of the patient visit; this data was then reviewed in the electronic medical record. Every patient seeking care for a first trimester obstetrics visit at the Perinatal Center at Methodist Women's Hospital was screened.

This research was carried out following established ethical protocols. For example, according to the SAMHSA trauma-informed framework, the principle of safety was emphasized (Substance Abuse and Mental Health Services Administration, 2014). Per protocol, no family,

friends, or significant others were allowed in the room at the time of screening to ensure confidentiality. However, some patients had a support person in the room while the AAS was administered; when this happened, the AAS questions were not asked. As a result, a third of participants were not screened. The principles of trustworthiness and transparency were also utilized; the clinic staff administering the screen were consistent and transparent with the patients. The principles of collaboration and mutuality were also a part of the process. The clinic staff have been trained in the era of recognizing patient autonomy which ensures that patients are seen as experts in their own lives (Anyikwa, 2016). This screening was incorporated into the regular clinic flow which assists to normalize the information being ascertained and attempts to make the patients more at ease when answering sensitive questions. As stated earlier, a positive screen was defined as the patient answering "yes" to any one of the five questions as has been established in standard usage of the AAS (Zachor et al., 2018). If patients screened positive, staff were instructed to provide clinical support and access to local resources such as the Women's Center for Advancement as nursing staff have not yet received trauma-informed care training.

Statistical Methods

Prior to data analysis, all patient information was de-identified. Summary statistics were used to describe the frequency of variables and mean and standard deviation of the numerical variables. A bivariate analysis was conducted to look for a relationship between IPV and any of the independent variables. Chi-square tests were used to test for an association between IPV and categorical independent variables. Independent t tests were run for age and BMI. For this study,

IBM SPSS Statistics Subscription build number 1.0.0.1327 was utilized to perform the statistical analyses (IBM SPSS Statistics for Macintosh, 2018).

Chapter 4: Results

Demographic Data

Table 1 includes demographic information including: insurance provider, language, race, ethnicity, marital status, employment, age, and body mass index (BMI). There are two missing variables for BMI as the BMI was incorrectly recorded for two patients; these values were 265.15 and 154.86 which were excluded. Body mass index was divided into patients with a BMI≥25 or BMI<25 as a BMI that is greater than or equal to 25 is defined as overweight or obese. This cutoff was chosen as it is clinically significant to be either a healthy weight or overweight/obese. For age, an age greater than or equal to 35 is defined as advanced maternal age. These cutoffs were reasoned to be clinically significant.

Table 1: Background Data (N=967)		
Variable	**N (%)**	**Mean (SD)**
Race		
Asian	27 (2.8)	
American Indian/Alaskan Native	8 (0.8)	
Black	44 (4.6)	
Multiple	40 (4.1)	
Other	25 (2.6)	
White	816 (84.4)	
Unknown	7 (0.7)	
Ethnicity		
Hispanic	60 (6.2)	
Multiple	17 (1.8)	
Non-Hispanic	864 (89.3)	
Other	1 (0.1)	
Unknown	25 (2.6)	
Preferred Language for Healthcare Information Delivery		
Arabic	1 (0.1)	

English	943 (97.5)	
French	1 (0.1)	
Other	5 (0.5)	
Russian	2 (0.2)	
Spanish	10 (1)	
Vietnamese	2 (0.2)	
Unknown	3 (0.3)	
Marital Status		
Divorced	24 (2.5)	
Married	734 (75.9)	
Single	195 (20.2)	
Unknown	14 (1.4)	
Insurance Provider		
Employer-Based Health Insurance	776 (80.2)	
Medicaid	177 (18.3)	
Self-pay	14 (1.4)	
Employment		
Employed	757 (78.3)	
Unemployed	201 (20.8)	
Unknown	9 (0.9)	
Age*		32.15 (5.29)
<35yo	461 (61.5)	
≥35yo	288 (38.5)	
BMI*		29.42 (8.03)
BMI <25	265 (35.5)	
BMI ≥25	484 (64.5)	
Missing	2 (0.3)	

*N=749

Demographic Data After Exclusion of Missing Delivery Data

Table 2 is a summary of demographic information after exclusion of patients with missing delivery data. In this table, the demographic data is split into two groups per variable based on the group with the highest percentage of patients. For insurance provider, patients were split into employer-based health insurance (EBHI) or non-employer-based health insurance.

Language was divided into English and Non-English. Race was split into White and Non-White. Ethnicity was split into Hispanic and Non-Hispanic. Marriage status was split into married and non-married. The demographic data was split into two groups at this stage to allow for larger group sample sizes. There was no missing demographic data after exclusion of patients with missing delivery data.

Table 2: Demographics After Exclusion of Missing Delivery Data	
N=749	**N (%)**
Race	
White	642 (85.7)
Non-White	107 (14.3)
Ethnicity	
Hispanic	693 (92.5)
Non-Hispanic	56 (7.5)
Preferred Language for Healthcare Information Delivery	
English	732 (97.7)
Non-English	17 (2.3)
Marriage Status	
Married	607 (81)
Non-married	142 (19)
Insurance Provider	
EBHI	626 (83.6)
Non-EBHI	123 (16.4)
Missing	0 (0)

Descriptive Data

Descriptive data that was collected included frequencies of all variables and demographic data. Patients with missing recorded delivery data likely only saw the MFM clinic for a consult or delivered somewhere other than Methodist Women's Hospital. The missing data column

consists of patients with an AAS screen marked “unable to answer” which typically meant someone other than the staff member and the patient was in the room.

Fetal Outcomes Before Exclusion of Patients with Missing Delivery Data

Table 3 includes the mean and standard deviation for fetal outcomes before exclusion of patients with missing delivery data. Each variable was divided into two groups for bivariate analysis based on clinical reasoning. For birth weight, low birth weight is designated as less than 2.499kg. For gestational age, a gestational age < 37 weeks is defined as preterm. For APGARs, an APGAR of 5 was chosen as the distinction as that is clinically significant. All of these cutoffs were reasoned to be clinically significant. Birth Weight was separated into birth weight A and B as there were 67 twins recorded. For all births that were singletons, birth weight A is the recorded weight for the singleton neonate. There are 900 missing values for Birth Weight B and APGAR B1 and B5 as there were only 67 twins total. From Table 3, it is evident that most patients gave birth at term to neonates of a normal birthweight with healthy APGAR scores. Of note, baby B of a twin pair tended to have a lower birth weight and APGAR than baby A of twin pairs. Table 4 includes fetal outcomes after exclusion of patients with missing delivery data.

