Pregnancy Intendedness and Physical Abuse Around the Time of Pregnancy: Findings from the Pregnancy Risk Assessment Monitoring System, 1996–1997

Mary M. Goodwin,[1,5] Julie A. Gazmararian,[2] Christopher H. Johnson,[1] Brenda Colley Gilbert,[1] Linda E. Saltzman,[3] and the PRAMS Working Group[4]

Objective: This study examines whether unintended pregnancy is associated with physical abuse of women occurring around the time of pregnancy, independent of other factors. *Methods*: In 1996–1997, state-specific population-based data were obtained from the Pregnancy Risk Assessment Monitoring System (PRAMS) from 39,348 women in 14 states who had delivered a live-born infant within the previous 2–6 months. The study questionnaire asked about maternal behaviors and characteristics around the time of pregnancy. *Results:* Women who had mistimed or unwanted pregnancies reported significantly higher levels of abuse at any time during the 12 months before conception or during pregnancy (12.6% and 15.3%, respectively) compared with those with intended pregnancies (5.3%). Higher rates of abuse were reported by women who were younger, Black, unmarried, less educated, on Medicaid, living in crowded conditions, entering prenatal care late, or smoking during the third trimester. Overall, women with unintended pregnancies had 2.5 times the risk of experiencing physical abuse compared with those whose pregnancies were intended. This association was modified by maternal characteristics; the association was strongest among women who were older, more educated, White, married, not on Medicaid, not living in crowded conditions, receiving first trimester prenatal care, or nonsmoking during the third trimester. *Conclusions*: Women with unintended pregnancies are at increased risk of physical abuse around the time of pregnancy compared with women whose pregnancies are intended. Prenatal care can provide an important point of contact where women can be screened for violence and referred to services that can assist them.

KEY WORDS: Pregnancy; unintended pregnancy; unwanted pregnancy; pregnancy intendedness; violence; abuse; reproductive health; women's health.

INTRODUCTION

Violence against women has become recognized as an issue of clinical and public health importance. An estimated 1.5 million adult women (1.5% of women aged ≥18 years) are physically or sexually assaulted by an intimate partner in the United States each year (1). Women in their peak childbearing

[1]Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.
[2]USQA Center for Health Care Research, Atlanta, Georgia.
[3]Division of Violence Prevention, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Georgia.
[4]The Pregnancy Risk Assessment Monitoring System (PRAMS) Working Group comprises the following state collaborators: L. Albert Woolbright, Alabama; Kathy Perham-Hester, Alaska; Gina Redford, Arkansas; Darci Cherry, Colorado; Richard Hopkins, Florida; Leslie Lipscomb, Georgia; Martha Henson, Maine; Yasmina Bouraoui, Michigan; Michael Medvesky, New York; Michelle Beck-Warden, North Carolina; Richard Lorenz, Oklahoma; Kriisten Helms, South Carolina; Linda Lohdefink, Washington; and Melissa Baker, West Virginia.
[5]Correspondence should be addressed to Mary Goodwin, Division of Reproductive Health, National Center for Chronic Disease Promotion and Health Promotion, Centers for Disease Control and Prevention, 4770 Buford Highway, MD K-35, Atlanta, Georgia 30341; e-mail: mmg2@cdc.gov.

1092-7875/00/0600-0085$18.00/0

years are at higher risk for experiencing violence by intimate partners (2). These findings have prompted researchers to examine the possible association between violence and pregnancy. A review of 11 studies examining violence during pregnancy indicates that the prevalence of violence during pregnancy ranges from 0.9% to 20.1%; most of the studies report rates between 3.9% and 8.3% (3). These data suggest that violence may be a more common problem for pregnant women than preeclampsia and gestational diabetes, conditions for which pregnant women are routinely screened.

Unintended pregnancy is another public health problem affecting a large number of women each year in the United States. It is estimated that between 1990 and 1995, 31% of births to U.S. women aged 15–44 years were the result of an unintended conception (22% mistimed and 9% unwanted) (4). When pregnancies ending in induced abortion are taken into account, it is estimated that in 1994, almost half (49%) of pregnancies to women aged 15–44 years were unintended (5). Among women having a live birth, unintended pregnancy has been associated with risk factors that can affect the mother and baby, such as lower likelihood of recognizing early signs of pregnancy, and greater likelihood of delayed entry into prenatal care (6).

