



Violence against pregnant women with disabilities

Journal of Health Disparities Research and Practice

Volume 9
Issue 2 *Summer*

Article 2

© Center for Health Disparities Research, School of Public Health, University of Nevada, Las Vegas

2016

Violence against pregnant women with disabilities

ari K. mwachofi , *Brody School of Medicine, ECU*, memwana@gmail.com

Follow this and additional works at: <https://digitalscholarship.unlv.edu/jhdrp>



Part of the [Clinical and Medical Social Work Commons](#), [Community Health Commons](#), and the [Public Health Commons](#)

Recommended Citation

mwachofi, ari K. (2016) "Violence against pregnant women with disabilities," *Journal of Health Disparities Research and Practice*: Vol. 9: Iss. 2, Article 2.

Available at: <https://digitalscholarship.unlv.edu/jhdrp/vol9/iss2/2>

This Article is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Article in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Article has been accepted for inclusion in Journal of Health Disparities Research and Practice by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact digitalscholarship@unlv.edu.

Violence against pregnant women with disabilities

Abstract

Background

Each year, violence is perpetrated against 1.5 million US women, of whom 324,000 are pregnant. Violence in pregnancy has adverse effects on maternal and infant health. Although there are 4.7 million childbearing age women with disabilities, and their pregnancy rates are growing, there is very little information about violence against pregnant women with disabilities.

Objectives

The study questions are: Are there differences in pre- and in-pregnancy violence experiences of women with and without disabilities? Is disability a significant predictor of pre- and in-pregnancy violence against women?

Methods

The study uses data from the 2009 Pregnancy Risk Assessment Monitoring System (PRAMS) from Massachusetts and Rhode Island. The study conducts χ^2 -tests and multivariate analyses of violence experiences.

Results

Pregnant women with disabilities experience more violence than those without. Disability is a significant violence predictor. The number and types of stress sources significantly affect the likelihood of violence. Poor health behaviors also contribute to the likelihood of violence.

Conclusion

There is a need to reduce violence against pregnant women particularly those with disabilities. Effective interventions require information about causality which can be established through analysis of primary data. Future studies should collect and analyze household level data. Care providers can contribute information by monitoring, recording, and reporting stress types, levels, and violence especially among pregnant women with disabilities.

Keywords

women with disabilities; domestic violence; pregnancy



Journal of Health Disparities Research and Practice
Volume 9, Issue 2 Summer 2016, pp. 28-45

© 2011 Center for Health Disparities Research

School of Community Health Sciences

University of Nevada, Las Vegas

Violence Against Pregnant Women with Disabilities

Ari K. Mwachofi, Brody School of Medicine, East Carolina University

ABSTRACT

Background: Each year, violence is perpetrated against 1.5 million US women, of whom 324,000 are pregnant. Violence in pregnancy has adverse effects on maternal and infant health. Although there are 4.7 million childbearing age women with disabilities, and their pregnancy rates are growing, there is very little information about violence against pregnant women with disabilities.

Objectives/hypothesis: The study questions are: Are there differences in pre- and in-pregnancy violence experiences of women with and without disabilities? Is disability a significant predictor of pre- and in-pregnancy violence against women?

Methods: The study uses data from the 2009 Pregnancy Risk Assessment Monitoring System (PRAMS) from Massachusetts and Rhode Island. The study conducts χ^2 -tests and multivariate analyses of violence experiences.

Results: Pregnant women with disabilities experience more violence than those without. Disability is a significant violence predictor. The number and types of stress sources significantly affect the likelihood of violence. Poor health behaviors also contribute to the likelihood of violence.

Conclusion: There is a need to reduce violence against pregnant women particularly those with disabilities. Effective interventions require information about causality, which can be established through analysis of primary data. Future studies should collect and analyze household level data. Care providers can contribute information by monitoring, recording, and reporting stress types, levels, and violence especially among pregnant women with disabilities.

Keywords: Intimate partner violence, pregnant women with disabilities, Pregnancy outcomes

INTRODUCTION

Violence is perpetrated against 1.5 million US women, of whom, 324,000 are pregnant (Centers for Disease Control and Prevention (CDC), 2013). Although large, these numbers underestimate the problem's magnitude because intimate partner violence (IPV) is often not reported (CDC, 2013). Findings of the 2010 National Intimate Partner and Sexual Violence Survey (NISVS) indicate that most violence against women is perpetrated by intimate partners. In 2010, 18.3% of US women responding to the survey experienced IPV and 24.3% reported experiencing severe physical IPV at some point in their lifetime (CDC, 2014). The Centers for Disease Control and Prevention (CDC) defines intimate partner violence (IPV) as,

"Intimate partner violence can be expressed through many types of violent behavior. Its hallmark is coercive control, which includes actual physical or sexual violence, threats of physical or sexual violence, and psychologic or emotional abuse. Often, psychologic and emotional abuse occur along with physical or sexual violence."

CDC also defines physical violence as,

"...intentional use of force with the potential for causing injury, harm, or death and includes, slapping, pushing, shaking, biting, choking, burning, hitting and using a knife, gun or other weapon. It also includes coercing other people to commit such acts... violence can be actual or threatened."

(CDC, 2013; *Intimate Partner Violence During Pregnancy, A Guide for Clinicians: Screen Show and Lecture Notes slides 7 & 8*
<http://www.cdc.gov/reproductivehealth/violence/intimatepartnerviolence/sld001.htm>).

Violence during pregnancy may be a more common problem than conditions routinely screened for (CDC, 2013). IPV is associated with depression, postpartum depression, and posttraumatic stress disorder (Kendall-Tackett, 2007). Women who experience violence are more likely to have, high stress and anxiety levels, high pregnancy risks, neonatal complications, and preterm delivery (Littleton, Bye, Buck & Amacker, 2010; Tegethoff, Greene, Olsen, Meyer & Meinschmidt, 2010). Relative to women who do not experience violence, women who do, have a higher likelihood of poor breast-feeding, neonatal death and of delivering low birth-weight infants (Sakar, 2008; Yang, Ho, Chou, Chang, & Ko, 2006; Abdi Ghazinour, Nygren, Nojomi, & Richter, 2013; Altarac, & Strobino, 2002). In-pregnancy, IPV traumatizes the unborn baby and their trauma symptoms manifest within their first year of life (Lannert et al., 2014).