Table 3: Fetal Outcomes Before Exclusion of Patients with Missing Delivery Data

	Mean (SD)
Birth Weight A (kg) n = 746	3.14 (0.74)
Birth Weight B (kg) n = 67	2.12 (0.75)
APGAR A1 n = 744	7.71 (1.63)
APGAR A5 n = 744	8.69 (1.39)
APGAR B1 n = 65	6.05 (2.85)
APGAR B5 n = 65	7.52 (2.49)
Gestational Age (GA) n=761	37.18 (4.07)

Fetal Outcomes After Exclusion of Patients with Missing Delivery Data

Table 4: Fetal Outcomes After Exclusion of Patients with Missing Delivery Data	
N= 749	**N (%)**
BWA ≥2.499	631(85)
BWA<2.499	111(15)
Missing	7 (0.9)
BWB ≥2.499	23 (34.3)
BWB<2.499	44 (65.7)
Missing (Singleton births)	682 (91.1)
GA ≥37	594 (79.3)
GA<37	155 (20.7)
Missing	0
APGARA1 ≥5	697 (93.8)
APGARA1<5	46 (6.2)
Missing	6 (0.8)
APGARA5 ≥5	726 (97.7)
APGARA<5	17 (2.3)
Missing	6 (0.8)
APGARB1≥5	49 (75.4)
APGARB1<5	16 (24.6)
Missing (Singleton births)	684 (91.3)
APGARB5≥5	54 (83.1)
APGARB5<5	11 (16.9)
Missing (Singleton births)	684 (91.3)

Delivery Data

Table 5 includes delivery outcomes including: mode of delivery data broken down into spontaneous vaginal delivery (SVD), operative vaginal delivery (OVD), primary cesarean

delivery (PCD), repeat cesarean delivery (RCD), and dilation and evacuation (D&E) for spontaneous abortions and intrauterine fetal demise. Table 5 also provides data for normal and abnormal progress of labor. Abnormal labor is defined as the abnormal progression of labor; abnormal progression of labor is defined as the observation of one of two abnormal labor patterns (protraction or arrest disorder) (Casanova et al., 2019); abnormal progress of labor was indicated by a record in the chart of prolongation of stage 2 of delivery.

Table 5: Delivery Outcomes	
(N=967)	**N (%)**
Spontaneous Vaginal Delivery	967 (42.1)
Operative Vaginal Delivery	30 (3.1)
Primary Cesarean Delivery	153 (15.8)
Repeat Cesarean Delivery	160 (16.5)
Dilation and Evacuation	10.0 (1.0)
Mode of Delivery (Missing)	207 (21.4)
Normal Progress of Labor	414 (42.8)
Abnormal Progress of Labor	63 (6.5)
Progress of Labor (Missing)	490 (50.7)

Delivery Data After Exclusion of Missing Delivery Data

Table 6 includes delivery and progress of labor data after exclusion of patients with missing delivery data. Patients were split into two groups at this stage for optimal data analysis. For delivery data, patients were recorded as vaginal or cesarean delivery. Progress of labor was recorded as normal or abnormal. Progress of labor is defined as abnormal if one of two abnormal labor patterns (protraction or arrest disorder) are observed (Casanova et al., 2019). This table shows no missing method of delivery. The missing progress of labor variable includes both cesarean deliveries wherein progress of labor does not apply and patients whose charts did not indicate progress of labor.

Table 6: Delivery Data After Exclusion of Missing Delivery Data

	N (%) N=749
Vaginal Delivery	437 (58.3)
Cesarean Delivery	312 (41.7)
Progress of Labor (Normal)	410 (86.7)
Progress of Labor (Abnormal)	63 (13.3)
Progress of Labor (Missing)	276 (36.8)

Pregnancy Condition Variables Before and After Exclusion of Patients with Missing Delivery Data

Table 7 includes the 21 pregnancy condition variables that were recorded before and after exclusion of patients with missing delivery data. After exclusion of patients with missing delivery data, there were no missing values.

Table 7: Pregnancy Condition Variables Before and After Exclusion of Patients with Missing Delivery Data

Pregnancy Condition	Before Exclusion (N=967)		After Exclusion (N=749)		
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Missing
High Risk Pregnancy	422 (43.6)	545 (56.4)	282 (37.7)	467 (62.3)	0
Ultrasound Anomaly	104 (10.8)	863 (89.2)	84 (11.2)	665 (88.8)	0
Fetal Anomaly	83 (8.6)	884 (91.4)	62 (8.3)	687 (91.7)	0
Intrauterine Growth Restriction	65 (6.7)	902 (93.3)	53 (7.1)	696 (92.9)	0
Gestational Diabetes Mellitus	90 (9.3)	877 (90.7)	77 (10.3)	672 (89.7)	0
Intrauterine Fetal Demise	8 (0.8)	959 (99.2)	6 (0.8)	743 (99.2)	0
Spontaneous Abortion	7 (0.7)	960 (99.3)	1 (0.1)	748 (99.9)	0
Hypertensive Disorders of Pregnancy	122 (12.6)	845 (87.4)	114 (15.2)	635 (84.8)	0
History of Spontaneous Abortion	29 (3)	938 (97)	25 (3.3)	724 (96.7)	0
History of Intrauterine Fetal Demise	15 (1.6)	952 (98.4)	10 (1.3)	739 (98.7)	0

History of Hypertensive Disorders of Pregnancy	52 (5.4)	915 (94.6)	46 (6.1)	703 (93.9)	0
History of Cesarean Delivery	194 (20.1)	773 (79.9)	172 (23)	577 (77)	0
Other Substance Use	9 (0.9)	958 (99.1)	5 (0.7)	744 (99.3)	0
Tobacco Use	50 (5.2)	917 (94.8)	36 (4.8)	713 (95.2)	0
Clotting Disorder	39 (4)	928 (96)	32 (4.3)	717 (95.7)	0
Seizure Disorder	9 (0.9)	958 (99.1)	7 (0.9)	742 (99.1)	0
Cardiac Disease	10.0 (1.0)	957 (99)	8 (1.1)	741 (98.9)	0
Renal Disease	10.0 (1.0)	957 (99)	7 (0.9)	742 (99.1)	0
Thyroid Disease	110 (11.4)	857 (88.6)	91 (12.2)	658 (87.9)	0
Chronic Hypertension	68 (7)	899 (93)	53 (7.1)	696 (92.9)	0
Diabetes Mellitus	24 (2.5)	943 (97.5)	20 (2.7)	729 (97.3)	0

Maternal and Fetal Health Outcomes

Table 8 includes pregnancy outcomes and fetal health outcomes. Pregnancy outcomes include preterm bleeding (PTB), maternal infection, preterm labor (PTL), premature rupture of membranes (PROM), preterm premature rupture of membranes (PPROM), hospitalization before delivery, anemia, bone fracture, laceration, head trauma, sexually transmitted infection, pain disorder, psychiatric disorder, and multiple births. Patients with missing delivery data likely delivered somewhere other than Methodist Women's Hospital, had not yet delivered, or had incomplete delivery data entered into the EMR. Table 8 fetal outcome data includes neonatal intensive care unit (NICU) admission and breastfeeding status.

