

THE ASSOCIATION BETWEEN SEXUAL VIOLENCE AGAINST WOMEN AND
THE FEMALE VICTIMS' FUTURE PREGNANCY INTENTION: A SECONDARY
ANALYSIS USING THE 2006-2010 NATIONAL SURVEY OF FAMILY GROWTH
(NSFG) DATA

by

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ABSTRACT

PUTRI PAMELA POWELL. The association between sexual violence against women and the female victims' future pregnancy intention: A secondary analysis using the National Survey of Family Growth (NSFG) 2006-2010 data. (Under the direction of DR. LARISSA R. BRUNNER HUBER)

The prevalence of sexual violence in the United States is on the rise. Sexual violence can result in a variety of physical, behavioral, and mental health issues as well as concerns on reproductive and fertility control, including unintended pregnancy. Unintended pregnancy can result in a number of adverse health outcomes for women, infants, and children. This study reports on a secondary data analysis of 9,776 women aged 18-45 years who participated in the National Survey of Family Growth (NSFG) from 2006-2010 to determine the association between sexual violence and future pregnancy intention. The women self-reported experience of non-voluntary sexual intercourse via Audio Computer-Assisted Self-Interview (ACASI) to ensure privacy and confidentiality. Information on future pregnancy intention was assessed through Computer-Assisted Personal Interviewing (CAPI). Logistic regression was used to examine the association between the experience of non-voluntary sexual intercourse and the women's future pregnancy intention. The study found that 21.57% of women reported to have experienced non-voluntary sexual intercourse, and 58.02% of women indicated that they did not want to have a baby in the future. After adjustment for marital status, women who experienced sexual violence had increased odds of not wanting to be pregnant in the future as compared to women who had never experienced such abuse, and the result was statistically significant (AOR = 1.32; 95% CI: 1.14-1.52). This study provided an important contribution to develop policies and programs that help survivors

to explore their reproductive desires and plans. Additional studies determining the psychosocial mechanism of the association and using more explicit categorization of the type of coercions exerted during the sexual abuse are needed to further confirm these findings.

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CHAPTER 1: INTRODUCTION

Sexual violence against women is of great public health importance due to the adverse health outcomes associated with the abuse. Sexual violence is defined as any sexual act that is perpetrated against someone's will that encompasses, but is not limited to, nonconsensual sexual acts, direct contacts, and indirect contacts [Centers for Disease Control and Prevention (CDC), 2002]. In the United States, the prevalence of sexual violence is on the rise (CDC, 2011). A nationally representative survey found that nearly 1 in 5 women (18.3%) reported that they had been raped, and 1 in 20 women (5.6%) indicated that they had experienced some type of sexual coercion besides rape at least once in their lives (CDC, 2011). A substantial body of literature has extensively explored the negative effects of sexual violence on the women's physical, behavioral, and mental health; however, the effect of sexual violence on women's fertility control, such as unintended pregnancy, is still scarce (Pallitto, Campbell, & O'Campo, 2005).

Unintended pregnancy, which is composed of mistimed and unwanted pregnancies, can result in a variety of adverse pregnancy-related outcomes and negative infant and child psychological development (Pallitto et al., 2005). Approximately 51% of the 6.6 million pregnancies in the United States each year are unintended (Finer & Zolna, 2014). Women who reported that they had felt unhappy about their pregnancies had higher risks for low-birth weight infants, perinatal mortality, postpartum complications, and poorer quality mother-child relationships compared to women with

intended pregnancies (Barber, Axinn, & Thornton, 1999; Laukaran & van den Berg, 1980; Sable, Spencer, Stockbauer, Schramm, Howell, & Herman, 1997).

The experience of sexual violence can be a traumatic event that damages a woman's psychological health tremendously, which in turn can influence her desire of having a child (Campbell & Lewandowski, 1997). Although past studies investigating the abused women's environment of fear and dominance have been useful in determining factors leading to unintended pregnancy, research on the female victims' own perspectives on childbearing is very scant (Pallitto et al., 2005). Using a nationally representative data of women in the United States interviewed for the National Survey of Family Growth (NSFG), this study evaluated the association between a woman's experience of sexual violence and her future pregnancy intentions.

CHAPTER 2: LITERATURE REVIEW

Violence against women, especially sexual violence, has been increasingly recognized as a significant human rights and public health issue. Sexual violence is defined as any sexual act that is perpetrated against someone's will (CDC, 2014). The range of sexual offenses vary, which includes completed or attempted forced penetration of a victim, forced acts in which a victim is made to penetrate a perpetrator or someone else, non-physically forced penetration which occurs after a person is facilitated with alcohol/drugs, is pressured verbally or through intimidation or misuse of authority to consent or acquiesce, unwanted sexual contact, and non-contact unwanted sexual experiences (CDC, 2014).

The consequences of abuse on women's physical and mental health have been well documented; however, few studies have considered the indirect effects of how the experience of abuse can affect women's sexual decision-making and fertility control (Pallitto, et al., 2005). Studies have demonstrated an increased risk of unintended pregnancy among women experiencing intimate partner violence (IPV) and other forms of sexual violence (Gomez, 2011). This phenomenon has been hypothesized as a result of the combination between trauma from the abusive experience and lack of control over sexual intercourse, pregnancy decision-making, and contraceptive use (Williams, Brett, & Abma, 2009; Yuan, Koss, Stone, 2006). In the following passages, I discuss the

prevalence of sexual violence and unintended pregnancy in the United States and the association between these factors.

2.1 Sexual Violence in the United States

Based on the most recent study by the CDC on a nationally representative sample of women in the United States, nearly 1 in 5 (18.3%) women reported experiencing rape at some time in their lives (CDC, 2011). Approximately 5.6% of women experienced other forms of sexual violence besides rape, including sexual coercion, unwanted sexual contact, and non-contact unwanted sexual experiences, in the past 12 months prior to the survey (CDC, 2011). Thirteen percent of the women in the study experienced unwanted sexual penetration after being pressured in a non-physical way, and 27.2% of women have experienced unwanted sexual contact at least once in their lifetime (CDC, 2011).