Women who experience violence are more likely to have poor social functioning (Cohen & Maclean, 2004), unintended pregnancy, delayed prenatal care, and risky behaviors such as smoking, alcohol and drug abuse (CDC, 2013). Other adverse effects of violence against pregnant women include, a three times higher risk for maternal mortality (Boy & Salihu, 2004), twofold increase in the risk of inflammation of membranes surrounding the fetus (Lipsky, Holt, Easterling, & Critchlow, 2003), and higher likelihood of neonatal death (Berenson, Weimann, Wilkinson, Jones, Anderson, 1994; Sakar, 2008). Furthermore, IPV increases healthcare costs directly from treating associated injuries and indirectly through higher utilization of other healthcare services (Chambliss, 2008).

There is a significantly higher incidence of violence against women with disabilities (WWD) than against those without (Brownridge, Ristock, & Hiebert-Murphy, 2008; Mitra, Manning & Lu, 2012). Relative to women without, those with disabilities are four times more likely to be

sexually assaulted (Martin et al., 2006; Casteel, Martin, Smith, Gurka & Kupper, 2008; Haydon, McRee, Tucker, Halpern, 2011). The young, well-educated WWD who are socially isolated and less mobile have a higher likelihood of experiencing violence (Nosek, Hughes, Taylo & Taylor, 2006). Older WWD who are isolated, unemployed, homeless and those living in shelters are more likely to be assaulted and to sustain physical injuries (Du Mont, Macdonald, White, & Turner, 2013).

Although there is evidence of violence against both WWD and those without, and evidence that pregnant women experience violence, there is little information about violence against pregnant WWD. One of the few studies of this population found a disproportionate prevalence of physical abuse before and during pregnancy (Mitra, Manning & Lu, 2012).

In 2010, there were 4.7 million WWD of childbearing age – defined as women aged 15-44 years (Census Bureau, 2012). The proportion of childbearing age women with disabilities is growing because of: increasing disability due to higher obesity rates (Lakdawalla, Bhattacharya, & Goldman, 2004; Sturm, Ringel, & Andreyeva, 2004), more women with cerebral palsy and spina bifida reach their reproductive age because of healthcare improvements, and there is a rise in the incidence of spinal cord injuries among women (Signore, 2012). Furthermore, because of changes in: the law protecting reproductive rights of people with disabilities, societal attitudes about disability, and improvements in medical therapies, there is a projected rise in pregnancy rates among WWD (Iezzoni, Yu, Wint, Smeltzer, & Ecker, 2013). Despite growth in the number of child-bearing age WWD and in their pregnancy rates, there is documented paucity of research about WWD's health care and status, needs, pregnancy experiences and outcomes (Signore, Spong, Krotoski, Shinowara, & Blackwell, 2011). Consequently, there is little empirical evidence to guide policy and health care for pregnant WWD (Rogers, 2010). Therefore, there is a need for studies of this population and their healthcare needs.

Study Objectives

The purpose of this study is to gather empirical evidence about pre- and in-pregnancy violence experiences of WWD. Specifically, the study examines differences in pre- and in-pregnancy violence experiences of women and without disabilities and the predictors of such violence. The study addresses the following questions: i) *Are there differences in pre- and in-pregnancy violence against women with and without disabilities?* ii) *Is disability a significant predictor of pre- and in-pregnancy violence against women?* iii) *What factors predict pre- and in-pregnancy violence against women?* The hypotheses are that there are no differences in violence against pregnant women with and without disabilities and that disability is not a significant predictor of violence against pregnant women.

METHODS

The study applies a household health production framework from health economics. In that framework, the household produces health using household, individual and environmental inputs (Grossman, 1972). Some inputs are produced by the household. The basic model used in previous studies (Grossman & Joyce, 1990; Behrman & Rosenzweig, 2004; Wehby, Murray, Castilla, Lopez-Camelo, & Ohsfeldt, 2009), can be represented by the following health production function:

$$H_i = f(I_i, E_i) \quad (1)$$

Where: the subscript i denotes the individual as the unit of analysis; H is a vector depicting health output; I is a set of individual and household variables (inputs) and E represents

environmental inputs. Researchers have applied this framework in studies of various health-related phenomena such as effects of prenatal care on birth weights (Wehby, Murray, Castilla, et al., 2009); household production and demand for health inputs and their effects on birth weights (Rosenzweig & Schultz, 1983); effects of childhood and education on health (Conti, Heckman & Urzua, 2011); the impact of maternal smoking on child neurodevelopment (Wehby, Prater, McCarthy, Castilla & Murray, 2011); and the relationship between household production, fertility and child mortality (Rosenzweig & Schultz, 1983). Economic theory and evidence from these studies guided selection of multivariate analysis variables.

Within the health production framework, intimate partner violence (IPV) and violence perpetrated by others (OV) are inputs in household production of health. Like other household health production inputs, IPV and OV are produced by the household, a production process that can be represented by equation 1 above. IPV and OV also affect other health production inputs such as individual health behaviors (e.g. smoking, alcohol and drug abuse). Based on the production function (equation 1), the multivariate analysis equations for IPV or OV are:

$$IPV_i = f(D_i, S_i, B_i, H_i, E_i) \quad (2)$$

$$OV_i = f(D_i, S_i, B_i, H_i, E_i) \quad (3)$$

Where: D represents demographic factors including disability; S is socioeconomic status (SES); B is health behaviors; H is health capital (e.g. health status), E are environmental factors. These equations represent the analysis models used to address study questions two and three. Each dependent variable (IPV and OV) has two measures representing pre- and in-pregnancy violence. The independent variables are disability status and other demographic characteristics (e.g., age, ethnicity, marital status), SES (dependence on public support), individual behaviors (smoking, drinking), health capital (BMI, Hypertension, diabetes, fever) and environmental factors represented by the household climate (stress from divorce, jail, employment, illness in the family, death).