Table 8: Maternal and Fetal Health Outcomes

Pregnancy Outcomes	**Before Exclusion (N=967)**			**After Exclusion (N=749)**		
	Yes N (%)	**No N (%)**	**Missing N (%)**	**Yes N (%)**	**No N (%)**	**Missing N (%)**
PTB	56 (5.8)	721 (74.6)	190 (19.6)	47 (6.3)	702 (93.7)	0 (0)

Maternal Infection	11 (1.1)	758 (78.4)	198 (20.5)	10 (1.3)	739 (98.7)	0 (0)
PTL	64 (6.6)	705 (72.9)	198 (20.5)	58 (7.7)	691 (92.3)	0 (0)
PROM	5 (0.5)	759 (78.5)	203 (21)	5 (0.7)	744 (99.3)	0 (0)
PPROM	36 (3.7)	728 (75.3)	203 (21)	35 (4.7)	714 (95.3)	0 (0)
Hospitalization Before Delivery	145 (15)	624 (64.5)	198 (20.5)	141 (18.8)	608 (81.2)	0 (0)
Anemia	58 (6)	882 (91.2)	27 (2.8)	54 (7.2)	695 (92.8)	0 (0)
Bone Fracture	0 (0)	940 (97.2)	27 (2.8)	0 (0)	749 (0)	0 (0)
Laceration	2 (0.2)	938 (97)	27 (2.8)	2 (0.3)	747 (99.7)	0 (0)
Head Trauma	2 (0.2)	938 (97)	27 (2.8)	2 (0.3)	747 (99.7)	0 (0)
STI	42 (4.3)	892 (92.9)	26 (2.8)	34 (4.5)	715 (95.5)	0 (0)
Pain Disorder	49 (5.1)	892 (92.2)	26 (2.7)	45 (6)	704 (94)	0 (0)
Psychiatric Disorder	186 (19.2)	757 (78.3)	24 (2.5)	151 (20.2)	598 (79.8)	0 (0)
Multiples	76 (7.9)	883 (91.3)	8 (0.8)	69 (9.2)	680 (90.8)	0 (0)
NICU	158 (16.3)	583 (60.3)	226 (23.4	157 (21.3)	580 (78.7)	12 (1.6)
Breastfeeding	650 (67.2)	43 (4.4)	274 (28.3)	648 (94)	41 (6)	60 (8)

Prevalence of Intimate Partner Violence

Table 9 provides data for the prevalence of IPV. Patients who answered yes to any of the five AAS questions were recorded as positive for having experienced IPV. The missing data column consists of patients with an AAS screen marked "unable to answer" which typically meant someone other than the staff member and patient was in the room. As noted earlier, around a third of patients were not able to be screened for IPV. Research question one asked what is the prevalence of IPV in a high-risk obstetrics population? According to this study, 5.6% +/- 1.45% (4.09%-7.1%) of high-risk obstetrics patients at Methodist Women's Hospital have experienced IPV.

Table 9: Prevalence of Intimate Partner Violence		
IPV	**Before Exclusion (N=967)**	**After Exclusion (N=749)**

	Yes N (%)	No N (%)	Missing N (%)	Yes N (%)	No N (%)	Missing N (%)
	54 (5.6)	587 (60.7)	326 (33.7)	35 (7.8)	413 (55.1)	301 (40.2)

Perpetrator of IPV

Table 10 describes the relationship of the perpetrators of IPV for the patients who provided that information for question two and three. Perpetrators were identified as: "ex-partner", "ex-husband", "partner", "stranger", "partner's best friend", or "ex-brother-in-law". Of the 54 patients who screened positive for IPV, only 9 patients (16.7%) indicated their relationship to the perpetrator of IPV. Of those who indicated their relationship to the perpetrator, it was most frequently a former partner who had perpetrated the IPV.

Table 10: Breakdown of Abuse Assessment Responses (N=9)

Abuse Assessment Screen		Frequency
Perpetrator of IPV	Partner	1
	Former Partner	5
	Acquaintance	0
	Stranger	1
	Other	2
	Multiple	0
	Total Who Specified	9

Abuse Assessment Screen Data

Table 11 includes the frequency of each Abuse Assessment Screen question and percent of total positive IPV screens. Of note, patients were able to voluntarily respond to any of the five questions, so multiple responses are possible for each patient. Question 2 and 3 had follow-up questions asking the patient to specify who had perpetrated the violence and how often; very few patients responded to these follow-up questions. Only five patients shared how often the violence

had occurred. Three patients stated it had happened once, one patient stated it had happened 30 times, and one patient stated it had happened 34 times. Only one patient specified where they had been hit; this patient indicated they had been kicked in the belly by a child with which they worked. Only nine patients responded who had perpetrated the violence (Table 10). There is no composite score for the AAS scale. If patients indicated yes on any one of the five questions, they were considered "positive" for intimate partner violence (McFarland et al., 1996). Fifty-four out of 967 participants (5.6%) scored "positive" on this scale. Of those that scored positive, most patients only answered Question 1; a large majority of patients (96.3%) responded yes to question 1: have you ever been emotionally or physically abused by your partner or someone important to you?