The age when the first incident of rape occurs varies (CDC, 2011). One study found that 20.4% of female victims were first raped at age 25 and older; 37.4% were first raped between the ages of 18-24; 29.9% were first raped between the ages of 11-17; and 12.3% were first raped at age 10 or younger (CDC, 2011). The perpetrators of sexual violence were mostly reported to be people the victims knew, such as intimate partners (51.1%), family members (12.5%) or acquaintances (40.8%), while strangers only accounted for 13.8% (CDC, 2011). Due to the possibility of multiple perpetrators, when combined, the percentages may exceed 100% (CDC, 2011).

The experience of sexual violence can have a tremendous effect on the victim's physical and mental health [CDC, 2011; World Health Organization (WHO), 2010]. Sexual violence victims may acquire bodily damages due to the physical coercion exerted during the abuse (CDC, 2011; WHO, 2010). Chronic stress that the women experienced

from the abuse can have long-term adverse health outcomes affecting gastrointestinal, cardiovascular, endocrine, and immune systems (CDC, 2011; WHO, 2010). Using data from the Behavioral Risk Factor Surveillance System (BRFSS), researchers found that history of nonconsensual sex was associated with increased risks for high cholesterol, stroke, and heart disease (Smith & Breiding, 2011). In particular, female victims of sexual violence were more likely to report heart attack and heart disease as compared to non-victims (Smith & Breiding, 2011). Furthermore, women who have been abused have higher rates of unintended pregnancies and abortions, are more likely to be infected with sexually transmitted infections, and tend to develop more mental illnesses such as anxiety, depression, suicidal behaviors, and sleep and eating disorders, compared to non-abused women (CDC, 2011; WHO, 2010).

Sexual abuse crime victimization costs the United States \$450 billion annually [The National Alliance to End Sexual Violence (NAESV), 2011]. The NAESV assessed that rape is the most costly of all crimes to its victims with the total estimated costs at \$127 billion a year, excluding the cost of child sexual abuse (NAESV, 2011). In 2008, violence and abuse constituted up to 37.5% of total health care costs, at approximately \$750 billion (NAESV, 2011).

2.2 Unintended Pregnancy in the United States

Unintended pregnancy is classified into two categories of pregnancy intentions: mistimed and unwanted pregnancy (Pallitto et al., 2005). Mistimed refers to a pregnancy that would have been wanted at a later date (Pallitto et al., 2005). Unwanted pregnancy refers to a pregnancy that was not wanted at that time or anytime in the future (Pallitto et al., 2005).

Using data from the NSFG, researchers found that 51% of nearly 6.6 million pregnancies that occurred in 2008 in the United States were unintended (Finer & Zolna, 2014). From 2002 to 2008, the rate of unintended pregnancy increased by 10% to 54 per 1,000 women (Finer & Zolna, 2014). The Population Council estimated that the United States' unintended pregnancy rate is significantly higher than the rate in many other developed countries (29-38 per 1,000 women) (Singh, Sedgh, & Hussain, 2010).

Women between the ages of 18 and 24 years old had the highest rate of unintended pregnancy compared to women who were younger or older than that age group (Finer & Zolna, 2014). Cohabiting women also had the highest unintended pregnancy and unintended birth rates, at 198 and 101 per 1,000 women respectively, which both are more than four times the rate of non-cohabitating or married women (Finer & Zolna, 2014). Women who had lower incomes, less education, and were of minority race (African-American and Hispanic) also had the highest risk for unintended pregnancy as compared to their counterparts (Finer & Zolna, 2014).

An extensive body of literature has described the magnitude of health consequences of unintended pregnancy to women, infants, and children (Pallitto et al., 2005). A longitudinal cohort study of married pregnant women found that women's negative attitude about pregnancy was associated with perinatal mortality and postpartum complications (Laukaran & van den Berg, 1980). Women who reported that the pregnancy was unwanted were more than twice as likely to deliver infants who died within the first 28 days of life than women who reported that the pregnancy was intended (Bustan & Coker, 1994). Another study found that mothers who reported they had felt unhappy about the pregnancy had 1.53 (95% CI: 1.10-2.12) times the odds of having very

low-birth-weight infants compared to mothers who reported that the pregnancy was intended (Sable et al., 1997). Unintended pregnancy has been linked to adverse infant outcomes due to reduced initiation of breastfeeding (Korenman, Kaestner, & Joyce, 2002). Unintended pregnancy has also shown to be associated with long-term adverse outcomes on children's health and development due to the increased odds of child abuse and neglect by mothers (Barber et al., 1999). Unintended pregnancy was associated with less opportunity for skill development and lower-quality relationships between mother and child, possibly because of mothers' depressive symptoms or lack of emotional investment (Barber et al., 1999).

Unintended pregnancy has placed a costly financial burden on the United States. In 2008, two-thirds (65%) of the 1.7 million births resulting from unintended pregnancies were paid for by public insurance programs, primarily Medicaid (Sonfield & Kost, 2013). Total public expenditures for births resulting from unintended pregnancies nationwide were estimated to be \$12.5 billion, coming from both federal and state expenditures (\$7.3 billion and \$5.2 billion, respectively) (Sonfield & Kost, 2013).

Due to the reasons described in the passages above, reducing the rate of unintended pregnancy has become part of a national public health goal (HealthyPeople.gov, 2014). The U.S. Department of Health and Human Services' *Healthy People 2020* campaign aims to reduce unintended pregnancy by 10%, from 49% of pregnancies to 44% of pregnancies, over the next 10 years (HealthyPeople.gov, 2014).

2.3 The Association between Sexual Violence and Unintended Pregnancy

Unintended pregnancy was initially linked with sexual violence because women whose pregnancies are unintended share some common risk factors with women who

experience violence, such as younger age, lower income, and being unmarried (Gazmararian, Petersen, Spitz, Goodwin, Saltzman, & Marks, 2000). In both population- and clinic-based studies, the results were fairly consistent that women whose pregnancy was unintended had two to four times the risk of experiencing violence as did women whose pregnancy was planned (Gazmararian et al., 2000).