Data Sources

The analysis uses data from the 2009 Pregnancy Risk Assessment Monitoring System (PRAMS) from Massachusetts and Rhode Island, the only states that gathered information about the mother's disability status. PRAMS is a surveillance system run by the Centers for Disease Control and Prevention (CDC) in collaboration with state health departments. It collects data about maternal experiences, health, socioeconomic status and demographics before, during, and shortly after pregnancy. PRAMS uses a standardized data collection system with a questionnaire composed of two parts: a core group of questions developed by the CDC and used by all states, and a set of questions that cover specific issues of interest to individual state health departments (CDC, 2013). Data from birth certificates augment survey data.

In 2009, the state of Massachusetts included two questions about disability status: i) *Are you limited in any way in any activities because of physical, mental, or emotional problems?* ii) *For how long have your activities been limited because of physical, mental, or emotional problems?* The state of Rhode Island also included a question similar to first question. For the sake of uniformity across the two states, we used responses to first question to identify women with disabilities. Therefore, disability is defined as *being limited in any way in any activities because of physical, mental or emotional problems*. This definition is similar to one used by the Americans with Disabilities Act (ADA)... *a physical or mental impairment that substantially limits one or more major life activities... include, but are not limited to, caring for oneself,*

performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working (Department of Justice, 2009, ADA, Section 12102; <http://www.ada.gov/pubs/adastatute08.htm#12102>)

Dependent variables

As indicated in equations 2 and 3, the dependent variables are: intimate partner violence (IPV) and violence perpetrated by others (OV). These are measured before pregnancy and during pregnancy resulting in four binary variables: pre-pregnancy IPV, in-pregnancy IPV, Pre-pregnancy OV and in-pregnancy OV. Data measuring these variables were extracted from response to PRAMS survey questions: *During the 12 months before you got pregnant with your new baby, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way? During your most recent pregnancy, did your husband or partner push, hit, slap, kick, choke, or physically hurt you in any other way?* These variables were coded one for “yes” zero for “no”. Data for OV were gathered from responses to similar questions about violence perpetrated by other individuals, and were coded in a similar manner.

Independent variables

These include demographics, socioeconomic status (SES) the individual’s health behavior, their health capital, and environmental factors measured as household climate. Demographic variables include marital status, age, ethnicity and disability status. SES is measured as participation in public health insurance programs and in Women, Infants and Children (WIC) a federal special supplemental nutrition program. Disability status is considered to be a demographic factor rather than health capital based on the social model of disability (Carson, 2009). SES and demographics play a significant role in health production (Grossman, 1972) and in determining an individual’s health status and behaviors (Marmot, 2006; Pampel, Krueger & Denney, 2010; Jha, et al., 2006; Cutler & Lleras-Muney, 2010). These PRAMS survey questions were used to gather data about health insurance and public support:

Did any of these health insurance plans help you pay for your prenatal care? (Medicaid, Tricare, chip, schip)

During your most recent pregnancy, were you on WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children)? The data were coded one for individuals responding “yes” and zero for “no” responses.

Individual health behaviors have a role in determining health status. These are measured using two variables – tobacco use (smoking) and the use of alcoholic beverages. There is evidence that both affect maternal and infant health and social relations (CDC, 2013b; Mokdad, Marks, Stroup & Gerberding, 2004; Stahre, Roeber, Kanny, Brewer & Zhang, 2014). There are also indications of correlations between smoking, alcohol consumption and violence (Lemon, Verhoek-Oftedahl & Donnelly, 2002). The data were extracted from the PRAMS survey questions, *Have you smoked any cigarettes in the past 2 years? Have you had any alcoholic drinks in the past 2 years?*

Health production theory and empirical evidence include health capital as an important input in health production (Grossman, 1972; Schultz & Strauss, 2008; Galama & van Kippersluis, 2013). Health capital is measured using indicators of health status such as pre-pregnancy weight, pregnancy weight gain, pre-pregnancy BMI, hypertension (HBP) bleeding during pregnancy, diabetes, having medical risks to pregnancy, experiencing fever during pregnancy and previous delivery by C-section. Data measuring pre-pregnancy health capital are

from answers to the question: *During the 3 months before you got pregnant with your new baby, did you have any of the following health problems?* A) Asthma b) High blood pressure c) Anemia (poor blood, low iron) d) Heart problems e) Epilepsy (seizures) f) Thyroid problems g) Depression h) Anxiety

In-pregnancy health capital was measured using responses to PRAMS questions: *During your most recent pregnancy, were you told by a doctor, nurse, or other health care worker that you had gestational diabetes (diabetes that started during this pregnancy)? Did you have any of the following problems during your most recent pregnancy (vaginal bleeding, kidney or bladder infection, severe nausea, hypertension), and other similar questions.* Responses to these questions were coded one for “YES” and zero for “NO” responses.

Social environmental factors affect health and health production (Marmot & Wilkinson, 2006; Berkman & Kwachi, 2000). For this study, we used household climate to measure the social environment. The variables included measure stressful events such as, loss of employment, divorce, arguments, loss or illness of a close family member or friend and incarceration of a partner or husband. Data for these variables were from responses to the PRAMS survey question: *This question is about things that may have happened during the 12 months before your new baby was born. For each item, circle Y (Yes) if it happened to you or circle N (No) if it did not. (It may help to look at the calendar when you answer these questions.)* a) A close family member was very sick and had to go into the hospital; b) I got separated or divorced from my husband or partner... e) My husband or partner lost his job ...g) I argued with my husband or partner more than usual ...j) I was in a physical fight k) My husband or partner or I went to jail ...m) Someone very close to me died... The responses were coded one for “YES” and zero for “NO”.

Analytic Methods

Hypothesis testing utilized two analysis steps: 1) χ^2 —tests of equality of the proportions of women with and without disabilities who experienced IPV and OV and 2) multivariate analysis of IPV and OV experiences. When χ^2 —tests indicated significant differences we applied multivariate analysis to determine the significance of disability as a predictor of the likelihood of violence while controlling for other factors (production inputs) that affect violence. Multivariate analysis applied equations 2 & 3 and identified other significant covariates/predictors of the likelihood of pre- and in-pregnancy IPV and OV.

RESULTS

Summary Statistics of study sample

Table 1 shows study variables, their definitions and the summary statistics for this study sample. About 7% of the women in this study sample had disabilities. Their average age is about 30 years, 60% were married, and 54% used the WIC program. On the average, 3% of the women in the study sample experienced pre-pregnancy IPV and another 3% had that experience during pregnancy. About 2% experienced pre-pregnancy OV and another 1.4% had that experience during pregnancy.

