

The Role of Stress, Depression, and Violence on Unintended Pregnancy Among Young Urban Women

Deborah B. Nelson, PhD,^{1,2} and Stephen J. Lepore, PhD¹

Abstract

Background: Unintended pregnancy (UP) is common, particularly among women exposed to violence, and it is linked to adverse maternal and child outcomes. This study investigated the potential role of current depressive symptoms, social support, and psychosocial stress in moderating the association between violence exposure and UP.

Methods: Pregnant women, being treated at an urban Emergency Room, completed a self-reported baseline interview where pregnancy intention as well as depression symptoms, perceived stress, past and current violence, and demographic factors were evaluated.

Results: Pregnant women were identified among women aged 14–40 years presenting to an urban emergency department. Women reporting sadness or planning to terminate the pregnancy were classified as having an UP. A higher number of women reported an UP if they had at least one episode of childhood sexual assault (CSA) (odds ratio [OR] = 1.39, 95% confidence interval [CI]: 1.03–1.87), but this association disappeared after adjusting for socioeconomic factors. Relative to women reporting an intended pregnancy, women reporting sadness or wanting to abort the pregnancy reported lower social support (mean number of friends 2.5 vs. 3.0, $p = 0.005$), had a higher prevalence of current depressive symptoms (67% vs. 49%, OR = 2.14, 95% CI: 1.72–2.66), and had higher mean levels of current perceived stress (6.9 vs. 5.6, $p < 0.001$). At least one episode of CSA and current depressive symptoms was positively associated with the report of sadness or wanting to abort the pregnancy relative to women with no depressive symptoms and no history of CSA. In addition, high level of stress positively moderated the role of CSA and reporting sadness or wanting to abort the pregnancy.

Conclusion: Ongoing screening for depressive symptoms and stress among female survivors of CSA may be important in reducing the high rates of unintended pregnancy in urban communities.

Introduction

APPROXIMATELY ONE-HALF OF ALL PREGNANCIES in the United States can be classified as mistimed or unintended.¹ Unintended pregnancy (UP) has been linked to numerous adverse maternal and child health outcomes such as delayed, inadequate or no prenatal care during pregnancy, higher substance abuse during pregnancy, higher cigarette use both during pregnancy and post-partum,² and greater stress during pregnancy.³ Additionally, unintended pregnancy has been associated with adverse child outcomes including low birth weight, preterm birth,⁴ infant mortality, reduced initiation and sustained breastfeeding, increased rates of child and maternal violence, and high post-partum and maternal depression.^{5–8}

Higher rates of UP occur among specific social groups, including unmarried women, minority and urban women, women with limited education, women living in poverty, and women at the youngest and oldest spectrum of their reproductive years.^{1,5,9,10} Another risk factor for UP is exposure to

violence during childhood or adulthood.¹¹ Approximately one in five women in the United States has experienced sexual violence as a child,¹² and a history of childhood sexual assault (CSA) has been associated with an increased risk of UP among adult women.^{9,11} In addition to increasing the likelihood of an UP, a history of childhood sexual assault has been shown to impact the outcome of a woman's pregnancy by increasing her risk of premature contractions, premature birth,¹³ and an increased number of hospitalizations during pregnancy.¹³ Thus, the potential impact of childhood sexual assault on pregnancy intention and outcome is significant.

Recent research has suggested that indicators of poor individual resiliency, such as high levels of stress, high depressive symptoms, and low social support, influence the inability to initiate or negotiate contraceptive usage and may increase the positive relation between violence exposure and UP.^{7,14,15} Resiliency theory provides a conceptual framework to examine why some young women living in an environment with high community and interpersonal violence continue to

practice safe sex practices and some young women do not.^{16–24} The resiliency model focuses on identifying individual factors, such as intra- and interpersonal strengths and resources that are important in the face of adversity. Factors promoting high resiliency, such as high levels of social support, can protect against the adverse effects of risk factors, in this case the effects of violence on experiencing sadness or wanting to abort the pregnancy.^{25–28} We suspect that social support would attenuate the association between violence and experiencing sadness or wanting to abort the pregnancy because social support is a stress buffer and may increase perceived control and self-efficacy.²⁹ Women with high social support may perceive that they will be able to bear and rear a child, possibly because they will have the help of others if necessary. In contrast, social and psychological factors promoting low resiliency may, independently or in combination with other risk factors, deter healthy development. We hypothesize that depressive symptoms and stress are psychological factors related to low resiliency and may exacerbate the link between violence and experiencing sadness or wanting to abort the pregnancy because these two factors are associated with feelings of helplessness about controlling important outcomes in life.^{30,31} Women with high depression and high stress may perceive the prospects of childbearing and rearing to be beyond their coping abilities.