Among seven published studies on violence against women that have included unintended pregnancy as an analysis variable, only two have specifically focused on the association between unintended pregnancy and abuse (7, 8). Others have included unintended pregnancy as one of a number of factors that could be associated with an increased likelihood of experiencing violence (9–13). Although findings from these studies are not easily comparable because different study populations and methodologies were used, four found that women who reported having experienced abuse during pregnancy were also more likely to report that their pregnancy was unintended (8, 10, 12, 13) or that they were unhappy about being pregnant (9, 12).

Despite these indications of a possible association between violence and unintended pregnancy, few studies have specifically examined the potential causal relationship, causal pathways, or temporal relationship (i.e., the extent to which unintended pregnancy precedes violence or vice versa). Two studies of women seeking elective abortion indicated that in some cases unintended pregnancy resulted directly from physical violence that included forced intercourse (14, 15). Researchers have also hypothesized that physical violence may occur after an unintended conception due to unhappiness about the pregnancy, stress associated with an unexpected life change (7), or disagreement between partners about what to do about the pregnancy (14, 15). It has also been posited that unintended pregnancy may result indirectly from abused women's inability to control the timing of sexual relations or to negotiate contraception with their partners (7). These theories, however, have not been tested empirically.

Given the large number of women who seek prenatal care and other reproductive health care services each year, providers in this area are in a key position to act as vital points of contact for identifying and assisting women who experience abuse. A better understanding of the relationship between unintended pregnancy and violence can help inform clinicians and other health care professionals about potential reproductive health risk factors associated with abuse. The purpose of this analysis is to explore the potential association between physical abuse and unintended pregnancy in a population-based sample of women who have recently given birth. The study examines the association between unintended pregnancy and violence during the 12 months before conception and during the pregnancy, while controlling for selected individual characteristics and pregnancy-related factors. The population-based sample allows us to draw conclusions that can be generalized to other women who have recently given birth.

MATERIALS AND METHODS

Data on physical violence and pregnancy intendedness came from the Pregnancy Risk Assessment Monitoring System (PRAMS), an ongoing, state-based surveillance system that conducts surveillance on maternal characteristics and behaviors before pregnancy, during pregnancy, and during the early postpartum period (16). This study analyzed population-based data from 14 states that collected PRAMS data in 1996, 1997, or both. The study sample included 1996 and 1997 data from Alabama, Alaska, Florida, Georgia, Maine, Oklahoma, South Carolina, Washington, West Virginia, and New York (excluding New York City); 1996 data only from Michigan; and 1997 data only from Arkansas, Colorado, and North Carolina (July–December only). In each state, between 100 and 250 new mothers were sampled each month using stratified, random sampling of all resident birth certificates. Sampled mothers were mailed a self-

administered 14-page questionnaire 2–6 months after delivery of a live-born infant. Repeat mailings or telephone interviews were conducted for initial nonresponders. State-specific response rates to the survey ranged from 69% to 80%. Data from individual questionnaires were combined with birth certificate data and weighted to adjust for selection probability, nonresponse, and noncoverage of the sampling frame. The resulting state-specific databases are representative of each state's entire population of women delivering a live infant (17).

The PRAMS questionnaire defined physical abuse as "pushing, hitting, slapping, kicking, or any other way of physically hurting someone." Abuse was measured by asking survey respondents whether they were physically abused during (1) the 12 months before they became pregnant, and (2) their most recent pregnancy. For each time period, respondents could indicate that they were physically abused by "my husband or partner, a family or household member, a friend, someone else, or no one." Women who responded that they had been abused by "someone else" were asked to specify the perpetrator. Preliminary data analysis found that more than three fourths of abused women reported abuse by a current or former intimate partner, and detected no statistical differences in pregnancy intendedness among abused women by type of perpetrator. We therefore combined all women who reported abuse regardless of relationship to the perpetrator. Of the 39,348 women in the study sample, we excluded 1706 respondents (4.3%) with missing or unknown responses to the preconception violence question and the pregnancy violence question. For our analysis, women were defined as "abused around the time of pregnancy" if they reported abuse at any time during the 12 months before pregnancy or during the pregnancy. Timing of abuse was further divided into one of three mutually exclusive categories (1) abuse only during the 12 months before pregnancy, (2) abuse only during pregnancy, and (3) abuse both before and during pregnancy. Throughout this paper, we use the term "physical abuse" since this terminology was used in the PRAMS questionnaire.