Table 1: Study variables, their definitions, proportions of sample and some descriptive statistics

Variable	Definition	% in the categories		
		Women With Disabilities	Women Without disabilities	Both
Dependent variables				
Pre-pregnancy IPV	=1 if abused by husband before pregnancy, otherwise =0	9	3	3
In-pregnancy IPV	=1 if abused by husband during pregnancy, otherwise=0	8	2	3
Pre-pregnancy OV	=1 if abused by other before pregnancy, otherwise =0	5	2	2
In-pregnancy OV	=1 if abused by other during pregnancy, otherwise =0	1	1	1
Independent variables				
Demographics				
Disability	=1 if has a disability, otherwise =0			7
Maternal Age	*Grouped: $\leq 17=1$; 18-19=2; 20-24=3; 25-29=4; 30-34=5; 35-39=6; $\geq 40=7$			4.29*
Latina	=1 if Latina, otherwise =0			18
Married	=1 if married, otherwise =0			60
SES				
PNC-Medicaid	=1 if Prenatal care paid by Medicaid, otherwise =0			21
WIC	=1 if receiving WIC, otherwise =0			54
Individual Behavior				
Smoke in 2 years	=1 if smoked cigarettes in the past 2years, otherwise =0			22
Drink in 2 years	=1 if drank alcohol in the past 2 years, otherwise =0			65

Household Climate		
Total stressors	Sum of all stressful events experienced (range is 0-13)*	1.81*
Job-loss	=1 if husband/partner lost his job, otherwise =0	12
Divorce	=1 if went through divorce, otherwise =0	8
Arguments	=1 if had more than usual arguments, otherwise =0	25
Jail-stress	=1 if spouse or self was incarcerated, otherwise =0	3
Death of loved one	=1 if death of someone close, otherwise =0	17
Health Capital		
Pregnancy weight gain	Pounds gained in pregnancy (range 0-97)*	30.26*
Pre-Pregnancy weight	Pre-pregnancy weight*	145.05*
BMI	Body Mass Index*	25.10*
HBP	=1 if have hypertension, otherwise =0	8
Bleed	=1 if bleeding during pregnancy, otherwise =0	3
Diabetic	=1 if diabetic, otherwise =0	4
Fever	=1 if had fevers during pregnancy, otherwise =0	2
Medical risk	=1 if had medical risk factors, otherwise =0	36
Previous C-section	=1 if previous C-section, otherwise =0	13

*Mean

Table 1 also shows the distribution of violence experiences by disability status. A higher proportion of WWD (9%) experienced pre-pregnancy IPV and 8% in-pregnancy, much higher than the proportions for women without disabilities at 3% and 2% respectively. A larger proportion of WWD also experienced pre-pregnancy OV (5% compared to 2% for women without disabilities).

Broken down by race, disability and violence experiences, the study sample had a minute number of minority women in the different categories. For example, the sample had zero black and Native American women experiencing OV during pregnancy. Only four black women in the sample experienced OV pre-pregnancy and zero Native American women indicated the experience. The sample sizes in these categories were so small that it was impossible to draw meaningful inferences so the analysis was not done by race.

Tests of differences in violence experiences

Summary statistics indicated that larger proportions of WWD experienced IPV, both before and during pregnancy. The study used Chi-square tests to determine statistical significance of the differences. The results are in table 2 and they indicate that IPV proportions of women with and without disabilities are significantly ($p \leq .0001$) different. There is more pre- and in-pregnancy IPV among WWD than among those without disabilities. The difference in pre-pregnancy OV is also statistically significant ($p \leq .0001$). However, there is no difference in proportions of women with and without disabilities experiencing in-pregnancy OV.

Table 2: Results of Chi-square tests of differences in proportions of women with and without disabilities experiencing violence

IPV (intimate partner violence)	Pre-Pregnancy		In-Pregnancy	
	Value	Sig.	Value	Sig.
Pearson Chi-Square	89.245***	.000	88.287***	.000
Continuity Correction	87.348***	.000	86.328***	.000
Likelihood Ratio	63.600***	.000	62.334***	.000
Linear-by-Linear Association	89.238***	.000	88.280***	.000
Number of Valid Cases	12467		12461	
OV (violence by others)	Value	Sig.	Value	Sig.
	Value	Sig.	Value	Sig.
Pearson Chi-Square	13.448***	.000	.001 ^a	.981
Continuity Correction	11.594**	.001	.000	1.000
Likelihood Ratio	9.519**	.002	.001	.980
Linear-by-Linear Association	13.443***	.000	.001	.981
Number of Valid Cases	2899		2899	

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Multivariate analysis of IPV & OV

Because χ^2 -tests showed proportion differences in pre- and in-pregnancy IPV and pre-pregnancy OV to be statistically significant, we conducted binary logistic regression analysis to determine if disability is a significant predictor of the likelihood of violence. IPV analysis results appear in tables 3 & 4 and OV results are in table 5. χ^2 -tests showed no proportion differences in in-pregnancy OV. Therefore, we did not conduct a multivariate analysis for in-pregnancy OV.

Disability is a statistically significant ($p \leq .05$) predictor of the likelihood of pre- and in-pregnancy IPV, even after controlling for other factors. Other significant and positive predictors of the likelihood of pre-pregnancy IPV are, Latina, health behavior (alcohol and smoking), and

household climate (divorce, arguments, a spouse going to jail). The higher the number of stress sources (stressful events) the higher the likelihood of IPV. One stress source that relates negatively to the likelihood of IPV is death of someone close. Other factors relating negatively to IPV are, being married, getting public support such as WIC or insurance from Medicaid. These results also show that the higher the BMI, the lower the likelihood of pre-pregnancy IPV. As indicated by the Wald statistic, the most important predictor of IPV is stress, particularly the total number of stressors. Smoking also appears to be a strong covariate for pre-pregnancy IPV.