A study of a nationally representative sample of women between 15 and 44 years old in Colombia (n = 11,585) used multivariate logistic regression to explore the relationship between IPV and unintended pregnancy (Pallitto & O'Campo, 2004). Respondents were classified as having experienced sexual abuse if she stated that her current or most recent partner had forced her to have sex, either sometimes or frequently (Pallitto & O'Campo, 2004). For the outcome variable, the respondent was asked about the intendedness of all pregnancies they had had in the last five years (including the current pregnancy, if applicable), whether she had wanted the pregnancy at the time of conception, had wanted it later or had not wanted it at all (Pallitto & O'Campo, 2004). The study found that having coerced sex by a non-partner and experiencing IPV were positively associated with unintended pregnancy [$p < .01$; AOR = 1.5 and 1.6, respectively], after adjusting for age, number of children, socioeconomic composite score, education level, history of terminated pregnancy, and the interaction between socioeconomic composite score and urban residence (Pallitto & O'Campo, 2004). Since the study was done in Colombia, cultural factors on male-female relationships may not be generalizable to populations elsewhere. In addition, since the study asked women to retrospectively report on the intendedness of prior pregnancies, there is a possibility that

women have altered their feelings about a pregnancy since giving birth (Pallitto & O'Campo, 2004).

Another more recent study using the same survey in Colombia identified the effect of sexual violence on unintended pregnancy, specifically among adolescents and young women aged 13-24 (n = 4,913) (Gomez, 2011). The study found that among women who had been pregnant in the past five years, sexual violence was associated with statistically significantly higher odds of unintended pregnancy (AOR = 1.4; 95% CI: 1.1-1.7) (Gomez, 2011). The study also found that female youth who reported to have been sexually abused by an intimate partner, specifically, were more likely to experience an unintended pregnancy (AOR = 1.5; 95% CI: 1.1-2.2) compared to youth who had not experienced abuse by an intimate partner (Gomez, 2011). The study has several limitations. First, there may be issues around the accuracy of sexual violence data because the national survey the study used did not explicitly define sexual violence (Gomez, 2011). Similar to the previous study in Colombia, this study also had issues with generalizability due to culturally specific male-female relationships and recall bias because the women were asked to retrospectively report pregnancy intentions (Gomez, 2011). Lastly, lifetime measures of sexual violence did not provide information about the timing of sexual violence; therefore the temporal sequence between the sexual abuse and unintended pregnancy could not be determined (Gomez, 2011).

A cross-sectional study in Peru evaluated the associations between lifetime physical and/or sexual violence with unintended pregnancy, specifically among pregnant women between the age of 15 and 49 years (n = 2,394) (Cripe, Sanchez, Perales, Lam, Garcia, & Williams, 2008). The study found that both lifetime physical (OR = 1.42; 95%

CI: 1.16-1.74) and sexual (OR = 1.85; 95% CI: 0.97-3.52) abuse were associated with increased risk of unintended pregnancy; however, the association between sexual abuse and unintended pregnancy was not statistically significant (Cripe et al., 2008). Women who experienced a combination of physical and sexual abuse had over three-fold increased odds (OR = 3.31; 95% CI: 2.13-5.15) of unintended pregnancy compared to non-abused women (Cripe et al., 2008). Several limitations of the study should be noted. First, the cross-sectional design limits the ability to determine a causal relationship (Cripe et al., 2008). Second, exposure to violence was determined through face-to-face interview and was therefore subject to non-systematic errors in recall and non-disclosure due to the sensitivity of the subject, which could pose the threat of misclassification in the study (Cripe et al., 2008). Third, pregnancy intendedness was assessed after labor and delivery, thus inferences could not be made to women who had miscarriages or abortion and perceptions of pregnancy intentions might have changed after childbirth (Cripe et al., 2008). Fourth, the results from the study may not be generalizable because the sample primarily came from low-socio-economic populations in Peru with their own cultural constraints on male-female relationships that may differ from populations elsewhere (Cripe et al., 2008).

A secondary analysis of a nationally representative sample of women in the United States used Cycle 6 (2002) NSFG data to examine the relationship between coercion at first intercourse and the intendedness of the pregnancy resulting in a woman's first live birth (n = 4,136) (Williams et al., 2009). The researchers controlled for age at interview, race/ethnicity, completed education at interview, age at first pregnancy, marital status at first pregnancy, forced sexual intercourse subsequent to the first intercourse, and

factors associated with respondent's early childhood and parental characteristics that might be associated either with unintended first birth or coercion at first sex, such as mother's education and age at first birth, parents' marital status at her birth, and the respondent's living situation before age 18 (Williams et al., 2009). The study focused on the severity of coercion that the women experienced (Williams et al., 2009). Compared to women who experienced no or minimal coercion, the odds of an unintended first birth was 3.4 times (95% CI: 1.9-6.2) for women who experienced significant coercion and 2.9 times (95% CI: 1.8-4.8) for women who experienced mild coercion (Williams et al., 2009). There were two sources of possible non-differential misclassification associated with the exposure and the outcome (Williams et al., 2009). Although coerced first intercourse is typically thought to be a salient event unlikely to be forgotten, it is possible that women's recollections may differ depending on what occurred afterward (Williams et al., 2009). Another source of misclassification was the retrospective response to pregnancy intentions because feelings may change during and after pregnancy, depending on a multitude of factors including changes in physical, emotional, and financial status (Williams et al., 2009).