The present study investigated potential social and psychological resiliency factors that might moderate the relationship between CSA and UP measured as sadness or wanting to abort the pregnancy, among a population of young, urban women. We hypothesized that two low resiliency factors—current depressive symptoms and current stress—will be positively associated with the relationship between CSA and sadness or wanting to abort the pregnancy. We examined the role of one high resiliency factor, social support, on the CSA and sadness or wanting to abort the pregnancy. These results will add to our understanding of resiliency factors related to experiencing sadness or wanting to abort the pregnancy. Findings from this investigation will identify women reporting sadness or wanting to abort the pregnancy and identify potentially modifiable factors that could be targets of intervention.

Methods

Study design and participants

Pregnant women enrolled in this study were identified among all women aged 14–40 years presenting to the emergency department (ED) at the Hospital of the University of Pennsylvania between January 1999 and August 2001 and residing in selected ZIP codes in Philadelphia. The ED was selected to recruit pregnant women into this study because many urban pregnant women utilize the ED for primary care and we may not have identified this group of pregnant women through a traditional prenatal care clinic until much later in their pregnancy. It should be noted that the majority of enrolled women were seeking care in the ED for nonurgent, nonpregnancy-related reasons (over 85%) and 70% had not yet received a prenatal care visit during the pregnancy. Thus, this population represents a group of urban, low-income pregnant women who have been identified, by others, as a high risk group for UP.^{1,9,10}

Each woman meeting the eligibility criteria was screened for pregnancy per hospital protocol. Women self-reporting a current pregnancy greater than 22 weeks of gestation, a history of hysterectomy, or a normal menstrual cycle in the past 28 days were excluded from the pregnancy screening process, since this assessment was interested in the examination of the role of violence, stress, and depressive symptoms among women early in pregnancy. Women who had delivered or reported a therapeutic or spontaneous abortion in the previous 14 days were also not screened for pregnancy. Urine pregnancy tests were conducted on all other women regardless of the reason for the ED visit. Following a positive urine pregnancy test, we further excluded non-English-speaking women; women diagnosed with an ectopic, molar, or twin pregnancy; or women who presented to the ED with an acute mental illness ($n = 325$). Since the majority of patients seen in the ED were English speaking, less than 5% of the women were excluded as non-English speaking. Among the remaining eligible pregnant women, 96% agreed to participate in the study ($n = 1494$).

At enrollment, while in the ED and after pregnancy confirmation, each woman completed an extensive, 40-minute in-person interview administered by a nurse interviewer. Data were collected on social and demographic factors, current living arrangements, self-reported current receipt of public assistance (yes/no), prior and current substance abuse, social support, current levels of psychosocial stress and depressive symptoms, and current and past exposure to interpersonal violence. Tolerance, Worry, Eye-opener, Amnesia, Cutdown (TWEAK), a five-item, validated scale commonly used among young women, was used to assess problem drinking.³² Intention of the pregnancy was captured in the baseline interview. All women provided written informed consent, and the protocol and consent forms were approved by the University of Pennsylvania institutional review board.

Study measures

Pregnancy intention. Pregnancy intention was the main outcome in this assessment. The intention of the pregnancy was captured by questions concerning feeling happy or sad at the time the pregnancy was first confirmed, and current plans to terminate the pregnancy. A woman was identified as having UP (yes/no) if she felt sad (compared with happy) when she first learned of the pregnancy or she planned to/considered terminating the pregnancy. Although the literature frequently uses a more precise construct of pregnancy intendedness, which includes both an assessment of mistimed and unwanted pregnancies, previous research suggests that happiness versus sadness about being pregnant and pregnancy intentions are highly correlated.³³ In addition, pregnancies ending in abortion are commonly considered unintended and the majority of women experiencing an unintended pregnancy report feeling unhappy or very unhappy about the pregnancy.³⁴

Violence indicators. The main risk factor of interest included self-reported measures of past and current violence. Information concerning prior childhood physical assault (yes/no) or childhood sexual assault (CSA) (yes/no) were measured by the questions: “Before you were 16 years old, did anyone slap, push, or hurt you in any way?” and “When you were growing up, that is, before you were 16 years old, did

anyone ever force you to have sex?" For the small group of women enrolled who were under 16 years of age, the violence indicator questions were modified and read: "Has anyone slapped, pushed, or hurt you in any way?" and "Has anyone ever forced you to have sex?"

Adult sexual assault (yes/no) was captured for the women over 16 years of age using the question, "Since you were 16 years old, has anyone ever forced you to have sex when you didn't want to?" In addition, intimate partner physical violence (yes/no) was measured using the question, "How many times, since you were 16, have you been slapped, pushed, or hurt by a partner?" The presence (yes/no) and amount of current physical violence during the pregnancy was identified using the question: "Since your last menstrual period, during any argument or fight, did you get pushed, slapped, or hurt in any way?"