Table 11: Abuse Assessment Screen Data

	Frequency	% of total 54 positive screens	% of total respondents
Question 1: Have you ever been emotionally or physically abused by your partner or someone important to you?	52	96.3	5.4
Question 2: Within the last year, have you been hit, slapped, kicked, or otherwise physically hurt by someone?	5	9.3	.5
Question 3: Since you've been pregnant, have you been hit, slapped, kicked, or otherwise physically hurt by someone?	1	1.9	.1
Question 4: Within the last year, has anyone forced you to have sexual activities"?	5	9.3	.5
Question 5: Are you afraid of your partner or anyone you listed above?"	4	7.4	.4

Outcome Data

Association between IPV and Maternal and Fetal Health Outcomes

Table 12 further provides information as to the statistical significance and direction of significance of independent variables on IPV before and after exclusion of patients with missing delivery data. Table 12 includes the p-values for all chi square tests for association between IPV and all independent variables. P-values are included for the analysis performed on the data before and after excluding patients with missing delivery data. Variables with a significant p-value defined as less than .05 are highlighted in red. There are seven total significant variables. The significant variables before exclusion are: BMI, STI, psychiatric disorder, birth weight for twin A, ultrasound anomaly, insurance provider, and marital status. Significant variables after exclusion of patients with missing delivery data are: psychiatric disorder, birth weight for twin A, ultrasound anomaly, insurance provider, and marital status. BMI was borderline significant before exclusion with a p-value of .010, and BMI became insignificant after exclusion of patients with missing delivery data. Additionally, only 42 patients screened positive for a STI before exclusion, and STI became insignificant after exclusion. No patients had a bone fracture or head trauma diagnosis which explains why no p-value exists for these two variables. Finally, during data analysis, variables that are bold had one cell (>20%) with an expected count less than 5 which meant that a Fisher's Exact Test result was recorded rather than the Pearson Chi-Square Test result.

Research question two asked: is IPV associated with adverse pregnancy outcomes and/or poor birth outcomes? Data from this study show that BMI >25, STI, psychiatric disorder, low birth weight, ultrasound anomaly, a non-employer-based insurance provider, and non-married status are associated with IPV.

Association Between IPV and Demographic and Birth Outcome Variables

Table 12 summarizes the direction of significance for six significant variables and eight non-significant variables. For the significant variables, to determine direction of significance, SPSS crosstabulation results were examined. For example, for patients who tested positive for an STI before exclusion, patients with an STI who screened positive for IPV were divided by the total number of patients who screened positive for IPV which was 8/51 or 15.7%. Then, patients with an STI who screened negative for IPV were divided by the total number of patients who screened negative for IPV which was 22/563 or 3.9%. Since 15.7% is greater than 3.9%, it is reasonable to conclude that a diagnosis of an STI is associated with IPV. This same reasoning was applied to all variables.

Table 13 provides data from the independent t tests that were conducted on BMI and age. An independent t test was conducted to determine if there was a difference in IPV between patients with a BMI≥25 and patients with a BMI<25. Results showed that there was a statistically significant difference between patients without IPV (n=585, M=29.5, SD=8.2) and patients with IPV (n=54, M=32.56, SD=9.02), t (637)= -2.581, p=0.01. The 95% confidence interval of the difference was -5.36 - -0.73. Patients with IPV had a slightly higher BMI with a mean of 32.6 than patients without IPV whose mean BMI was 29.5. Next, an independent t test was conducted to determine if there was a difference in IPV between patients aged ≥35 years old and patients aged <35 years old. There was not a statistically significant difference in mean age between patients without IPV (n=587, M=32.08, SD=5.381) and patients with IPV (n=54, M=31.72, SD=5.97), t (639)= 0.463, p=0.643, 95% CI for difference= -1.159-1.875). After exclusion of patients with missing delivery data, neither BMI nor age were shown to be

statistically significant. There was no statistically significant difference between mean BMI in patients without IPV (n=411, M=28.996, SD=7.502) and patients with IPV (n=35, M=32.271, SD=9.996), p=.066. Similarly, there was also no statistically significant difference in mean age between patients without IPV (n=413, M=32.83, SD=5.107) and patients with IPV (n=35, M=32.03, SD=6.100), p=0.381.

Table 12: Association Between IPV and Demographic and Birth Outcome Variables

	Before Exclusion (N=967)					**After Exclusion (N=749)**				
	+IPV	+IPV%	-IPV	-IPV%	P-value	+IPV	+IPV%	-IPV	-IPV%	p-value
Significant Variable										
STI	8/51	15.7	22/563	3.9	0.002	4/35	11.4	18/413	4.4	0.083
Psychiatric Disorder	21/52	40.4	96/565	17	<0.001	14/35	40	73/413	17.7	0.001
BWA < 2.499kg	10/34	29.4	64/414	15.5	0.035	10/34	29.4	62/411	15.1	0.029
US Anomaly	11/54	20.1	60/587	10.2	0.019	10/35	28.6	45/413	10.9	0.006
Non-EBHI Insurance	22/54	40.7	126/587	21.5	0.001	14/35	40	72/413	17.4	0.001
Non-Married Marital Status	31/54	57.4	149/585	25.6	<0.001	19/35	52.3	82/413	19.9	<0.001
Non-Significant Variable										
PTL	4/38	10.5	42/428	9.8	0.781	4/35	11.4	37/413	9	0.547
PPROM	0/38	0	23/423	5.4	0.242	0/35	0	23/413	5.6	0.241
Hospitalization Before Delivery	7/38	18.4	94/427	22	0.607	7/35	20	90/413	21.8	0.805
Pain Disorder	2/51	3.9	27/564	4.8	1	2/35	5.7	24/413	5.8	1
GA	24/36	66.6	325/421	77.2	0.153	24/35	68.6	324/413	78.5	0.178
APGAR A5	33/34	97	399/410	97.3	1	33/34	97	398/409	97.3	1

GDM	5/54	9.3	85/913	9.3	0.99	3/35	8.6	43/413	10.4	1
DM	2/54	3.7	22/913	2.4	0.392	2/35	5.7	14/413	3.4	0.36

Table 13: Association Between IPV and BMI and Age

Variable	N	Mean	Standard Deviation	t	df	Sig	95% CI for difference in mean
Before Exclusion of Patients with Missing Delivery Data (n=967)							
BMI + no IPV	585	29.52	8.22	-2.58	637	.010	-5.36 - -0.73
BMI+ yes IPV	54	32.56	9.02				
Age+ no IPV	587	32.08	5.381	.463	639	.643	-1.159-1.875
Age+ yes IPV	54	31.72	5.973				
After Exclusion of Patients with Missing Delivery Data (n=749)							
BMI + no IPV	411	28.996	7.50	-1.894	37.3	.066	-6.779-0.228
BMI + yes IPV	35	32.27	9.996				
Age+ no IPV	413	32.83	5.107	0.878	446	.381	-0.994-2.597
Age+ yes IPV	35	32.03	6.100				

Summary of Results

The first research question asked: what is the prevalence of IPV in the MFM population at Methodist Perinatal Center? According to a survey of 967 patients, the prevalence of IPV in the MFM population at Methodist Women's Hospital is 5.6%. The prevalence of 5.6% is somewhat higher than the 2.2% +/- 0.08% (1.4-3%) that was estimated prior to data collection based on previous studies. Overall, the fact that this study finds a higher prevalence of IPV than was expected highlights how underreported IPV is. The second research question asked: Is IPV associated with adverse pregnancy outcomes and/or poor birth outcomes? The variables that

were found to be significant after exclusion of patients with missing delivery data are: psychiatric disorder, birth weight for twin A, ultrasound anomaly, insurance provider, and marital status.