Pregnancy intendedness was measured with the question, "Thinking back to just before you were pregnant, how did you feel about becoming pregnant?" Intendedness of the pregnancy was categorized as intended (the woman wanted the pregnancy at that time or sooner), mistimed (the woman wanted to be pregnant later), or unwanted (the woman did not want to be pregnant then or at any time in the future). Because of lack of significant differences among women whose pregnancies were mistimed and those whose pregnancies were unwanted, for parts of our analysis we combined the two groups to create a broader category of "unintended" pregnancies. Women who responded "don't know" or did not reply (7.6%) were excluded from the analysis. Throughout the paper, the term "pregnancy intendedness" refers to the intendedness of pregnancies resulting in a live birth.

We included in our analysis individual characteristics and behaviors identified by previous studies as related to both violence during pregnancy (3), and unintended pregnancy (6) (maternal age, education, race, marital status, socioeconomic status, and maternal behaviors during pregnancy). Age, education, race, and marital status were obtained from birth certificate data. Race was defined as White, Black or "other," which included Alaska Natives, American Indians, and Asian/Pacific Islanders. Marital status was based on reported status at the time of delivery. Information on Medicaid, household crowding, and selected behaviors during pregnancy were obtained from the PRAMS questionnaire data. Medicaid status was defined as having received Medicaid just before the pregnancy or having had Medicaid pay for prenatal care or delivery. Household crowding was defined as more than one person per room, based on the Census of Housing definition (18). Selected maternal behaviors were (1) delayed entry into prenatal care (14 weeks or later) and (2) smoking during the third trimester of pregnancy. In addition, we included an indicator of the father's feeling about the pregnancy, a variable that has not been considered in other studies and is newly available from the PRAMS questionnaire. Women were asked whether the baby's father had at any time during the 12 months before delivery said that he did not want her to be pregnant.

To assess whether unintended pregnancy and physical abuse were associated for women whose pregnancies resulted in a live birth, we compared pregnancy intendedness among women who did not report abuse with the intendedness among abused women. Prevalence of abuse was examined according to maternal characteristics, including intendedness of the pregnancy. We also examined the potential association between pregnancy intendedness and timing of the abuse in relation to the pregnancy. Finally, we conducted a stratified analysis comparing prevalence of abuse among women with intended and unintended pregnancies resulting in live births

according to selected maternal characteristics. Risk ratios and 95% confidence intervals were calculated to determine strength of associations and precision of estimates when stratified by maternal characteristics. SUDAAN (Software for Survey Data Analysis) was used to calculate standard errors that account for selection and response probabilities of the multistage sampling design (19).

RESULTS

The analysis dataset included 39,348 women who had delivered a live-born infant within the previous 2–6 months. Of these, 86% were at least 20 years of age, 80% had completed at least 12 years of education, and 68% were married. Seventy-seven percent of the respondents were White, 19% were Black, and 4% were of other races. The majority of women (87%) received prenatal care in the first trimester. Forty-two percent of the women reported having received Medicaid, 11% lived in crowded conditions, and 15% reported smoking during the third trimester of pregnancy. Twelve percent of the women reported that at some time during the 12 months before the delivery the father had said he did not want the pregnancy.

Among women who reported no abuse, over half (58.2%) reported that at the time of conception their pregnancy was intended, 30.9% reported their pregnancy was mistimed, and 10.9% reported that their pregnancy was unwanted (Table I). Combining mistimed and unwanted pregnancies, we found that 42% of women who reported no abuse had an unintended pregnancy. In contrast, among women who had experienced abuse around the time of pregnancy (violence at any time during 12 months before conception or during pregnancy), only 33.7% reported that their pregnancy was intended, and 66.3% had an unintended pregnancy ending in a live birth; 46.0% of the pregnancies were mistimed and 20.3% unwanted.