Resiliency moderators of interest. The main objective of this assessment was to explore the moderating influence of two psychological factors related to low resiliency, current depressive symptoms, and current psychosocial stress, and one social factor related to high resiliency—social support—on the relationship between violence and experiencing sadness or wanting to abort the pregnancy.

Recent depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D). The CES-D, developed by the National Institutes of Health, is a 20-item, self-reported scale to identify current depressive symptoms and has been used extensively among pregnant women.³⁵ After appropriate items were reversed, a total CES-D score for each woman was calculated and a summary score of 16 indicated current depressive symptoms (yes/no) (Cronbach's alpha = 0.874). A CES-D score of 16 or greater is commonly used in the literature to identify persons with high levels of depressive symptoms.³⁶

Current stress was measured using the Cohen's Perceived Stress Scale (PSS). The PSS, developed by Cohen, Kamarck, and Mermelstein, measures the degree to which certain situations in the past month were appraised as stressful.³⁷ The four-item scale has been validated in low-income African American women and found to have high reliability³⁸ (Cronbach's alpha = 0.651). Cutoffs for the PSS have not been created; therefore, for this sample, we determined median values and created dichotomous cutoffs to assess the moderating effect of high versus low stress. Given the sample distribution, women were classified as having a high PSS score if the summary score was 7.0 or higher and women were classified as having a low PSS score if the summary score was less than 7.0.

Social support was measured using two questions regarding the self-reported number of people each woman reported that she could count on in times of need and the number of close friends. Given the distribution in these data, women were classified as having high social support if the summary score was 5.0 or higher, and women were classified as having a low social support if the summary score was less than 5.0.

Data analysis

Women reporting sadness or wanting to abort the pregnancy were compared with women who were happy or planned to continue the pregnancy to term on demographic

factors, past or current violence indicators, and the resiliency factors of interest. Initially, significance of direct effects was assessed using *t*-tests, Wilcoxon rank sum, and Chi-squared tests, as appropriate.

Logistic regression analyses were conducted to examine the main effects of violence indicators and the resiliency moderators on risk of sadness or wanting to abort the pregnancy (1 = yes; 0 = no). Interaction terms were created to examine the moderating effect of depressive symptoms (1 = yes; 0 = no) and stress (1 = high; 0 = low) on prior childhood sexual assault or current violence and experiencing sadness or wanting to abort the pregnancy. For example, to examine the moderating effect of depressive symptoms on childhood sexual assault and sadness or wanting to abort the pregnancy, the following groups were created: (1) women experiencing at least one episode of childhood sexual assault and current depressive symptoms; (2) women experiencing at least one episode of childhood sexual assault without current depressive symptoms; (3) women without a history of childhood sexual assault with current depressive symptoms; and (4) women without a history of childhood sexual assault without current depressive symptoms. Logistic regression models were created to assess the significance of each interaction term on experiencing sadness or wanting to abort the pregnancy (yes/no) adjusting for race, education, and marital status. Age and parity were not included in the multivariate models given the lack of significance at the univariate level.

In the multivariate models, we chose to assess the role of confounders to examine the independent relationship between violence and pregnancy intention: race (African American vs. non-African American), educational attainment (high school graduate; yes/no), marital status (single/never married; yes/no), problem drinking (using a TWEAK score of 3 or higher; yes/no), receiving assistance in the past year (yes/no), and having at least one child living at home (yes/no). The marital status variable included women who reported currently single and never married compared with all others. SPSS version 19.0 was used to analyze these data.

Results

We found that 40% of women reported that they were sad (compared with happy) or that they planned to terminate the current pregnancy and were classified as experiencing an UP pregnancy. Women reporting sadness or wanting to abort the pregnancy were significantly more likely to be African American (odds ratio [OR] = 1.94, 95% confidence interval [CI]: 1.26–2.98), report less than a high school education (OR = 1.24, 95% CI: 1.09–1.41), report receiving assistance in the past year (OR = 1.66, 95% CI: 1.13–2.44), and to report being single/never married (OR = 2.42, 95% CI: 1.85–3.16). In addition, higher proportions of women reporting sadness or wanting to abort the pregnancy had children (OR = 1.82, 95% CI: 1.45–2.29) or were classified as a problem drinker (OR = 1.68, 95% CI: 1.08–2.61) (Table 1).