Chapter 5: Discussion

Summary

According to this study, 5.6% of high-risk obstetrics patients at Methodist Women's Hospital have experienced IPV. Results showed that the percent of high-risk pregnant women in the Omaha Metro that experience IPV was 2.4% higher than the expected 2.2% (CDC, 2017a). The prevalence of 2.2% was chosen as a reference because the PRAMS survey covers both physical and psychological violence and is a 50-state survey making it the most generalizable data. The prevalence of 5.6% is also higher than the 3.2% statistic cited by Chisholm et al. (2017a). However, the prevalence of 5.6% falls within the range of 3.9-8.7% that a majority of studies report (Van Parys et al., 2014) but is lower than the prevalence of 3-30% reported by Devries et al. (2010). To my knowledge, this is the first study to estimate the prevalence of IPV in the MFM population of women.

The prevalence of 5.6% determined by this study is likely underestimating the true prevalence of IPV in this population as IPV is often under-reported due to patients' fear of repercussions due to disclosure or embarrassment (Chisholm et al., 2017a; Hossieni et al., 2017; James et al., 2013; Baird, 2015). Moreover, only one percent of domestic violence cases are ever reported to the police (James et al., 2013). In this study, 33.7% of patients were not screened due to another person's presence in the room at the time of screening. Clearly, there is a need to educate the staff to ensure the importance of the partner not being in the room when delivering

the survey so that staff can safely administer the survey for all patients. In addition, even among the patients who were screened, studies show patients are very hesitant to report IPV; only 21% of women who have experienced IPV actually disclose their experience with IPV to a provider (Chisholm et al., 2017b). Many more patients might have screened positive if all patients had been screened and if patients felt comfortable disclosing IPV.

With regard to maternal and fetal health outcomes, data from this study show that BMI ≥25, STI, psychiatric disorder, low birth weight, ultrasound anomaly, a non-employer-based insurance provider, and non-married status are associated with IPV. An association between IPV and negative pregnancy outcomes were found which include: overweight BMI, sexually transmitted infection, psychiatric disorder, low birth weight, and ultrasound abnormality. Further, IPV is associated with non-married patients and patients who self-pay for insurance or receive Medicaid. Several of the health outcomes found to be associated with IPV in this study corroborate past studies. For example, several studies have found low birth weight to be associated with IPV (Chen et al., 2017; Laelago et al., 2017; Chisholm et al., 2017a). Chen et al. (2017) found that a NICU admission is associated with IPV. Studies have shown STIs and psychiatric disorders to be associated with IPV (Chisholm et al., 2017a; Zachor et al., 2018). Chisholm et al. (2017a) report that physical inactivity (which can lead to a higher BMI) is associated with IPV. Further, Yakubovich et al. (2018) found that identifying as married is a protective factor against IPV and James et al. (2013) report that being single is associated with IPV. The finding from these previous studies corroborate the finding from this study that non-married status is associated with IPV in the MFM population. The only variable found to be significant in this study that has not been reported in other studies was ultrasound abnormality. This may be because most studies on IPV in pregnancy focus on normal pregnancies that,

seemingly, would not have an ultrasound abnormality. This study included ultrasound abnormality as maternal fetal medicine specialists are more likely to encounter patients whose pregnancies contain ultrasound abnormalities. This finding may be new and subject for future research. For all of these patients experiencing IPV, their future health trajectories will likely be negatively affected by IPV. Based on this study, it is clear that it is vitally important to screen all patients- especially high-risk pregnant patients- for IPV.

With regard to risk factors, research shows young women, typically under age 25, are at higher risk for IPV (Yakubovich et al., 2018). However, this study did not show that age was statistically significant. For this study, patients of advanced maternal age are more clinically significant in the MFM population than being a younger age. When it became necessary to split patient ages into two groups for data analysis, the age of 35 was chosen as the delineating point because being 35 or older is defined as advanced maternal age. Additionally, the mean age for patients in this study was 32 which also justified an age cut-off of 35. Perhaps if the age cutoff had been lower, that might have shown significance as younger women have been shown to be at higher risk for IPV than older women. Further studies could create a lower age cutoff to examine this. Also, Chisholm et al. (2017a) state that certain health disparities according to race, ethnicity, education, income, and age are associated with IPV. Of these variables, this study only showed a non-employer-based insurance provider to be statistically significant. In the United States, since most people rely on their job for health insurance (Berchick et al., 2019), health insurance can be used as a surrogate for employment and, thus, socioeconomic status. Since having non-employer-based health insurance (self-pay or Medicaid) was statistically significant in its association to IPV, it stands to reason that patients of lower socioeconomic status are at higher risk for IPV in this study population. Additionally, as this study population was not very

diverse in ethnicity, race, or language spoken, future studies would benefit from a more diverse population. If this study were to include patients from other health centers in Omaha that have a larger percentage of a diverse patient population, that would provide more data about the patient population of the Omaha Metro Area as a whole.

Additionally, studies have found that abuse before pregnancy is associated with IPV (James et al., 2013). Among the patients in this study who screened positive for IPV, 96.3% of them screened positive for Question 1 of the AAS which asks if a patient has ever been emotionally or physically abused by a partner or someone important to them. This indicates that a majority of the patients in this study that screened positive for IPV had experienced IPV sometime during their life prior to or during their current pregnancy. The results of this study seem to support prior findings that abuse before pregnancy is associated with IPV. Another risk factor for IPV is having experienced violence by a family member which is an adverse child event (Ludermir et al., 2017). While only two patients of this cohort indicated their former IPV exposure was from a family member, that is not clinically insignificant. This finding highlights the need for providers to holistically approach patients and further understand how the lifespan affects a patient- with particular focus on how exposure to adverse childhood events can impact a person later in life.