In a study of pregnant women aged 14-40 years ($n = 1,536$) in Pennsylvania, researchers interviewed women regarding their experience of physical and/or sexual violence and pregnancy intention (Uscher-Pines & Nelson, 2010). The results demonstrated that there is a positive correlation between violence and pregnancy intendedness (Uscher-Pines & Nelson, 2010). Women who reported at least one episode of forced sex before age 16 were significantly more likely to report an unintended pregnancy after adjusting for race, educational attainment, social support, and marital

status (AOR = 1.51; 95% CI: 1.11-2.04) (Uscher-Pines & Nelson, 2010). In addition, women reporting forced sex after age 16 (AOR = 1.54; 95% CI: 1.14–2.07), women reporting spousal abuse in the current pregnancy (AOR = 1.64; 95% CI: 1.32–2.04), and women reporting physical violence in a previous pregnancy (AOR = 1.70; 95% CI: 1.15–2.51) had significantly higher odds of reporting an unintended pregnancy after adjusting for the control variables (Uscher-Pines & Nelson, 2010). The study was unable to be generalized to all women in the United States because the sample includes only pregnant women in Pennsylvania. The responses were obtained through face-to-face interview, which could open the possibility of non-disclosure due to the sensitive nature of the topic on violence (Uscher-Pines & Nelson, 2010).

2.4 Male-Partner's Control Over Women's Reproductive Decisions

Almost all studies have examined unintended pregnancy and women's inability to control fertility through the lens of fear and male dominance evident in abusive relationships (Pallitto et al., 2005). A qualitative study using focus group methodology investigated the relationship of IPV and unintended pregnancy (Campbell et al., 1995). The study conducted focus groups in wife abuse shelters at two geographically distinct locations, i.e. Middle Atlantic (n = 10) and Southern (n = 13) urban communities (Campbell et al., 1995). One of the central questions asked during the discussion was, "How did you decide to get pregnant, did it just happen or was it planned?" (Campbell et al., 1995). The main theme identified by the women was control by the male-partner (Campbell et al., 1995). The male-partner's control was manifested in the women's decisions about daily life, in decisions about having children, and in decisions to use contraceptives to prevent pregnancy (Campbell et al., 1995). The majority of the women

stated that all pregnancies were not the male-partner's idea, but often he pushed the pregnancy (Campbell et al., 1995). The purpose of pushing to have a child was for the male-partner to further exert his control and to make the woman need him (Campbell et al., 1995). Most of the women claimed that their partners threw away their birth control pills, refused to wear condoms, and explicitly instructed them to not use any contraceptive methods (Campbell et al., 1995). Limitations of this study are the small sample size and the inability for the study to be generalized to all women in the United States because the participants were recruited from abuse shelters in Mid-Atlantic and Southern urban communities only (Campbell et al., 1995).

Another qualitative study conducted in-depth interviews with adolescent females (n = 53) with a history of IPV and examined the chronologies and contexts of pregnancy and sexual health outcomes (Miller, Decker, Reed, Raj, Hathaway, & Silverman, 2007). The women explained a range of male behaviors and messages encouraging them to bear a child, such as the male partner stating explicitly that he wanted her to become pregnant, getting angry if she asked him to use a condom, as well as blocking her access to contraception, such as flushing birth control pills down the toilet, intentional breaking condoms, and removing contraceptive rings or patches (Miller et al., 2007). Limitations of this study are the small sample size and the inability for to the study to be generalized to all adolescent females in the United States because the participants were recruited from low-income urban communities using a purposive sampling strategy (Miller et al., 2007). In addition, this study relied solely on self-report by adolescent females and their perceptions of partner behaviors related to pregnancy, thus exposing the study to recall bias and subjective interpretations of male behavior (Miller et al., 2007).

As a follow-up study, Miller et al. conducted cross-sectional research on females ages 16-29 years (n = 1,278) seeking care in family planning clinics in California to identify pregnancy coercion by male partners (Miller, Decker, McCauley, Tancredi, Levenson, Waldman, Schoenwal, & Silverman, 2010). In analyses stratified by exposure to partner violence, reproductive control (pregnancy coercion and birth control sabotage) was associated with unintended pregnancy among those exposed to partner violence after adjusting for age, ethnicity, clinic site, and immigrant status [adjusted odds ratio (AOR) = 2.02; 95% confidence interval (CI): 1.45-2.82] (Miller et al., 2010). The combined effect of both partner violence and reproductive control increased the odds of unintended pregnancy almost two-fold after adjusting for the control variables (AOR = 1.99; 95% CI: 1.11-3.58) (Miller et al., 2010). There are two limitations to this study. First, due to the cross-sectional nature of the study the true temporal sequence of events cannot be determined (Miller et al., 2010). Second, the participants were recruited through convenience sample from family planning clinics in one Northern California region; therefore, the results cannot be generalized to all family planning clinic clients in the United States (Miller et al., 2010).

2.5 Trauma Mechanism

A possible explanation for the female victim's low desire to have a child is due to the immediate and chronic psychological consequences resulting from the abusive experience (Yuan et al., 2006). Immediate psychological consequences include shock, denial, fear, confusion, anxiety, withdrawal, guilt, nervousness, distrust of others, and symptoms of post-traumatic stress disorder, such as emotional detachment, sleep disturbances, flashbacks, and mental replay of assaults (Yuan et al., 2006). Chronic

psychological consequences include depression, attempted or completed suicide, alienation, and post-traumatic stress disorder symptoms (Yuan et al., 2006).

Many current mental health researchers and practitioners conceptualize the psychological effects of sexual violence using a traumatic response framework (Campbell & Lewandowski, 1997). Trauma ensues when an individual is exposed to a dramatic event that has caused a feeling of helplessness in the face of unbearable danger (Campbell & Lewandowski, 1997). The *Diagnostic and Statistical Manual of Mental Disorders IV* (DSM-IV) describes a traumatic event as a phenomenon in which the individual “experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of himself or herself or others” and that the individual’s “response involved intense fear, helplessness or horror” (Campbell & Lewandowski, 1997). Burstow (2003), on the other hand, offers a more political definition of trauma as “a reaction to profoundly injurious events and situations in the real world and, indeed, to a world in which people are routinely wounded” (Burstow, 2003). She suggests that people can experience trauma just by living in an environment that engulfs sexism, oppression, and poverty (Burstow, 2003). This re-conceptualization of trauma is relevant to young, low-income, minority mothers, whose psychological toll may be aggregated just by living under such conditions. Because of the degree of trauma that sexual abuse can ensue, it is plausible that many women may experience a multitude of depressive symptoms that could result in a negative perception toward their prospect of having children and their abilities to mother compared to women who have never experienced sexual coercion.