Table 3: Estimating the Likelihood of Pre-pregnancy IPV

Variable	B	Wald	Sig.	95% C.I. for EXP(B)	
				Lower	Upper
Disability	.332*	3.977	.046	1.006	1.932
Maternal-Age	-.087	2.814	.093	.828	1.015
Latina	.426**	6.583	.010	1.106	2.119
Married	-.310*	4.084	.043	.543	.991
WIC	-.273	3.342	.068	.568	1.020
PNC-Medicaid	-.359*	5.663	.017	.520	.939
Drink in 2 years	.357*	5.995	.014	1.074	1.901
Smoke in 2 years	.488***	13.895	.000	1.260	2.105
BMI	-.064*	5.563	.018	.890	.989
Pre-Pregnancy Weight	.008*	3.728	.053	1.000	1.017
Previous C-section	.368*	4.137	.042	1.013	2.060
Divorce-stress	.420**	8.171	.004	1.141	2.030
Argument –stress	.635***	16.493	.000	1.389	2.563
Jail-stress	.777***	20.930	.000	1.559	3.032
Death of loved one	-.473**	9.563	.002	.462	.841
Total stressors	.395***	106.759	.000	1.378	1.601
N=11408	Prediction accuracy = 96.9%			Nagelkerk e R ² =0.303	

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Table 4 shows multivariate analysis results of in-pregnancy IPV. Disability is a statistically significant predictor of the likelihood of in-pregnancy IPV ($p \leq .05$). Women with disabilities have a significantly higher likelihood of experiencing IPV during pregnancy. Similar to findings about pre-pregnancy IPV, stress is the most important in-pregnancy IPV predictor. The results indicate that the larger the number of stressors, the higher the likelihood of in-pregnancy IPV ($p \leq .0001$). However, stress related to death of someone close relates negatively to the likelihood of in-pregnancy IPV ($p \leq .002$). Smoking is also a significant predictor of in-pregnancy IPV ($p \leq 0.005$).

Table 4: Estimating the Likelihood of in-Pregnancy IPV

Independent Variables	B	Wald	Sig.	95% C.I. for EXP(B)	
				Lower	Upper
Disability	.408*	4.567	.033	1.034	2.188
Maternal-Age	-.107	3.195	.074	.798	1.010
Latina	.405*	4.972	.026	1.050	2.140
Married	-.146	.712	.399	.615	1.213
Smoke in 2 years	.417**	7.799	.005	1.132	2.034
HBP	.331	1.325	.250	.793	2.445
Bleeding	.623	2.766	.096	.895	3.882
Diabetic	-.709	2.122	.145	.190	1.278
Fever	-.568	.874	.350	.172	1.865
Medical Risk	-.111	.476	.490	.653	1.227
Preg. Weight Gain	-.006	1.282	.257	.984	1.004
Pre-Pregnancy Weight	-.003	1.643	.200	.994	1.001
Previous C-section	-.175	.527	.468	.523	1.346
Divorce-stress	.187	1.194	.274	.862	1.687
Argument-stress	1.213*** *	36.833	.000	2.273	4.975
Jail-Stress	.505**	6.641	.010	1.129	2.434
Death of loved one	-.565**	10.045	.002	.401	.806

39 Violence Against Pregnant Women with Disabilities
Mwachofi

Total Stressors	.440***	102.03	.000	1.426	1.691
N =10288	Prediction accuracy =97.5%			Nagelkerke R^2 =0.324	

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Being Latina is also a positive and significant predictor of the likelihood of in-pregnancy IPV, but being married is statistically insignificant as a predictor of in-pregnancy IPV. Factors indicative of the health of the woman appear to be statistically insignificant in predicting the likelihood of IPV in pregnancy.

Table 5 shows results of analysis of the likelihood of pre-pregnancy violence from other individuals-OV. Although the analysis controlled for other factors that could trigger violence against women, disability appears to be statistically significant ($p \leq 0.05$). Access to public support (WIC) relates significantly and negatively to the likelihood of pre-pregnancy OV ($p \leq 0.01$). Stress appears to be the most important predictor. Stress factors included in the analysis that appear to be statistically significant predictors of violence are: husband or partner's job-loss, fights with a husband or partner, total number of stressors, and experiences of IPV. Women who experience IPV also have a higher likelihood of experiencing OV.

Table 5: Estimating the Likelihood of Pre- Pregnancy Abuse by Other (OV)

	B	Wald	Sig.	95% C.I.for EXP(B)	
				Lower	Upper
Disability	.829*	4.201	.040	1.037	5.062
Maternal-Age	-.207	2.111	.146	.614	1.075
Married	-.778	3.118	.077	.194	1.089
PNC-Medicaid	.115	.072	.789	.484	2.595
Mom WIC	- 1.143**	7.181	.007	.138	.736
Smoke in 2 years	.541	2.835	.092	.915	3.225
Pre-pregnancy IPV	1.163**	7.816	.005	1.416	7.227
Car-crash	1.164*	4.872	.027	1.139	9.003
Total stressors	.340***	10.14	.001	1.140	1.732
Family illness	-.793*	3.861	.049	.205	.998
Fight-stress	1.53***	13.90	.000	2.061	10.245
Jail-stress	-.947	3.114	.078	.136	1.110

Divorce	-.375	.758	.384	.296	1.598
Job-loss	-.979*	4.912	.027	.158	.893
N = 2741	Prediction accuracy = 98.2%			Nagelkerke R ² = .325	

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

DISCUSSION

As indicated, the definition of disability is based on the PRAMS questionnaire but it is similar to ADA's disability definition. Results indicate that WWD experience more pre- and in-pregnancy IPV and pre-pregnancy OV than women without disabilities and the differences are statistically significant. However, there is no difference in in-pregnancy OV experiences for women with and without disabilities. Multivariate analysis results also show disability to be a statistically significant predictor of IPV and of pre-pregnancy OV. Household climate appears to be the most important predictor of both IPV and OV. Other important covariates of IPV and OV are individual health behavior (smoking) and SES.

Stress appears to be the most important predictor of the likelihood of IPV before and during pregnancy and of pre-pregnancy OV. This finding is consistent with the sociological view with its emphasis on stress, poor conflict management skills, and male-female power imbalance as significant violence contributors (Noel & Yam, 1992). The results also indicate that the source of stress matters. Stress from a death in the family or of someone close reduces the likelihood of violence. A plausible explanation is that the loss results in a different type of stress that brings people together seeking consolation. On the other hand, loss of employment brings anger, frustration, and fear about how to take care of the family- a different type of stress, one that leads to IPV or OV. Public support (WIC and Medicaid) also appears to reduce the likelihood of IPV.