Furthermore, some of the effects of IPV that have been reported in the literature are bone fracture, laceration, head trauma, STI, pain disorder, and psychiatric disorder (Chisholm et al., 2017a). Of these effects, STI and psychiatric disorder were statistically significant in this study. It might be important for staff and providers at this clinic to take these findings in consideration when working with patients with STIs and/or psychiatric disorders as they may be experiencing IPV. Adverse fetal outcomes that have been shown to be related to IPV are small for gestational

age, preterm birth, and low birthweight (Chisholm et al., 2017a). Specifically, many studies have shown low birthweight to be associated with IPV (Chisholm et al., 2017a; Chen et al., 2017; Laelago et al., 2017). Results from this study indicate that IPV is associated with infants with a low birth weight. This is significant because low birthweight infants are at risk for a multitude of health issues (American Academy of Pediatrics, 2017). For example, having an infant with low birth weight and its effects could place stress on the mother and potentially strain the mother's relationship with her partner and exacerbate any IPV that may be occurring. One study found that mothers who have infants born with a very low birth weight experience stress due to related complications; this stress negatively affects mothers, families, and infants (Helle et al., 2018). When considering low birth weight infants as similar to very low birth weight infants, it is possible that mothers with low birth weight infants would also experience stress, thus, negatively affecting the mother, infant, and family structure. Further, Ellis et al. (2008) found that after birth women who had experienced IPV continue to report higher levels of stress and less partner support than women who do not experience IPV. They found that women who have experienced IPV seek healthcare more often for their infants than women who have not experienced IPV; the study hypothesized that the IPV may result in the infants and their mothers experiencing more illness. Any of this additional stress could exacerbate any IPV that might be occurring.

Strengths and Limitations

One strength of this study is that through the partnership with physicians at Methodist Perinatal Center, the full five-question abuse assessment screen was implemented into the electronic health record for the entire Methodist Women's Hospital system. As of January 2019, all patients receiving care for a first obstetrics visit are to be screened for IPV with the AAS. Prior to implementing the AAS, the IPV screen was only a one-question, unvalidated screen.

Another strength of the study is the choice of the screening instrument. The AAS is short which decreases survey fatigue. Also, the survey includes various forms of abuse including both physical and psychological abuse which not all IPV screening instruments do. Further, the AAS includes a question specifically about pregnancy; not all IPV surveys include a question about pregnancy. Additionally, this study is one of the first to examine IPV in the MFM population, providing valuable groundwork for further work on IPV in this patient population.

There are several limitations of this study. First, it is unclear if patients who only presented for an ultrasound were excluded from the initial sample. Support staff ran an analysis of every patient that was seen for a first OB visit within the study time parameters, but some visits that were for ultrasound-only might have been included unintentionally which may have contributed to the 218 patients that have missing delivery data. Second, confounding factors likely made a difference in patients' understanding of the survey questions. The confounding variable is patient understanding of "abuse" or "emotional abuse" which possibly resulted in underreporting. Also, two patients who screened positive for IPV indicated that their exposure was due to their profession being around children who kicked them; while that circumstance technically answers the AAS questions, that response does not fall under the definition of IPV or interpersonal abuse. In this way, those two patients were false positives. While not a large number, that still indicates there was some confusion on patients' behalf regarding the purpose of the questions. This points to either the need for more training for the staff delivering these questions or the need to choose an IPV survey instrument that better clarifies the screening questions. Also, the AAS allows for patients to select options "stranger" and "acquaintance" for the identity of the perpetrator of the IPV. Neither strangers or acquaintances fall under the

definition of an intimate partner. In this way, the AAS includes both IPV and interpersonal violence, which is a consideration for future studies when selecting a survey instrument.

Further, another limitation is the inability to screen patients alone. If a woman was not able to be screened alone, the staff were instructed not to administer the survey questions for the patient's safety which resulted in a smaller sample size. There are three likely possibilities for patients not being able to be screened alone: the patient might have wanted another person in the room with them, persons accompanying the patient might have insisted on accompanying the patient and disregarded the request of staff members to speak to the patient alone, and/or staff members might have failed to provide clear instructions to the patient and support person or did not have the skills to separate the patient from the person. Any one of these or other reasons could have contributed to a third of patients not being able to be screened alone. However, even if patients were able to be screened alone, research shows that patients often do not feel safe reporting IPV (Chisholm et al., 2017a; Hossieni et al., 2017; James et al., 2013; Baird, 2015; Fletcher et al., 2016). For example, in this study 54 patients screened positive for IPV. However, six other patients who did not screen positive for IPV in this study had diagnosis codes in their chart indicating a history of IPV even to the point that one patient requested a cesarean delivery due to the patient's past IPV-related trauma.

With 33.7% of patients not being screened, there is improvement to be made to ensure staff are able to separate patients from support persons (often partners) to conduct the survey confidentially. Another issue indicating a need to educate the support staff is that some staff were still using the previously-used IPV screen. Those patients had to be excluded, decreasing the sample size of this study. Educating the support staff on IPV and the AAS might help alleviate this confusion. Staff also weren't trained on how to provide feedback to patients' questions about

the questionnaire. Past studies have shown that training nursing and support staff about IPV and the screening survey is well received (Burmele et al., 2018). Perhaps, the staff at Methodist Perinatal Center can undergo training on IPV and the AAS which might lead to an increase IPV screening rate. Training of providers has also been shown to increase their communication with patients about IPV; in the future, providers at Methodist Perinatal Center could also undergo IPV training (Zachor et al., 2018).

Further, due to personnel constraints, a screen during subsequent trimesters was not possible during this research study which limited this study's ability to capture all patients who experienced IPV during the entirety of their pregnancy. However, future research projects could include screens during each pregnancy trimester to ensure that patients are not being missed if they experience IPV later in their pregnancy. Also, certain demographic information such as gender identity and sexual orientation are not included as the electronic health record utilized does not provide this information. As we are unable to collect this information at this time, this is an area for future research projects to examine. Additionally, there was no plan in place for the patients who screened positive other than following clinical guidelines and providing local resources- namely information about the Women's Center for Advancement, the main resource center for people who have experienced interpersonal violence in the Omaha Metro Area. In the future, a more robust plan should be in place in the event of a positive IPV screen. Another limitation is that staff had not been trained in the concepts of trauma-informed care; this is something which the clinic could pursue in the future.