2.6 Concluding Remarks

Due to the high prevalence of violence against women and the adverse health outcomes associated with it, the topic of sexual violence has increasingly gained attention and recognition in the human rights and public health fields. Similarly, unintended pregnancy has also been found to be associated with numerous health consequences for women, infants, and children (Pallitto et al., 2005). Male-partners' control over the women's reproductive decisions and the trauma that the women experienced from the abuse are explained to be contributing factors to unintended pregnancy among female victims of sexual violence. Although examining pregnancy coercive behaviors of the male-partners have been helpful in identifying factors leading to unintended pregnancy, many of the studies have only relied on the women's interpretation of their partners' behaviors and have failed to investigate the women's own perspective on childbearing. In addition, past studies have only assessed women's pregnancy intention after they had the child or during pregnancy, which may cloud the women's responses about their pregnancy intention. Furthermore, since most research on sexual violence and pregnancy intentions was conducted internationally, it is difficult to generalize to the results to United States women. Using data from the NSFG, this study evaluated the association between sexual abuse experience and future pregnancy intentions among nationally representative women in the United States.

CHAPTER 3: HYPOTHESIS

The purpose of this study was to evaluate the association between a woman's experience of sexual violence and her future pregnancy intention in a nationally representative sample of United States women interviewed for the 2006-2010 National Survey of Family Growth (NSFG). The following was the specific hypothesis addressed:

- Women who reported to have experienced non-voluntary sexual intercourse have increased odds of not wanting to have a baby in the future compared to women who never experienced non-voluntary sexual intercourse.

CHAPTER 4: METHODS

4.1 Study Design and Population

This study used data from the 2006-2010 National Survey of Family Growth (NSFG). The NSFG is designed and administered by the National Center for Health Statistics (NCHS), an agency of the United States Department of Health and Human Services, in collaboration with several other federal agencies (U.S. DHHS, 2011). The NSFG has been conducted seven times since 1973 (U.S. DHHS, 2011). The purpose of the survey is to produce national estimates of characteristics relating to trends and determinants of birth and pregnancy rates, sexual activity, contraceptive use, infertility, marriage, divorce, cohabitation, and adoption, as well as men's and women's attitudes about sex, childbearing, and marriage (Groves, Mosher, Lepkowski, & Kirgis, 2009; U.S. DHHS, 2011).

The first six cycles of NSFG were produced through large one-time data collection efforts within the year that it was released (Groves et al., 2009). Given the limited budget, the survey developers discovered that there was increasing uncertainty in using the large one-time field effort design, including unknown eligibility rates in samples of U.S. addresses, unknown contact and cooperation rates, and various diseconomies of scale in the staffing organization (Groves et al., 2009). Therefore, in the seventh round of NSFG, the design of the survey was revised into a stratified clustered design that was done continuously from June 2006 to June 2010 (Groves et al., 2009).

The first step in the sampling procedure was to select a national sample of 110 primary sampling units (PSUs) that consist of counties or groups of adjacent counties (Lepkowski, Mosher, Davis, Groves, & van Hoewyk, 2010). The national sample was then divided into four parts, each of which was used each year from 2006 to 2010 (Lepowski et al., 2010).

The interviews were conducted in person in the homes of respondents by 40 professional female interviewers using laptop computers (Groves et al., 2009). The NFSG enrolled both women and men participants. However, this study only focused on responses given by women. Approximately 5,500 women between the ages of 15-44 years old were interviewed annually (Lepowski et al., 2010). The interviews took an average of 80 minutes (U.S. DHHS, 2011). From 2006-2010, 12,279 women between the ages of 15 and 44 years old were sampled for the NSFG (U.S DHHS, 2012). The overall response rate was 78%, with an oversample of Blacks/African-Americans, Hispanics, and participants ages 15-24 (U.S DHHS, 2012).

Most of the survey was administered using Computer-Assisted Personal Interviewing (CAPI), in which the interviewer asks the questions and enters the responses into a computer (U.S. DHHS, 2012). Parts of the survey that included sensitive items were administered using the Audio Computer-Assisted Self-Interview (ACASI), in which respondents entered their responses directly into the computer without the help of an interviewer (U.S. DHHS, 2012). The sensitive items encompass current and past behavior related to the risk of acquiring sexually transmitted diseases (STDs, including HIV), experience with pregnancy, non-voluntary sexual intercourse and the force experienced during the event, and other types of sexual activity including oral and anal

sex as well as same-sex partners (U.S. DHHS, 2012). For this study, only women between 18 and 44 years old who provided complete information on sexual violence and future pregnancy intentions were included.

4.2 Exposure Assessment

The main exposure of interest is the experience of sexual violence. Respondents self-reported information on non-voluntary sexual intercourse (at first sexual intercourse and at any other time during their lives) during the ACASI portion of the interview. Women who answered that they had ever experienced non-voluntary sexual intercourse were considered to be exposed.

4.3 Outcome Assessment

The main outcome variable is future pregnancy intention. This variable was measured in the NSFG questionnaire by the following question: “Looking to the future, do you intend to have (a/nother) baby at some time (after this pregnancy is over)?” If respondents indicated that they did not intend to have a baby in the future or were unsure, they were classified as having negative pregnancy intention. If respondents indicated that they intended to have a baby in the future, they were classified as having positive pregnancy intention.

4.4 Covariate Assessment

The confounders are based on past literature and other factors that are not believed to be on the causal pathway between the exposure and the outcome. The following variables related to the respondent herself were included as potential confounding factors: age, race/ethnicity, completed education at interview, marital status, parity, and living situation at age 18 (i.e., whether living independently at that age)

(Cripe et al., 2008; Gomez, 2011; Pallitto & O'Campo, 2004; Williams et al., 2009). In addition, variables related to the respondent's mother were also considered as potential confounding factors. These factors include: mother's education, mother's age at first birth, and mother's marital status at the time of respondent's birth (Gomez, 2011; Williams et al., 2009).