A higher proportion of women reporting sadness or wanting to abort the pregnancy reported at least one episode of childhood sexual assault (16.0% vs. 12.0%, OR = 1.39, 95% CI: 1.03–1.87) or at least one episode of adult sexual assault (28.1% vs. 22.2%, OR = 1.37, 95% CI: 1.08–1.75) compared with women reporting an intended pregnancy (Table 2). Among women reporting at least one episode of CSA, 36% reported

TABLE 1. SOCIAL AND DEMOGRAPHIC CHARACTERISTICS BY PREGNANCY INTENTION

	Intended n=901	Unintended n=593	OR (95% CI)
Age (mean)	23.7 years	23.0 years	$p=0.46$
Race			
African American	90.6%	94.9%	1.94 (1.26–2.98)
Other	9.4%	5.1%	
Education			
<High school (%)	30.0%	38.1%	1.24 (1.09–1.41)
Employed/working for pay (%)	73.8%	72.3%	0.93 (0.74–1.17)
Received assistance in past year	13.9%	21.1%	1.66 (1.13–2.44)
Never married/single (%)	70.3%	85.1%	2.42 (1.85–3.16)
First pregnancy	19.4%	15.3%	0.75 (0.57–0.99)
At least one live child/children	62.1%	74.9%	1.82 (1.45–2.29)
Problem drinker	4.5%	7.3%	1.68 (1.08–2.61)
Prior induced abortion	38.5%	42.5%	1.18 (0.96–1.46)

Problem drinking was assessed using the TWEAK score. CI, confidence interval; OR, odds ratio; TWEAK, Tolerance, Worry, Eye-opener, Amnesia, Cutdown.

sexual assault by an intimate partner (i.e., boyfriend, date, or acquaintance) and 64% reported CSA by a family member or family friend (data not shown). We also found that 3.6% of women reporting at least one episode of childhood sexual abuse were also experiencing current intimate partner violence. We did not find a history of childhood physical violence to be related to sadness or wanting to abort the pregnancy (data not shown). In terms of current violence, women reporting sadness or wanting to abort the pregnancy were significantly more likely to report physical violence during the current pregnancy (16.9% vs. 12.6%, OR = 1.42, 95% CI: 1.05–1.90).

Women experiencing sadness or wanting to abort the pregnancy reported poorer scores on the resiliency moderators of interest. Women reporting sadness or wanting to abort the pregnancy reported lower forms of social support as measured by a lower mean number of close friends (2.49 vs. 3.02, $p=0.005$) and less people she could count on in times of need (4.06 vs. 5.24, $p=0.01$) compared with women reporting an intended pregnancy (Table 3). Sixty-seven percent of women reporting sadness or wanting to abort the pregnancy

TABLE 2. SEXUAL VIOLENCE REPORTS AND PREGNANCY INTENTION

	Intended n=901	Unintended n=593	OR (95% CI)
Prior violence			
Child sexual assault	12.0%	16.0%	1.39 (1.03–1.87)
Adult sexual assault	22.2%	28.1%	1.37 (1.08–1.75)
Current violence			
Physical violence during the current pregnancy			
Yes	12.6%	16.9%	1.42 (1.05–1.90)

TABLE 3. PSYCHOSOCIAL MODERATORS OF INTEREST BY PREGNANCY INTENTION

	Intended n=901	Unintended n=593	OR (95% CI) or p value [†]
<i>Social support</i>			
Number of close friends (mean)	3.02 ± 5.3	2.49 ± 2.8	$p=0.005$
Number of people that you can count on (mean)	5.24 ± 9.0	4.06 ± 6.2	$p=0.01$
Summary social support score [‡]	8.27 ± 11.6	6.54 ± 7.4	$p=0.001$
<i>Depressive symptoms</i>			
CES-D (mean)	17.4 ± 10.8	22.1 ± 12.2	$p<0.001$
Depression (CES-D ≥ 16)	48.6%	67.0%	2.14 (1.72–2.66)
<i>Stress</i>			
PSS (mean)	5.6 ± 3.5	6.9 ± 3.4	$p<0.001$

[†]OR reported for dichotomous comparisons and p value reported for mean comparisons.

[‡]The summary social support score is a summary of the reported number of current close friends and the number of people you can count on in times of need.

CES-D, Center for Epidemiologic Studies Depression Scale; PSS, Cohen's perceived stress scale.

were classified as currently experiencing depressive symptoms compared with women reporting an intended pregnancy (67% vs. 49%, OR = 2.14, 95% CI: 1.72–2.66). In addition, women reporting sadness or wanting to abort the pregnancy reported higher mean perceived stress (6.9 vs. 5.6, $p=0.001$) compared with women reporting an intended pregnancy.