Moreover, there are several limitations to a non-probability sampling method. Non-probability sampling methods are not as robust as probability sampling methods. While it is the easiest form of sampling to complete, convenience sampling creates the potential for bias within

the data collected. Since convenience samples are not randomized, there is no way to reduce bias within the sample. Since the sample data is only coming from one clinic, there is no way to generalize the data to other populations. Because there is no randomization within convenience sampling, that makes it a weaker sampling method. Future studies can an attempt to incorporate more robust sampling methods. Further, only one hospital system was sampled due to time constraints and personnel constraints. Including other hospitals in the study in an effort to increase generalizability of data would require participation and cooperation from multiple departments and personnel.

Additionally, future research could include a mixed methods study by gathering qualitative data from interviews with patients who screen positive and staff who administer the survey. This could provide valuable information that could help guide decision-making regarding intervention strategies for future patients. Additionally, another area for future research would be to examine the difference in proportion screened for IPV before the Abuse Assessment Screen was incorporated into the EMR at Methodist Perinatal Center and after the incorporation of the screen. Prior to this study, the Methodist Perinatal Center included a one-question unvalidated screen for IPV. After incorporating a more robust and standardized screening survey and procedure, it is hypothesized that there would be an increase in screening after incorporation of the Abuse Assessment Screen into the EMR. This question highlights the effects of various forms of EMR on screening for any health condition. Depending on the hospital system and which EMR a hospital system chooses to use, there may be a difference in the robustness of screening tools implemented by a given healthcare system.

Interpretation

Data from this study indicates that more patients than expected are experiencing IPV at Methodist Women's Hospital as this study found that IPV was 3.4% higher than the expected 2.2% (CDC, 2017a). Often, the IPV discourse focuses on populations that are known to be at risk for IPV. The demographics of the patient population at Methodist Perinatal Clinic was shown to be largely white, English-speaking, non-Hispanic, employed, married, and with employer-based health insurance which is not largely representative of the populations who are known to be at greater risk for IPV. One takeaway from this study is that IPV can and does exist in all patient populations- even among patients who might be among the demographics that carry less risk factors for IPV such as patients who are white, English-speaking, non-Hispanic, employed, and married. Again, it is clear that it is vitally important that all patients be screened for IPV. There is always the potential to encounter a patient who has experienced IPV and to intervene and improve outcomes.

Generalizability

This study took place at one clinic in Omaha, NE. Unfortunately, the Methodist Perinatal Center is not representative of the entire Omaha Metro Area population as the demographic make-up of patients at Methodist Perinatal Center does not reflect the demographic make-up of the Omaha Metro Area. Including more hospital systems in future studies would help to diversify the patient population to make it more generalizable to the Omaha Metro Area. However, even then that would not make it generalizable to the overall population of the United States. Future studies could consider including hospitals from multiple states to ensure the greatest generalizability. This often requires funding and can be logistically challenging, but it would provide invaluable information about how many high-risk obstetrics patients are experiencing IPV and how that is affecting them.

Conclusion

The research question for this study was born out of a passion for investigating intimate partner violence among high-risk pregnant patients. As IPV has not been thoroughly studied among the high-risk pregnant population, a quantitative assessment of the prevalence of IPV in the MFM population was helpful before attempting a qualitative in-depth analysis of the population. Now that quantitative data has been obtained, qualitative data from patients who screen positive for IPV could be obtained in the future that would further inform IPV intervention strategies. Further, it is evident from the findings of this study that the life course theory can inform thinking about IPV in the setting of pregnancy- including high-risk pregnancy. Pregnancy is an important transition in the lives of many women that has the potential to either positively or negatively alter a woman's life course trajectory and, possibly, her future offspring's trajectory. Further, if a woman experiences IPV during her pregnancy, that more than likely negatively affects her trajectory. The maternal fetal medicine patient population is already at high risk of experiencing a negative change in their health trajectory after pregnancy. Thus, an understanding of intimate partner violence is vitally important for all health care personnel caring for high-risk pregnant patients.

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Supervision and Facilities

This capstone project has been supervised by Dr. Dahlke, and data was collected from Methodist Women's Hospital. Dr. Lynette Smith was consulted for assistance with statistical analysis. Dr. Rajaram and Dr. Carl Smith have provided additional advice and guidance throughout the project.

Human Subjects

This project required an IRB from both UNMC and Methodist. Dr. Dahlke assisted with the Methodist IRB (Appendix B), and the student obtained UNMC IRB approval (Appendix C). IRB approval at both UNMC and Methodist was obtained prior to data collection.

Appendix A: Abuse Assessment Screen

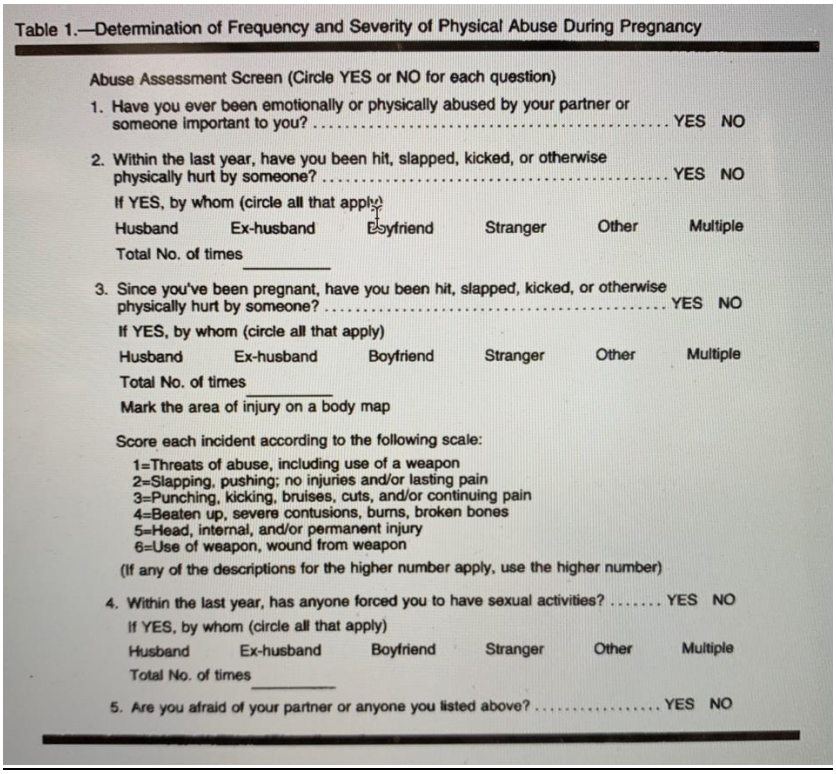


Table 1.—Determination of Frequency and Severity of Physical Abuse During Pregnancy