Similar to other studies (Saltzman, Johnson, Gilbert, & Goodwin, 2003) these results indicate age to correlate negatively with violence. However, in this study, the correlation appears to be statistically insignificant. Being married also relates negatively to violence but it is statistically significant only in pre-pregnancy IPV ($p < .05$). This finding echoes other findings that show single marital status being associated with increased risk of violence (Charles & Perreira, 2007; Heaman, 2005; Dunn & Oths, 2004; Saltzman Johnson, Gilbert, & Goodwin, 2003).

We used access to public support programs (WIC and PNC-Medicaid) as indicators of SES. The results show that access to WIC has a negative and significant correlation with pre-pregnancy OV ($p < .01$) but the relation to IPV is statistically insignificant. Access to PNC-Medicaid relates significantly only to Pre-pregnancy IPV ($p < .05$). These results are consistent with current empirical evidence of inconsistencies in the association between SES and violence against women (Taillieu & Brwonridge, 2010; Heaman, 2005)

Health behavior indicators used were smoking and alcohol use. It is important to note here that, health behavior can influence the likelihood of violence but it can also be a result of experiences of violence. Smoking was an insignificant predictor of pre-pregnancy OV. However, similar to other findings, (Bailey & Daugherty, 2007; Heaman, 2005) it is a positive and significant predictor of the likelihood of both in-pregnancy IPV ($p < .01$) and pre-pregnancy IPV ($p < .001$). Alcohol use is a positive and significant predictor of pre-pregnancy IPV ($P \leq .01$). However, this behavior appears to be an insignificant covariate for in-pregnancy IPV and OV.

Study Limitations

The study uses cross-sectional data, and causal interpretations are neither possible nor intended. The data were from two small states in northeast US therefore, the narrow geographic focus limits generalization of the results to other states. There are many types of disabilities but these data allowed for only one definition of disability which includes physical, sensory and other disabilities. Different disability types might have different effects on IPV or OV. Because all disability types are grouped together as one variable, the study findings indicate average effects. The size of effects indicated might overestimate the impact of some specific disabilities while underestimating the effects of other types of disabilities. The racial composition of the study sample did not allow for analysis by race and disability status.

Implications

Despite its limitation, this study provides some preliminary implications for research, policy and practice. The higher IPV incidence among WWD than among those without suggests that WWD is vulnerable population group. There should be policies and practices to monitor and protect them from violence. Violence should be included as an important screening item in their health care. Monitoring is especially critical because domestic violence is one of the leading preventable causes of blunt trauma fetal and maternal mortality. Evidence suggests that current management does little to reduce mortality. Therefore, prevention is the key to increasing maternal and fetal survival (Grossman, 2004). IPV is one of the most common traumatic injuries during pregnancy, and all childbearing age women should be routinely screened for IPV (Murphy & Quinlan, 2014). Furthermore, intimate partner violence increases the risk for mental health problems, depression, posttraumatic stress disorder, and substance abuse (Golding, 1999). Therefore, close monitoring is critical to protecting the health of pregnant WWD.

The study results indicate that, household climate, measured in terms of stressful events, is the most important predictor of violence against pregnant women. This finding suggests a need for monitoring stress levels, the number and types of stressful events. Those providing healthcare to pregnant women should monitor their stress levels or the household climate, the number and the types of stressors. It is important to find methods of reducing stressors, and stress.

WIC has a protective effect. Pregnant women who qualify for such programs should be encouraged to access WIC. This finding is supported by other studies which indicate that poverty and associated stress are key contributors to IPV (Jewkes, 2002) and that the lower the household income, the higher the reported intimate partner violence rates (Carlson, Worden, van Ryn, & Bachman, 2000). Public support programs **do** reduce IPV rates and that reduction in public support benefits increases IPV rates (Dugan, Nagin, and Rosenfeld, 2003). IPV prevention programs should include methods of improving access to the public support programs. Such access is critical for WWD because of their high poverty rates.

Smoking appears to be an important and statistically significant predictor of IPV. It is possible that individuals smoke because of the stress from experiencing violence and vice versa. This is an important research question. However, smoking is an important indicator of the likelihood of IPV, therefore, apart from encouraging smoking cessation, care providers should screen the women who smoke more closely for IPV. Health behaviors should also be monitored and appropriate changes (e.g. quit smoking) should be encouraged and supported.

CONCLUSION

Stress appears to be the most important predictor of IPV and OV. Therefore, there is a need for studies to determine how stress triggers such violence and to create interventions that would protect WWD both before and during pregnancy. Secondary data do not capture all necessary information for detailed and causal analyses. It is important for follow-up studies to gather in-depth primary data about IPV and OV among pregnant women especially those with disabilities. Such data could establish causality and therefore, offer methods of reducing IPV and OV incidence, how to reduce stress and improve household climate. Those studies could also determine how to influence health behaviors to reduce IPV and OV against women, pregnant women and particularly women with disabilities.

There is a need to reduce violence against pregnant women particularly those with disabilities. Effective interventions require information about causality, which can be established through analysis of primary data. Future studies should collect and analyze household level data. Care providers can contribute information by monitoring, recording, and reporting stress types, levels, and violence especially among pregnant WWD.