Overall prevalence of physical abuse around the time of pregnancy was 8.8% (n = 3494), and varied significantly by maternal characteristics, including intendedness of the pregnancy (Table II). Among women whose pregnancies were intended, 5.3% reported abuse around the time of pregnancy, compared with 12.6% of those whose pregnancies were mistimed and 15.3% of those whose pregnancies were

Table I. Distribution of Pregnancy Intendedness, by Physical Abuse Status Around the Time of Pregnancy[a]

	Not physically abused (%)	Physically abused around the time of pregnancy (%)
Pregnancy intendedness		
Intended	58.2	33.7
Mistimed	30.9	46.0
Unwanted	10.9	20.3
N	31,341	3,494

[a]Physical abuse at any time during the 12 months before pregnancy or during pregnancy. Table excludes 2807 cases with unknown pregnancy intendedness, 1528 cases with unknown abuse, and 178 cases for which both variables were unknown.

Table II. Percentage of Women Reporting Physical Abuse Around the Time of Pregnancy,[a] by Maternal Characteristics

	Physical abuse around the time of pregnancy (n = 34,835)	
Characteristic	%	(95% CI)
Total	8.8	(8.3–9.3)
Intendedness		
Intended	5.3	(4.8–5.8)
Mistimed	12.6	(11.5–13.7)
Unwanted	15.3	(13.4–17.2)
Maternal age (years)		
<20	18.5	(16.6–20.4)
20–29	9.4	(8.6–10.2)
30+	4.4	(3.7–5.1)
Education (years)		
<12	18.8	(17.0–20.6)
12	9.6	(8.6–10.6)
>13	4.2	(3.7–4.7)
Race		
White	7.5	(6.9–8.1)
Black	14.1	(12.9–15.3)
Other	8.9	(6.8–11.0)
Marital status		
Married	4.7	(4.2–5.2)
Other	17.6	(16.3–18.9)
Medicaid status		
Not on Medicaid	7.3	(6.8–7.8)
On Medicaid	20.8	(18.6–23.0)
Household crowding		
Crowded	14.5	(12.4–16.6)
Not crowded	8.0	(7.4–8.6)
Prenatal care entry		
First trimester	7.6	(7.1–8.1)
Delayed/none	17.3	(15.3–19.3)
Smoked third trimester		
No	7.0	(6.5–7.5)
Yes	18.6	(16.6–20.6)
Baby's father said he did not want pregnancy		
No	6.8	(6.3–7.3)
Yes	24.2	(21.8–26.6)

[a]Physical abuse at any time during the 12 months before pregnancy or during pregnancy.

unwanted. Prevalence of abuse among women with intended pregnancies was significantly lower than among those with mistimed or unwanted pregnancies; there was no statistically significant difference in prevalence between the latter two groups. The prevalence of physical abuse around the time of pregnancy was significantly greater for women less than 20 years of age compared with those aged 20 years and older, and significantly higher among women aged 20–29 years compared with women aged 30 years and older. A similar pattern of statistical significance was found by education level; those who had completed fewer than 12 years of education had a higher prevalence of abuse than women with more years of education. Black women and those who were not married at the time of delivery reported significantly higher prevalence of abuse. Prevalence of abuse was also significantly higher among women who were on Medicaid, living in crowded conditions, reported late entry into prenatal care, and smoked during the third trimester of pregnancy. Women for whom the baby's father expressed that he did not want the pregnancy also reported significantly higher prevalence of abuse than those for whom the father did not state that he did not want the pregnancy.