The main association between CSA, current physical violence and sadness or wanting to abort the pregnancy was reduced after including the socioeconomic factors. For example, after adjusting for race, education, problem drinking, children at home, receiving assistance in the past year, and marital status, CSA was not associated with sadness or wanting to abort the pregnancy (define aOR [aOR] = 1.56, 95% CI: 0.93–2.59); however, depressive symptoms did remain significantly related to sadness or wanting to abort the pregnancy (aOR = 1.81, 95% CI: 1.32–2.94). We were interested in assessing the moderating influence of depressive symptoms and stress on the violence and sadness or wanting to abort the pregnancy. As shown in Table 4, reporting at least one episode of prior childhood sexual assault with current depressive symptoms was positively associated with sadness or wanting to abort the pregnancy compared with not reporting childhood sexual violence with no current depressive symptoms (OR = 3.18, 95% CI: 1.70–5.94). In the main effect model, high current stress remained significantly associated with sadness or wanting to abort the pregnancy (aOR = 1.89, 95% CI: 1.38–2.59) adjusting for race, education, problem drinking, children at home, receiving assistance in the past year, and marital status. In addition, reporting at least one episode of childhood sexual assault and current high stress was positively associated with sadness or wanting to abort the pregnancy compared with not experiencing childhood sexual assault and current low stress scores (OR = 3.26, 95% CI: 1.62–6.53). The relationship between prior adult sexual assault and social support did not remain significant in the adjusted models and moderation was not found (data not shown).

TABLE 4. MODERATORS OF THE RELATIONSHIP BETWEEN CHILDHOOD SEXUAL VIOLENCE AND UNINTENDED PREGNANCY

	OR	95% CI
Prior childhood sexual assault		
<i>Moderation by depressive symptoms</i>		
<u>Main effects*</u>		
History of childhood sexual violence	1.56	0.93–2.59
Depressive symptoms	1.81	1.32–2.49
<u>Interactive effects*</u>		
History of childhood sexual violence and current depressive symptoms vs. no history of childhood sexual violence and no depressive symptoms	3.18	1.70–5.94
<i>Moderation by stress</i>		
<u>Main effects*</u>		
History of childhood sexual violence	1.61	0.97–2.68
High current PSS	1.89	1.38–2.59
<u>Interactive effects*</u>		
History of childhood sexual violence and High PSS vs. no history of childhood sexual violence and low PSS	3.26	1.62–6.53
Current physical violence during the pregnancy		
<i>Moderation by depressive symptoms</i>		
<u>Main effects*</u>		
Current violence	1.39	0.88–2.19
Depressive symptoms	1.85	1.35–2.55
<u>Interactive effects*</u>		
Current violence and current depressive symptoms vs. no violence and no depressive symptoms	2.30	1.33–3.99
<i>Moderation by stress</i>		
<u>Main effects*</u>		
Current violence	1.36	0.86–2.15
High current PSS	1.82	1.32–2.49
<u>Interactive effects*</u>		
Current violence and high PSS vs. no violence and low PSS	2.05	1.16–3.61

All models adjusted for race, education, at least one live child, problem drinking, receiving assistance in past year, and marital status. Depressive symptoms classified as a CES-D score of 16 or higher. High PSS was classified as a value of 7 or higher.

A similar moderating relationship was found when examining current physical violence during the pregnancy. As shown in Table 4, depressive symptoms remained significantly associated with sadness or wanting to abort the pregnancy after adjusting for race, education and marital status (aOR = 1.85, 95% CI: 1.35–2.55) but current violence was no longer related to sadness or wanting to abort the pregnancy after adjusting for these socioeconomic factors. However, reporting at least one episode of physical violence in the current pregnancy and current depressive symptoms was positively associated with sadness or wanting to abort the pregnancy compared with reporting no depressive symptoms without current violence (OR = 2.30, 95% CI: 1.33–3.99). In addition, reporting high stress continued to be associated with sadness or wanting to abort the pregnancy (aOR = 1.82, 95% CI: 1.32–2.49) and reporting physical violence and high stress was

positively associated with sadness or wanting to abort the pregnancy compared with not reporting current violence with low stress scores (OR = 2.05, 95% CI: 1.16–3.61) adjusting for race, education, problem drinking, children at home, receiving assistance in the past year, and marital status (Table 4).

Discussion

The simple associations between violence exposure, either CSA or current physical violence, and the report of sadness or wanting to abort the pregnancy were completely explained by the socioeconomic factors. High levels of depressive symptoms or high stress levels among this group of pregnant women continued to be positively associated with the report of sadness or wanting to abort the pregnancy after adjusting for the socioeconomic factors. In each multivariate model, reporting current depressive symptoms was positively associated with sadness or wanting to abort the pregnancy after adjustment for race, education, and marital status. In addition, women found to have high levels of perceived stress were significantly more likely to report sadness or wanting to abort the pregnancy after adjustment for race, education, and marital status. Among this group of urban, predominately African American, pregnant women, we did find that under the circumstance of having psychological factors related to low resiliency, current high levels of perceived stress or depressive symptoms, CSA or current violence was related to the report of sadness or wanting to abort the pregnancy.