REFERENCES

- Abadi, M.N., Ghazinour, M., Nygren, L., Nojomi M., & Richter, J. (2013). Birth weight, domestic violence, coping, social support, and mental health of young Iranian mothers in Tehran. *J Nerv Ment Dis.*, 201(7), 602-8.
- Altarac, M., & Strobino, D. (2002). Abuse during pregnancy and stress because of abuse during pregnancy and birthweight. *J Am Med Womens Assoc.*, 57(4), 208-14.
- Bailey, B.A. & Daugherty R.A. (2007). Intimate partner violence during pregnancy: Incidence and associated health behaviors in a rural population. *Maternal Child Health Journal*, 11, 495-503
- Behrman, J.R. & Rosenzweig, M.R. (2004). Returns to birth weight. *The Review of Economics and Statistics*, 86(2), 586-601
- Berenson, A.B., Wiemann, C.M., Wilkinson, G.S., Jones, W.A, & Anderson, G.D. (1994). Perinatal morbidity associated with violence experienced by pregnant women. *Am J Obstet Gynecol.*, 170(6),1760-6
- Berkman, L. & Kawachi, I. (2000). *Social Epidemiology*. Oxford University Press, New York 2000.
- Boy, A.,& Salihu, H.M. (2004). Intimate partner violence and birth outcomes: a systematic review. *Int J Fertil Womens Med.*, 49(4),159-64.
- Brownridge, D.A., Ristock, J., & Hiebert-Murphy, D. (2008).The high risk of IPV against Canadian women with disabilities. *Med Sci Monit.*, 14(5), 27-32.
- Carlson, B.E., Worden, A.P. van Ryn, M. & Bachman, R. (2000). *Violence Against Women: Synthesis of Research for Service Providers*. Final report to the National Institute of Justice. Washington, DC: U.S. Department of Justice, National Institute of Justice, 2000, NCJ 199578.
- Carson, G. (2009). The social model of disability. Scottish Accessible Information Forum. Retrieved from <http://www.ukdpc.net/site/images/library/Social%20Model%20of%20Disability2.pdf>
- Casteel, C., Martin, S.L., Smith, J.B., Gurka, K.K., & Kupper, L.L. (2008). National study of physical and sexual assault among women with disabilities. *Inj Prev.*, 14(2),87-90

- CDC, (2013) Intimate Partner Violence During Pregnancy, A Guide for Clinicians. Retrieved from <http://www.cdc.gov/reproductivehealth/violence/intimatepartnerviolence/sld001.htm>
- Centers for Disease Control and Prevention (2013a). QuickStats: Number of Deaths from 10 Leading Causes—National Vital Statistics System, United States, 2010. *Morbidity and Mortality Weekly Report*, 62(08),155.
- Centers for Disease Control and Prevention (2013b). About PRAMS. Retrieved from <http://www.cdc.gov/prams/AboutPRAMS.htm>
- Centers for Disease Control and Prevention.(2014). National Intimate Partner and Sexual Violence Survey 2010 Summary Report. Retrieved from http://www.cdc.gov/ViolencePrevention/pdf/NISVS_Report2010-a.pdf
- Chambliss, L.R. (2008). Intimate partner violence and its implication for pregnancy. *Clin Obstet Gynecol.*, 51(2), 385-97
- Charles, P. & Perreira, K.M. (2007). Intimate partner violence during pregnancy and 1-year post-partum. *Journal of Family Violence*, 22, 609–619
- Cohen M.M., & Maclean, H. (2004). Violence against Canadian Women. *BMC Women's Health*, 25 4 Suppl 1:S22
- Conti, G., Heckman, J.J. & Urzua, S. (2011). Early endowments, education and health. Becker Friedman Institute Research Repository. Retrieved from <https://econresarch.uchicago.edu/content/early-endowments-education-and-health>
- Cutler, D.M., & Lleras-Muney, A. (2010). Understanding differences in health behaviors by education. *J Health Econ.*, 29(1), 1-28.
- Das, S. Bapat, U., More,N.S, Alcock,G. Joshi, W., Pantvaidya, S. & Osrin, D.(2013). Intimate partner violence against women during and after pregnancy: a cross-sectional study in Mumbai slums. *BMC Public Health*, 13:817. doi: [10.1186/1471-2458-13-817](https://doi.org/10.1186/1471-2458-13-817)
- Dugan, L., Nagin, D.S. & Rosenfeld, R. (2003). Do Domestic Violence Services Save Lives? *NIJ Journal*, 250, 20–25
- Du Mont, J., Macdonald, S., White, M., & Turner, L. (2013). She was truly an angel: Women with disabilities' satisfaction with hospital-based sexual assault and domestic violence services. *J Forensic Nurs.*, 9(3),129-39
- Dunn, L.L., & Oths., K.S., (2004). Prenatal predictors of intimate partner violence. *Journal of Obstetrics, Gynecologic and Neonatal Nursing*, 33 (1), 54–63
- Galama, T.J. & van Kippersluis, H. (2013). Health Inequalities through the lens of health capital theory: Issues, solutions and future directions. *Res Econ Inequal*, 21, 263-284
- Golding, J.M. (1999). Intimate Partner Violence as a Risk Factor for Mental Disorders: A Meta-Analysis. *Journal of family violence*, 14(2), 99-132
- Goodwin, S.N., Chandler, S. & Meisel, J.(2003). Violence Against Women: The Role of Welfare Reform. Final report to the National Institute of Justice, 2003, NCJ 205792.
- Grossman, M. (1972). On the concept of health capital and the demand for health. *The Journal of Political Economy*, 80, 223–55
- Grossman, N.B. (2004). Blunt trauma in pregnancy. *Am Fam Physician*, 70(7), 1303-1310.
- Haydon, A.A., McRee, A.L., & Halpern, C. T. (2011). Unwanted sex among young adults in the United States: the role of physical disability and cognitive performance. *J Interpers Violence*, 26(17), 3476-93