4.5 Data Analysis

4.5.1 Univariate Analysis

The frequencies and percentages of all demographics, sexual violence experiences, and future pregnancy intentions were summarized for the participants in the study.

4.5.2 Bivariate Analysis

Logistic regression was used to calculate odds ratios and 95% confidence intervals to provide a crude association between the experience of sexual violence and future pregnancy intention. In addition, other factors associated with future pregnancy intention were identified.

4.5.3 Multivariate Analysis

Multivariate logistic regression was used to calculate adjusted odds ratios and 95% confidence intervals to model the association between the experience of sexual violence and future pregnancy intention while controlling for confounders (Table 3). A variable was considered to be a confounder if it changed the magnitude of the exposure-disease relationship by at least 10% (Maldonado & Greenland, 1993). All analyses were conducted using SAS-Callable SUDAAN to accommodate the NSFG's complex sampling design.

4.6 Sample Size and Power

Setting the ratio of unexposed (i.e. have never experienced non-voluntary sexual intercourse) to exposed (i.e. have experienced non-voluntary sexual intercourse) is approximately 3.3:1 and setting alpha at 0.05, power at 80%, and the prevalence of negative pregnancy intention among the unexposed at 41.47%, the smallest detectable OR is approximately 1.14.

CHAPTER 5: RESULTS

5.1 Univariate Results

A total of 12,279 women participated in the 2006-2010 NSFG. Women were excluded from this study if they were not between the ages of 18 and 45 years old (n=1,304), if they never had any sexual intercourse (n=50), and if they did not answer the question on future pregnancy intention (n=822). Women were further excluded if they selected “no mother figure” on the question asking for respondent’s mother’s education (n=97), if they did not know if their parents were married at the time of their births (n=71), if they did not know their mothers’ age of first birth (n=157), or if they refused to answer whether they lived at home at the age of 18 (n=2). Thus, 9,776 women were available for analysis.

Approximately 23.12% of the women were between the ages of 18-24, 36.76% were between the ages of 25-34, and 40.11% were between the ages of 35-45 (Table 1). More than half of the women were non-Hispanic White (62.68%), followed by Hispanic women (16.63%), non-Hispanic Black women (14.32%), and women of other race (6.36%). Most women were highly educated with 21.64% having attended some college and 36.05% have a college education or more. The majority of women indicated that they were married (49.42%) and most women had never been pregnant (34.32%).

More than one-fifth of women reported that they have been coerced to have sexual intercourse at least once in their lifetime (21.57%). For the outcome of interest,

more than half of the women indicated that they did not intend to have a baby or were unsure about whether they wanted a child in the future (58.02%).

5.2 Bivariate Results

Women between the ages of 35-45 had 8.02 times (95% CI: 6.60-9.75) the odds of not wanting to have a baby in the future as compared to 25-34 years old women, while women between the ages of 18-24 had 0.25 the odds of not intending to have a baby in the future (95% CI: 0.20-0.30; Table 2). Women who did not complete high school or had a high school diploma/GED as the highest education attainment had nearly 1.50 times the odds of not wanting to have a future pregnancy as compared to women who had a college degree or more (less than high school: OR=1.54; 95% CI: 1.30-1.82 and high school/GED: OR=1.50; 95% CI: 1.26-1.79). In contrast, women who attended only some college had 20% decreased odds of not wanting to have a baby in the future as compared to women who completed college or more (OR=0.80; 95% CI: 0.68-0.94). Women with lower than \$19,999 annual household income and women with annual household income between \$20,000-\$44,999 had decreased odds of not wanting a baby in the future (OR=0.81; 95% CI: 0.69-0.96 and OR=0.83; 95% CI: 0.71-0.97, respectively) as compared to women who had more than \$49,999 household annual income. Women who lived with an opposite sex partner and those who neither cohabitated nor were married had 55% and 63% decreased odds, respectively, of not wanting a future pregnancy as compared to married women (cohabitated: OR=0.45; 95% CI: 0.37-0.55 and living alone: OR=0.37; 95% CI: 0.32-0.44). As the number of live births increased, the odds of not wanting to have a baby in the future also increased (one baby: OR=3.02;

95% CI: 2.54-3.59, two babies: OR=15.21; 95% CI: 12.67-18.26), and three or more babies: OR=30.06; 95% CI: 23.05-39.20).

As the education level of the respondent's mother increased, the odds of not wanting a future pregnancy decreased (high school: OR=2.46; 95% CI: 2.00-3.03, high school/GED: OR=1.96; 95% CI: 1.63-2.35, and some college: OR=1.10; 95% CI: 0.91-1.34). As the respondent's mother's age at first birth decreased, the odds of not wanting a baby in the future increased (20-24 years old: OR=1.63; 95% CI: 1.37-1.95, 18-19 years old: OR=2.24; 95% CI: 1.85-2.71, and less than 18 years old: OR=2.25; 95% CI: 1.83-2.77). Women who lived away from parents before the age of 18 had 1.52 times (95% CI: 1.30-1.78) the odds of negative pregnancy intention as compared to women who lived with their parents.

Compared to women who had never been coerced to have sexual intercourse, women who experienced sexual violence at least once in their lifetime had 1.14 times the odds of not wanting to have a baby in the future, however, the association was not statistically significant (95% CI: 0.99-1.31).

5.3 Multivariate Results

After adjusting for marital status, the magnitude of the history of sexual violence-future negative pregnancy intention association increased and became statistically significant. Specifically, women who had been coerced to have sexual intercourse at least once in their lifetime had 32% increased odds of not wanting to have a baby in the future compared to women who had never experienced non-voluntary sexual intercourse (95% CI: 1.14-1.52).