We also identified a role of current depressive symptoms and high stress scores, moderating the relationship between prior CSA and sadness or wanting to abort the pregnancy. We found that pregnant women who reported experiencing at least one episode of childhood sexual assault and high depressive symptoms were more than twice as likely to report sadness or wanting to abort the pregnancy relative to their counterparts who neither reported a history of childhood sexual assault nor current depressive symptoms. In addition, we found the experience of childhood sexual assault with concurrent high stress was positively associated with the report of sadness or wanting to abort the pregnancy. Reporting sadness or wanting to abort the pregnancy was highest among the group of pregnant women experiencing both a prior history of childhood sexual assault with concurrent high stress compared with women without a history of childhood sexual assault and low stress. We suspect that the combination of these resiliency factors—high stress or high depressive symptoms—with prior violence could lead to chronically lower feelings of sexual self-efficacy and self-esteem, which would make the prospects of negotiating and adhering to consistent contraceptive use especially daunting.

This sample of pregnant women constitutes a particularly vulnerable population, in which both reports of sadness or wanting to abort the pregnancy and levels of prior and current violence are particularly high.^{9,10} Our findings indicated that there are long-term effects of experiencing CSA, and women with a history of childhood sexual assault are more likely to report sadness or wanting to abort the pregnancy, ongoing depressive symptoms, and higher stress into adulthood. We have shown that a history of childhood sexual assault and concurrent depressive symptoms infer a significant, independent increase in the report of sadness or wanting to abort the pregnancy. Others have suggested screening and

monitoring for perinatal and postpartum depressive symptoms among survivors of childhood sexual assault and these findings add to the importance of recognizing the lasting influence of childhood sexual assault on depressive symptoms and UP.^{39,40} Additional research that employs prospective study designs among nonpregnant, sexually active urban women to identify various characteristics of childhood sexual violence as well as measurements of resiliency factors that may influence a young women's ability to negotiate contraception use are warranted.

This is one of the first studies, to our knowledge, to explore the moderating effects of two resiliency factors—current depressive symptoms and stress—on the relationship between childhood sexual assault and sadness or wanting to abort the pregnancy. Unfortunately, we were unable to identify factors that help to diminish the influence of CSA. In the future, large-scale prospective studies designed to examine the moderating influence of resiliency factors such as depressive symptoms and stress, and high resiliency factors such as high self-esteem, high emotion regulation, high self-efficacy, and strong family/peer support networks on childhood sexual assault and UP are important. Determining the importance of resiliency factors and attempting to identify factors that may intensify or attenuate the relationship between CSA and experiencing sadness or wanting to abort the pregnancy may add in reducing unintended pregnancies among urban women.

As with all studies, it is important to recognize the limitations. First, the measurement of UP used in this study (i.e., the report of sadness or wanting to abort the pregnancy) did not capture all of the various possible dimensions of pregnancy intendedness or desirability.⁴⁰ Other dimensions of reproductive sabotage and pregnancy coercion, as outlined by Miller et al., were also not measured in this study.^{42–44} Since the cohort included women early in pregnancy, the possibility exists that some women classified as reporting sadness or wanting to abort the pregnancy may have intended to become pregnant but due to current depressive symptoms or stress, did not plan to continue the pregnancy. It should also be recognized that the possibility exists that women may under report sadness or wanting to abort the pregnancy due to social or medical stigma. In addition, since our definition of UP included a report of feeling sad at the time of pregnancy confirmation, some women may in fact report feeling happy at the time of pregnancy confirmation and the pregnancy was unintended. Future prospective studies should measure pregnancy intention on a continuum in a nonjudgmental manner, among sexually active, nonpregnant women, and capture data on use of contraception use, timing of pregnancy, efforts in achieving or delaying pregnancy, partner's attitude and relationship negotiation skills, and adoption of positive health actions to prepare for pregnancy to allow an assessment of mistimed compared with unwanted pregnancy.^{41–46} Second, the definition of childhood sexual assault captured the most severe forms of sexual assault and might have missed other forms of sexual contact or noncontact sexual assault. Third, the measure of social support used in this study relied on the reported number of friends and/or the number of people one can count on in times of need, which does not capture all of the characteristics of an important social or peer support network. Fourth, to assess the role of stress in moderating vio-

lence and sadness or wanting to abort the pregnancy, we created a dichotomous stress variable using median values from the sample cohort to classify high/low stress scores. Since validated cutoffs for the PSS scores have not been created, this methodology may misclassify the current stress level and may have diminished the true relationship. Fifth, this population was drawn from a group of pregnant women seeking care in an urban emergency department. The exclusion criteria applied to the study population (i.e., women with a prior hysterectomy, women with a normal menstrual period, women reporting a very recent therapeutic or spontaneous abortion within 14 days of enrollment) resulted in a very low probability of missing a pregnant woman seen in the ED. In addition, we did not include a measurement of economic resources, household structure, or duration of relationships, which may limit the generalizability of the findings. Women with low economic resources, unstable households, and shorter relationship duration may also be vulnerable to low resiliency and higher risk of sadness or wanting to abort the pregnancy.^{1,47}