- Heaman, M.I. (2005). Relationships between physical abuse during pregnancy and risk factors for preterm birth among women in Manitoba. *Journal of Obstetrics, Gynecologic and Neonatal Nursing*, 34, 721–731
- Iezzoni, L.I., Yu, J., Wint, A.J., Smeltzer, S.C., & Ecker, J.L. (2013). Prevalence of current pregnancy among US women with and without chronic physical disabilities. *Med Care*, 51 (6), 555-62
- Jewkes, R. (2002). Intimate partner violence: causes and prevention. *Lancet*, 359, 1423–29
- Jha, P., Peto, R., Zatonski, W., Boreham, J., Jarvis, M.J., & Lopez, A.D. (2006). Social inequalities in male mortality, and in male mortality from smoking: indirect estimation from national death rates in England and Wales, Poland, and North America. *Lancet*, 368 (9533), 367-70
- Kendall-Tackett, K.A. (2007). Violence against women and the perinatal period: the impact of lifetime violence and abuse on pregnancy, postpartum, and breastfeeding. *Trauma Violence Abuse*, 8(3), 344-53.
- Lakdawalla, D. N., Bhattacharya, J. & Goldman, D. P. (2004). Are the young becoming more disabled? *Health Affairs*, 23(1), 168-176
- Lannert, B.K., Garcia, A.M., Smagur, K.E., Yalch, M.M., Levendosky, A.A., Bogat, G.A., & Lostein, J.S. (2014). Relational trauma in the context of intimate partner violence. *Child Abuse & Neglect*, 38(12), 1966-1975
- Lemon, S.C., Verhoek-Oftedahl, W. & Donnelly, E.F. (2002). Preventive healthcare use, smoking, and alcohol use among Rhode Island women experiencing intimate partner violence. *Journal of Women's Health & Gender-Based Medicine*, 11(6), 555-562.
- Lipsky, S., Holt, V.L., Easterling, T.R., & Critchlow, C.W. (2003). Impact of police-reported intimate partner violence during pregnancy on birth outcomes. *Obstet Gynecol.*, 102(3), 557-64.
- Littleton, H.L., Bye K, Buck, K., & Amacker, A. (2010). Psychosocial stress during pregnancy and perinatal outcomes: a meta-analytic review. *J Psychosom Obstet Gynaecol.*, 31(4), 219-28.
- Marmot, M.G. & Wilkinson, R.D. (2006). Social Determinant of Health Oxford University Press, Oxford England 2006
- Marmot, M. (2006). Smoking and inequalities. *Lancet*, 368(9533), 341-2.
- Martin, S.L., Ray, N., Sotres-Alvarez, D., Kupper, L.L., Moracco, K.E., Dickens, P.A., Scandlin, D., & Gizlice, Z. (2006). Physical and sexual assault of women with disabilities. *Violence Against Women*, 12(9), 823-37.
- Mokdad, A.H., Marks, J.S., Stroup, D.F., & Gerberding, J.L. (2004). Actual Causes of Death in the United States. *Journal of the American Medical Association*, 291(10), 1238–45
- Murphy, N.J. & Quinlan, J.D. (2014). Trauma in Pregnancy: Assessment, Management, and Prevention. *Am Fam Physician*, 90(10), 717-724
- Noel, N.L., & Yam, M. (1992). Domestic violence: The pregnant battered woman. *Women's Health*, 27 (4), 871–884
- Nosek, M.A., Hughes, R.B., Taylor, H.B., & Taylor, P. (2006). Disability, psychosocial, and demographic characteristics of abused women with physical disabilities. *Violence Against Women*, 12(9), 838-50.
- Pampel, F.C., Krueger, P.M., & Denney, J.T. (2010). Socioeconomic disparities in health behaviors. *Annu Rev Sociol.*, 36, 349–370.

- Robinson-Whelen, S., Hughes, R.B., Gabrielli, J., Lund, E.M., Abramson, W., & Swank, P.R. (2014). A safety awareness program for women with diverse disabilities: a randomized controlled trial. *Violence Against Women*, 20(7), 846-68.
- Rogers, J. (2010). Pregnancy Planning for Women with Mobility Disabilities. In: JH Stone, M Blouin, editors. International Encyclopedia of Rehabilitation. Retrieved from <http://cirrie.buffalo.edu/encyclopedia/en/article/260/>
- Rosenzweig, M.R. & Schultz, T.P. (1983). Estimating a Household Production Function: Heterogeneity, the Demand for Health Inputs, and Their Effects on Birth Weight. *Journal of Political Economy*, 91, 723-46.
- Saltzman, L.E., Johnson, C.H., Gilbert, B.C. & Goodwin, M.M. (2003). Physical abuse around the time of pregnancy: An examination of prevalence and risk factors in 16 states *Maternal and Child Health Journal*, 7 (1), 31-43
- Sarkar, N.N. (2008). The impact of intimate partner violence on women's reproductive health and pregnancy outcome. *J Obstet Gynaecol.*, 28(3), 266-71.
- Schultz TP & Strauss J. (2008). Handbook of Development Economics Volume 4 North – Holland Publications, Amsterdam 2008.
- Signore, C. (2012). Pregnancy in Women with Physical Disabilities. In J.T.Queenan, C. Y. Spong, & C. J. Lockwood (Eds.) *Queenan's Management of High-Risk Pregnancy: An Evidence-Based Approach* (pp. 253-259, chapter 32) (6th ed.) John Wiley and Sons Ltd.
- Signore, C., Spong, C.Y., Krotoski, D., Shinowara, N.L., & Blackwell, S.C. (2011). Pregnancy in women with physical disabilities. *Obstet Gynecol.*, 117(4), 935-47
- Stahre, M., Roeber, J., Kanny, D., Brewer, R.D., & Zhang, X. (2014). Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Prev Chronic Dis*, 2014;11:130293. DOI: <http://dx.doi.org/10.5888/pcd11.130293>
- Sturm, R., Ringel, J. & Andreyeva, T. (2004). Increasing Obesity Rates and Disability Trends. *Health Affairs*, 23(2), 1-7
- Taillieu, T.L. & Brwonridge, D.A. (2010). Violence against pregnant women: Prevalence, patterns, risk factors, theories and directions for future research. *Aggression and Violent Behavior*, 15(1), 14-35
- Tegethoff, M., Greene, N., Olsen, J., Meyer, A.H., & Meinlschmidt, G. (2010). Maternal psychosocial adversity during pregnancy is associated with length of gestation and offspring size at birth: evidence from a population-based cohort study. *Psychosom Med.*, 72(4), 419-26.
- US Department of Justice, Civil Rights Division, (2009). 42 U.S. Code § 12211 - Definitions, Americans with Disabilities Act of 1990, As Amended. Retrieved from <http://www.ada.gov/pubs/adastatute08.htm#12102>
- Wehby, G.L., Murray, J.C., Castilla, E.E., Lopez-Camelo, J.S., & Ohsfeldt, R.L. (2009). Quantile effects of prenatal care utilization on birth weight in Argentina. *Health Econ*, 18(11), 1307-1321
- Wehby, G.L., Prater, K., McCarthy, A.M., Castilla, E.E. & Murray, J.C. (2011). The impact of maternal smoking during pregnancy on early child neurodevelopment. *Journal of Human Capital*, 5 (2), 207-254
- Yang, M.S., Ho, S.Y., Chou, F.H., Chang, S.J., & Ko, Y.C. (2006). Physical abuse during pregnancy and risk of low-birth weight infants among aborigines in Taiwan. *Public Health*, 120(6), 557-62