Abuse Assessment Screen (Circle YES or NO for each question)

1. Have you ever been emotionally or physically abused by your partner or someone important to you? ..... YES NO

2. Within the last year, have you been hit, slapped, kicked, or otherwise physically hurt by someone? ..... YES NO

   If YES, by whom (circle all that apply)

   Husband Ex-husband Boyfriend Stranger Other Multiple

   Total No. of times _____

3. Since you've been pregnant, have you been hit, slapped, kicked, or otherwise physically hurt by someone? ..... YES NO

   If YES, by whom (circle all that apply)

   Husband Ex-husband Boyfriend Stranger Other Multiple

   Total No. of times _____

   Mark the area of injury on a body map

   Score each incident according to the following scale:

   1=Threats of abuse, including use of a weapon
   2=Slapping, pushing; no injuries and/or lasting pain
   3=Punching, kicking, bruises, cuts, and/or continuing pain
   4=Beaten up, severe contusions, burns, broken bones
   5=Head, internal, and/or permanent injury
   6=Use of weapon, wound from weapon

   (If any of the descriptions for the higher number apply, use the higher number)

4. Within the last year, has anyone forced you to have sexual activities? ..... YES NO

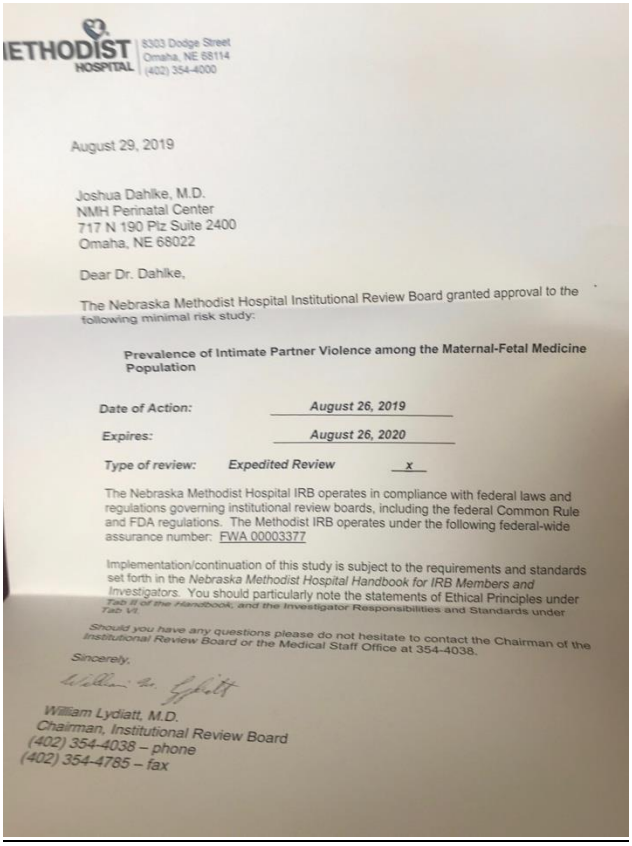
   If YES, by whom (circle all that apply)

   Husband Ex-husband Boyfriend Stranger Other Multiple

   Total No. of times _____

5. Are you afraid of your partner or anyone you listed above? ..... YES NO

Appendix B: Methodist IRB Approval



METHODIST HOSPITAL | 8303 Dodge Street Omaha, NE 68114 (402) 354-4000

August 29, 2019

Joshua Dahlke, M.D.
NMH Perinatal Center
717 N 190 Plz Suite 2400
Omaha, NE 68022

Dear Dr. Dahlke,

The Nebraska Methodist Hospital Institutional Review Board granted approval to the following minimal risk study:

Prevalence of Intimate Partner Violence among the Maternal-Fetal Medicine Population

Date of Action: *August 26, 2019*

Expires: *August 26, 2020*

Type of review: *Expedited Review* *x*

The Nebraska Methodist Hospital IRB operates in compliance with federal laws and regulations governing institutional review boards, including the federal Common Rule and FDA regulations. The Methodist IRB operates under the following federal-wide assurance number: FWA 00003377

Implementation/continuation of this study is subject to the requirements and standards set forth in the *Nebraska Methodist Hospital Handbook for IRB Members and Investigators*. You should particularly note the statements of Ethical Principles under Tab III of the Handbook, and the Investigator Responsibilities and Standards under Tab VI.

Should you have any questions please do not hesitate to contact the Chairman of the Institutional Review Board or the Medical Staff Office at 354-4038.

Sincerely,

William Lydiatt, M.D.
Chairman, Institutional Review Board
(402) 354-4038 – phone
(402) 354-4785 – fax

Appendix C: UNMC IRB Approval

NEBRASKA'S HEALTH SCIENCE CENTER

Office of Regulatory Affairs (ORA)
Institutional Review Board (IRB)

September 20, 2019

Joshua Dahlke, MD
Sarah Larsen
Methodist Hospital

IRB # 713-19-ET

TITLE OF PROPOSAL: Prevalence of Intimate Partner Violence Among the Maternal-Fetal Medicine Population

DATE OF REVIEW: 09/20/2019

DATE OF FINAL ACCEPTANCE: VALID UNTIL: 09/20/2020

The UNMC IRB has completed its review of the above-titled external protocol. Please be advised that the UNMC IRB has accepted approval from the Methodist IRB under the provisions of 45 CFR 46.114.

It is understood that Methodist IRB is responsible for oversight of the above-titled research project in accordance with HHS regulations at 45 CFR 46 and FDA regulations at 21 CFR 50, 56 as applicable. Such oversight includes: 1) continuing review no less often than annually, 2) approval of any protocol amendments, 3) reporting to the Office for Human Research Protections (OHRP), and FDA as applicable, 4) unanticipated problems involving risk to subjects or others, and 5) serious and continuing non-compliance, as well as suspensions. Should any reports be filed with OHRP and/or FDA, the UNMC IRB should be provided with copies of such correspondence.

Finally, please be advised that acceptance by the UNMC IRB of the Methodist IRB approval is valid for a period of **five years** from the initial date of review. If the study continues beyond the five year period, the project must be resubmitted in order to maintain an active status.

On Behalf of the IRB,

Signed on: 2019-09-20 14:52:00.000

Gail Kotulak, BS, CIP
IRB Administrator III
Office of Regulatory Affairs

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