CHAPTER 6: DISCUSSION

6.1 Summary of Main Findings

The current study found that women who experienced sexual abuse had increased odds of not wanting to be pregnant in the future compared to women who never experienced any sexual coercion. After adjusting for marital status, the magnitude of the association increased and the result became statistically significant.

Findings in this study on sexual coercion and future pregnancy intention support the hypothesis and are consistent with results from many past studies that found that sexual violence significantly increased the odds of unintended pregnancy (Gomez, 2011; Pallitto & O'Campo, 2004; Uscher-Pines & Nelson, 2010; Williams et al., 2009). Cripe et al. also found that sexual abuse was associated with increased risk of unintended pregnancy; however, their result was not statistically significant (Cripe et al., 2008). All of the studies in the past evaluated women's pregnancy intention by inquiring about pregnancies that have occurred or are currently being carried to term (Cripe et al., 2008; Gomez, 2011; Pallitto & O'Campo, 2004; Uscher-Pines & Nelson, 2010; Williams et al., 2009). In contrast, this study considered a woman's pregnancy intention in the future.

Most previous studies evaluating the association between sexual violence and pregnancy intention were conducted outside of the United States (Cripe et al., 2008; Gomez, 2011; Pallitto & O'Campo, 2004). Pallitto and O'Campo as well as Gomez used the same survey to conduct studies on a nationally representative sample of women in

Colombia (Gomez, 2011; Pallitto & O'Campo, 2004). Cripe et al., on the other hand, conducted a cross-sectional study in Peru among pregnant women (Cripe et al., 2008). Some studies of the association between sexual violence and unintended pregnancy have been conducted within the United States. Uscher-Pines and Nelson conducted a study in a sample of pregnant women in Pennsylvania and found a positive correlation between sexual violence and not wanting to be pregnant (Uscher-Pines & Nelson, 2010). Similar to the present study, Williams et al. also used secondary data from the NSFG to examine a sample of nationally representative women in the United States (Williams et al., 2009). Williams et al. only evaluated sexual coercion that occurred at first intercourse and pregnancy intention during the woman's first live birth and found that women who experienced significant and mild coercions during first intercourse had increased odds of unintended first birth as compared to women who experienced no coercion (Williams et al., 2009). Thus, the current study's findings are similar to a number of studies conducted both within the United States and internationally where the experience of sexual violence increased the odds of unintended pregnancy.

6.2 Strengths and Limitations

This current study has several strengths and limitations, which are described in the passages that follow:

6.2.1 Nondifferential Misclassification

Nondifferential misclassification of the outcome and exposure is possible. The outcome variable, women's future pregnancy intentions, was obtained through self-report and cannot be confirmed subjectively because the question asks about attitudes and beliefs. The responses to the outcome variables were obtained through face-to-face

interview. The respondents may feel hesitant to express disinterest in being pregnant due to the widely accepted societal and biological norm and expectation for a woman to have a child.

The exposure variable, experience of sexual violence, was also obtained through self-report. Unlike questions on future pregnancy intentions, the questions about sexual violence experience were asked through the ACASI, which aid in providing confidentiality and privacy for respondents. However, the women might still be afraid or ashamed to report their experience of sexual violence due to the sensitive nature of the topic. If misclassification occurred, it would likely bias the results toward the null.

6.2.2 Selection Bias

Selection bias is unlikely due to the high response rate of NSFG. The response rate for women participants was 78% (U.S. DHHS, 2012). However, if participation was somehow related to both the exposure and the outcome, the results may be biased away from the null.

6.2.3 Information Bias

Information bias is unlikely to occur. Female interviewers who have gone through extensive training asked the questions on future pregnancy intentions and recorded them into the computer. For the questions on sexual violence, respondents used the ACASI method by reading or listening to the questions and entering the responses directly into the interviewer's computer. Due to the extensive training that the interviewers went through and the fact that they were blinded to the women's sexual violence history at the time of the interview, the possibility for information bias was minimized.

6.2.4 Confounding

Confounders related to both the exposure and outcome considered in this study are age, race/ethnicity, completed education at interview, marital status, the education and age of first birth of the respondent's mother, whether the respondent's parents were married at her birth, and whether the respondent lived on her own before the age of 18. There is a possibility that there are other variables related to both the exposure and disease that are not on the causal pathway and were not included in the NSFG questionnaire, such as the IPV experience of the respondent's mother and the respondent's childhood history of sexual abuse outside of vaginal penetration. Failure to control for a known or unknown confounder could result in an over or underestimation of the true association.

6.2.5 Strengths

This study is one of only a few studies that used a nationally representative sample of women in the United States to investigate the association between sexual violence and future pregnancy intention. The high response rate of the NSFG (78%) minimizes concerns about selection bias. Furthermore, sensitive questions on the experience of non-voluntary sexual intercourse were asked through the ACASI, which reduces information bias. Also, this study is the first one to assess pregnancy intention in the future instead of based on pregnancies that have occurred or are currently being carried to term. Lastly, the complex sampling design adopted by the NSFG ensures that participants are representative of the United States population. Thus, the results of this study may be generalizable to women throughout the United States

6.3 Implications and Future Research

Findings from this study suggest that women's experience of sexual violence increased the odds of future unintended pregnancy, and the result was statistically significant after adjusting for marital status. This study has provided a better understanding of the association between sexual violence and pregnancy intention. The findings can be incorporated into current interventions that have proven to be successful for female survivors of sexual violence. Through the teaching, learning, and utilization of existing effective treatment methodologies, including same-gender survivors' group therapy, assertiveness skills training, art therapy, and family therapy, counselors can help in the facilitation of healing that leads the transition from being a victim to being a survivor (Underwood, Stewart, & Castellanos, 2007). Same-gender group therapy, in particular, has been evaluated to provide benefits beyond what individual therapy is able to provide that results in increased empowerment and psychological wellbeing (Underwood et al., 2007). Sexual abuse victims participating in group therapy are able to replace secrecy and isolation with disclosure and belonging to live through their trauma (Underwood et al., 2007). Results from this study may also be integrated into routine consultations between medical and public health providers and female survivors of abuse. Knowing that women who have experienced sexual violence have higher risk for unintended pregnancy as compared to those who have never experienced sexual violence, public health and/or medical practitioners could, first, provide female victims with guidance on how to obtain greater control of their reproductive decisions to prevent a pregnancy that is mistimed or unwanted from occurring, and second, counsel them on the importance of having a pregnancy that is desired and planned. The aforementioned

strategies could ultimately help in reaching the *Healthy People 2020* goal of reducing the prevalence of unintended pregnancy in the United States from 49% to 44% by 10 years (HealthyPeople.gov, 2015).