Conclusions

In conclusion, we found that among women reporting at least one episode of childhood sexual assault, the report of current high depressive symptoms or high perceived stress levels was positively associated with the likelihood of feeling sadness and/or plans to terminate the pregnancy. Understanding the mechanism of depressive symptoms and stress resulting in women being more vulnerable to sadness or wanting to abort the pregnancy and ongoing screening for depressive symptoms and stress during the reproductive years among female survivors of childhood sexual assault may be important in improving consistent contraception use and reducing the high rates of UP in urban communities.

References

1. Finer LB, Zolna MR. Unintended pregnancy in the United States: Incidence and disparities, 2006. *Contraception* 2011; 84:478–485.
2. Cheng D, Schwarz EB, Douglas E, Horon I. Unintended pregnancy and associated maternal preconception, prenatal and postpartum behaviors. *Contraception* 2009;79: 194–198.
3. Messer LC, Dole N, Kaufman JS, Savitz DA. Pregnancy intendedness, maternal psychosocial factors and preterm birth. *Matern Child Health J* 2005;9:403–412.
4. Shah PS, Balkhair T, Ohlsson A, Beyene J, Scott F, Frick C. Intention to become pregnant and low birth weight and preterm birth: A systematic review. *Matern Child Health J*; 2011;15:205–216.
5. Simmonds KE, FE Likis. Providing options counseling for women with unintended pregnancies. *J Obstet Gynecol Neonatal Nurs* 2005;34:373–379.
6. Orr ST, CA Miller. Unintended pregnancy and the psychosocial well-being of pregnant women. *Womens Health Issues* 1997;7:38–46.
7. Pallitto CC, Campbell JC, O'Campo P. Is intimate partner violence associated with unintended pregnancy? A review of the literature. *Trauma Violence Abuse* 2005;6: 217–235.