The review of past literatures demonstrated that there are very limited studies on sexual violence and pregnancy intention that are generalizable to women in the United States. Given the high percentage (58%) of women in this study who reported they did not want to have a baby in the future more studies on nationally representative women in the United States are needed because of the potential for some of these women to experience unintended pregnancy. Since unintended pregnancy is associated with a multitude of adverse health effects on women, infants, and children (Pallitto et al., 2005), it is important to further investigate possible risk factors for this outcome. Future studies examining the association between sexual violence and pregnancy intention should consider the IPV experience of the respondent's mother and the respondent's childhood history of sexual abuse outside of vaginal penetration as potential confounders. Classifying the different types of coercions that the women experienced during the sexual abuse, which was not feasible in the present study due to the high number of missing answers and the women's overlapping responses, would also be helpful in further analyzing the association of the different degrees of sexual coercions on unintended pregnancy. A longitudinal study would also assist in assessing whether feelings about pregnancy change as the woman becomes more removed from the sexual violence. Additional studies to understand the underlying psychosocial mechanism that may be at play may also provide an important contribution to the literature and could lead to more effective interventions in reducing unintended pregnancy among victims of sexual abuse.

In summary, although the present study found a statistically significant association between sexual violence and future unintended pregnancy, more research is still needed to fill the gap in the literature. Victims of sexual abuse should be provided with trauma coping resources and strategies to prevent a pregnancy that is unwanted or mistimed due to the adverse health outcomes associated with unintended pregnancy on women, infants, and children in the United States.

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APPENDIX: TABLES

Table 1: Characteristics of respondents participating in 2006-2010 NSFG

Variables	Number (N)	Weighted Percent (%)
Age (years)	2,431	23.12
18-24	4,081	36.76
25-34	3,264	40.11
35-45		
Race/ethnicity		
Hispanic	2,143	16.63
Non-Hispanic White	5,053	62.68
Non-Hispanic Black	2,060	14.32
Other	520	6.36
Education		
Less than HS graduate	1,897	16.20
HS graduate	2,625	26.11
Some college	2,152	21.64
College graduate or above	3,102	36.05
Income		
<\$19,999	2,775	21.25
\$20,000-\$44,999	3,271	32.26
≥\$45,000	3,166	40.07
Don't know	564	6.42
Marital status		
Married	3,822	49.42
Cohabitate	1,359	13.05
Neither	4,595	37.53
Parity		
0	3,438	34.32
1	2,073	18.82
2	2,268	25.23
≥3	1,997	21.63
Mother's education		
Less than HS graduate	2,523	23.60
HS graduate	3,264	33.98
Some college	2,266	23.27
College graduate or above	1,723	19.15

Table 1: (Continued)

Parents married at birth		
Yes	7,700	83.51
No	2,076	16.49
Mother's age at first birth (years)		
<18	1,797	16.51
18-19	2,039	20.50
20-24	3,736	38.94
≥25	2,204	24.04
Lived away from parents before age 18		
Yes	2,373	22.83
No	7,403	77.17
Experience of sexual violence		
Yes	2,270	21.57
No	7,506	78.43
Future pregnancy intention		
Yes	4,369	41.98
No	5,407	58.02

Table 2: Unadjusted odds ratios and 95% confidence intervals for the association between demographic and sexual violence and future pregnancy intention, 2006 2010 NSFG

Variables	Odds Ratio	95% Confidence Interval
Age (years)		
18-24	0.25	0.20-0.30
25-34	1.00	Referent
35-45	8.02	6.60-9.75
Race/ethnicity		
Hispanic	0.93	0.80-1.08
Non-Hispanic White	1.00	Referent
Non-Hispanic Black	0.94	0.80-1.10
Other Race	0.71	0.54-0.94
Education		
Less than HS graduate	1.54	1.30-1.82
HS graduate	1.50	1.26-1.79

Table 2: (Continued)

Some college	0.80	0.68-0.94
College graduate or above	1.00	Referent
Income		
<\$19,999	0.81	0.69-0.96
\$20,000-\$44,999	0.83	0.71-0.97
≥\$45,000	1.00	Referent
Don't know	0.54	0.42-0.70
Marital status		
Married	1.00	Referent
Cohabitate	0.45	0.37-0.55
Other	0.37	0.32-0.44
Parity		
0	1.00	Referent
1	3.02	2.54-3.59
2	15.21	12.67-18.26
≥3	30.06	23.05-39.20
Mother's education		
Less than HS graduate	2.46	2.00-3.03
HS graduate	1.96	1.63-2.35
Some college	1.10	0.91-1.34
Bachelor's degree or higher	1.00	Referent
Parents married at birth		
Yes	1.00	Referent
No	0.93	0.79-1.09
Mother's age at first birth (years)		
<18	2.25	1.83-2.77
18-19	2.24	1.85-2.71
20-24	1.63	1.37-1.95
≥25	1.00	Referent
Lived away from parents before age 18		
Yes	1.52	1.30-1.78
No	1.00	Referent
Experience of sexual violence		
Yes	1.14	0.99-1.31
No	1.00	Referent

Table 3: Adjusted odds ratios and 95% confidence intervals for the association between the experience of sexual violence and future pregnancy intentions, 2006-2010 NSFG

Variables	Odds Ratio	95% Confidence Interval
Sexual Violence		
Yes	1.32	1.14-1.52
No	1.00	Referent

Model adjusted for marital status.