8. Gipson JD, Koenig MA, Hindin, MJ. The effects of unintended pregnancy on infant, child, and parental health: A review of the literature. *Stud Fam Plann* 2008;39:18–38.
9. Dietz PM, Spitz AM, Anda RF, et al. Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *JAMA* 1999;282:1359–1364.
10. Besculides M, Laraque F. Unintended pregnancy among the urban poor. *J Urban Health* 2004;81:340–348.
11. Uscher-Pines L, Nelson DB. Neighborhood and individual-level violence and unintended pregnancy. *J Urban Health* 2010;87:677–687.
12. American College of Obstetricians and Gynecologists, Committee on Health Care for Underserved Women. Committee opinion No. 498: Adult manifestations of childhood sexual abuse. *Obstet Gynecol* 2011;118(2 Pt 1):392–395.
13. Leeners B, Stiller R, Block E, Görres G, Rath W. Pregnancy complications in women with childhood sexual abuse experiences. *J Psychosom Res* 2010;69:503–510.
14. Goodwin MM, Gazmararian JA, Johnson CH, Gilbert BC, Saltzman LE. Pregnancy intendedness and physical abuse around the time of pregnancy: Findings from the pregnancy risk assessment monitoring system, 1996–1997. PRAMS Working Group. *Pregnancy Risk Assessment Monitoring System. Matern Child Health J* 2000;4:85–92.
15. Coker AL. Does physical intimate partner violence affect sexual health? A systematic review. *Trauma Violence Abuse* 2007;8:149–177.
16. Chen JY, Clark MJ. Family resources and parental health in families of children with Duchenne muscular dystrophy. *J Nursing Research* 2010;18:239–248.
17. Ponto JA, Ellington L, Mellon S, Beck SL. Predictors of adjustment and growth in women with recurrent ovarian cancer. *Oncology Nursing Forum* 2010;37:357–364.
18. Leitch L, Miller-Karas E. A Case for using biologically-based mental health intervention in post-earthquake China: Evaluation of training in the trauma resiliency model. *Internat J Emergency Mental Health* 2009;11:221–233.
19. Leitch ML, Vanslyke J, Allen M. Somatic experiencing treatment with social service workers following hurricane Katrina and Rita. *Social Work* 2009;54:9–18.
20. Brody AC, Simmons LA. Family resiliency during childhood cancer: The father's perspective. *J Pediatr Oncol Nursing* 2007;24:152–165.
21. Van Riper M. Families of children with Down syndrome: Responding to “a change of plans” with resilience. *J Pediatr Nursing* 2007;22:116–128.
22. Palmer N. Resilience in adult children of alcoholics: A non-pathological approach to social work practice. *Health Soc Work* 1997;22:201–209.
23. Beitin BK, Allen KR. Resilience in Arab American couples after September 11, 2001: A systems perspective. *J Marital Fam Ther* 2005;31:251–267.
24. Callahan HE. Families dealing with advanced heart failure: A challenge and an opportunity. *Critical Care Nurs Q* 2003;26:230–243.
25. Ostazewski K, Zimmerman MA. The effects of cumulative risks and promotive factors on urban adolescent alcohol and other drug use: A longitudinal study of resiliency. *Am J Community Psychol* 2006;38:2237–2249.
26. Resnick MD, Bearman PS, Blum RW, et al. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *J Am Med Assoc* 1997;278:823–832.
27. Zimmerman MA, Salem DA, Notaro PC. Make room for day II: The positive effects of fathers' role in adolescent development. In: Taylor RD, Wang MC, eds. *Resilience across contexts: Family, work, culture, and community*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc, 2000: 233–253.
28. Zimmerman MA, Steinman KJ, Rowe KJ. Violence among urban African American adolescents: The protective effects of parental support. In: Arriaga XB, Oskamp S, eds. *Addressing community problems: Psychological research and interventions*. Thousand Oaks, CA: Sage, 1998:78–103.
29. Cutrona CE, Troutman BR. Social support, infant temperament, parenting self-efficacy: A mediational model of postpartum depression. *Child Dev* 1986;57:1507–1518.
30. Maier SF, Seligman ME. Learned helplessness: Theory and evidence. *J Exp Psychol* 1976;105:3–46.
31. Garber J, Seligman EP, eds. *Human helplessness: Theory and applications*. London: Academic Press, 1980.
32. Chan AWK, Pristach EA, Welte JW, Russell M. Use of the TWEAK test for screen of alcoholism/problem drinking in three populations. *Alcohol Clin Exp Res* 1993;17:1188–1192.
33. Blake SM, Kiely M, Gard CC, El-Mohandes AA, El-Khorazaty MN; NIH-DC Initiative. Pregnancy intentions and happiness among pregnant black women at high risk for adverse infant health outcomes. *Perspect Sex Reprod Health* 2007;39:194–205.
34. Santelli J, RoCHAT R, Hatfield-Timajchy K, et al. The measurement and meaning of unintended pregnancy. *Perspect Sex Reprod Health* 2003;35:94–101.
35. Roberts RE. Reliability of the CES-D scale in different ethnic contexts. *Psychiatry Res* 1980;2:125–134.
36. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Appl Psychol Meas* 1977;1:385–401.
37. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav.* 1983;24:385–396.
38. Cohen S, Williamson GM. Perceived stress in a probability sample of the United States. In: Spacapan S, Oskamp S, eds. *The social psychology of health: Claremont Symposium on applied social psychology*. Newbury Park, CA: Sage, 1988:31–67.
39. Lesser J, Koniak-Griffin D. The impact of physical or sexual abuse on chronic depression in adolescent mothers. *J Pediatr Nurs* 2000;15:378–387.
40. Boden JM, Fergusson DM, Horwood LJ. Experience of sexual abuse in childhood and abortion in adolescence and early adulthood. *Child Abuse Negl* 2009;33: 870–876.
41. Barrett G, Smith SC, Wellings K. Conceptualization, development, and evaluation of a measure of unplanned pregnancy. *J Epidemiol Community Health* 2004;58:426–433.
42. Miller E, Decker MR, McCauley HL, et al. Pregnancy coercion, intimate partner violence and unintended pregnancy. *Contraception* 2010;81:316–322.
43. Miller E, Cecker MR, Reed E, Raj A, Hathaway JE, Silverman JG. Male partner pregnancy-promoting behaviors and adolescent partner violence: Findings from a qualitative study with adolescent females. *Ambul Pediatr* 2007;7:360–366.
44. Miller E, Silverman JG. Reproductive coercion and partner violence: Implications for clinical assessment of unintended pregnancy. *Expert Rev Obstet Gynecol* 2010;5:511–515.

45. Speizer IS, Santelli JS, Afaible-Munsuz A, Kendall C. Measuring factors underlying intendedness of women's first and later pregnancies. *Perspect Sex Reprod Health* 2004;36:198-205.
46. Schunmann C, Glasier A. Measuring pregnancy intention and its relationship with contraceptive use among women undergoing therapeutic abortion. *Contraception* 2006;73:520-524.
47. Koren A, Mawn B. The context of unintended pregnancy among married women in the USA. *J Fam Plann Reprod Health Care* 2010;36:150-158.

Address correspondence to:

Deborah B. Nelson, PhD

Temple University

College of Health Professions and Social Work

Department of Public Health

1301 Cecil B. Moore Avenue

Ritter Annex, Room 905

Philadelphia, PA 19112

E-mail: dnelson@temple.edu