When abuse was stratified according to timing of abuse in relation to the pregnancy, overall, 3.2% of women reported abuse only during the 12 months before the pregnancy, 1.5% reported abuse only during the pregnancy, and 4.1% reported abuse during both time periods (Table III). Thus, almost half of the abused women (45%) experienced abuse both before and during pregnancy. Women with intended pregnancies reported significantly lower prevalence of abuse than women who had mistimed or unwanted pregnancies for each of the three time periods of abuse; no significant differences were found between women with mistimed and unwanted pregnancies. In addition, the timing pattern of abuse did not vary by pregnancy intendedness. For all levels of intendedness, the proportion of the study population experiencing abuse during both time periods was consistently higher, and the proportion reporting abuse only during the pregnancy was lower. Since prevalence of abuse did not vary significantly between women with mistimed and unwanted pregnancies, and since timing of abuse did not vary significantly when stratified by intendedness, the remainder of the analysis classifies pregnancies as either (1) intended or (2) unintended, and abuse as physical abuse around the time of pregnancy (i.e., does not stratify by timing of abuse).

Prevalence of abuse was significantly higher for women with unintended pregnancies than for women with intended pregnancies (Table IV). When prevalence of abuse was stratified by pregnancy intendedness and maternal characteristics, we found that both for women whose pregnancies were intended and for those whose pregnancies were unintended, prevalence of abuse was significantly higher among younger women, those with fewer years of education, those who were unmarried, on Medicaid, living in crowded conditions, had delayed entry into prenatal care, and smoked during the third trimester, and for whom the father said he did not want the pregnancy. Abuse was statistically higher for Black women whose pregnancies were intended compared to White women and those of other races, but no statistical differences were found by race among those whose pregnancies were unintended.

When risk ratios were calculated, we found that, overall, women with unintended pregnancies were 2.5 times more likely to have experienced abuse. However, the association between abuse and unintended pregnancy was modified by maternal characteristics. The association was strongest for women

Table III. Prevalence of Physical Abuse by Pregnancy Intendedness and Timing of Abuse

			Timing of physical abuse in relation to pregnancy					
	Abused around the time of pregnancy[a]		Before pregnancy[b] only		During pregnancy only		Before and during pregnancy	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Total	8.8	(8.3–9.3)	3.2	(2.9–3.5)	1.5	(1.3–1.7)	4.1	(3.8–4.4)
Pregnancy intendedness								
Intended	5.3	(4.8–5.8)	2.0	(1.7–2.4)	0.7	(0.5–0.9)	2.5	(2.1–2.9)
Mistimed	12.6	(11.5–13.7)	4.5	(3.8–5.2)	2.3	(1.8–2.8)	5.6	(4.8–6.4)
Unwanted	15.3	(13.4–17.2)	5.0	(3.8–6.2)	3.2	(2.2–4.2)	7.3	(5.9–8.7)

[a]Physical abuse at any time during the 12 months before pregnancy or during pregnancy.
[b]"Before pregnancy" refers to the 12 months before conception.

Table IV. Prevalence of Physical Abuse by Pregnancy Intendedness and Association Between Physical Abuse Around the Time of Pregnancy and Unintended Pregnancy, by Selected Characteristics

Characteristic	Intended pregnancy		Unintended pregnancy		Unintended vs. intended pregnancy	
	%	(95% CI)	%	(95% CI)	RR	(95% CI)
Total	5.3	(4.8–5.8)	13.3	(12.3–14.3)	2.5	(2.2–2.8)
Maternal age (years)						
<20	16.3	(13.0–19.6)	19.2	(16.9–21.5)	1.2	(0.9–1.5)
20–29	5.9	(5.1–6.7)	13.7	(12.4–15.0)	2.3	(2.0–2.8)
30+	3.3	(2.6–4.0)	6.9	(5.3–8.5)	2.1	(1.6–2.9)
Education (years)						
<12	15.5	(14.8–16.2)	20.7	(18.4–23.0)	1.3	(1.1–1.6)
12	5.8	(4.8–6.8)	13.7	(12.0–15.4)	2.4	(1.9–2.9)
>13	2.7	(2.2–3.2)	7.0	(5.9–8.1)	2.6	(2.1–3.3)
Race						
White	4.4	(3.8–5.0)	12.6	(11.3–13.9)	2.8	(2.4–3.3)
Black	12.1	(10.1–14.1)	15.1	(13.6–16.6)	1.3	(1.0–1.5)
Other	6.2	(3.5–8.9)	12.2	(8.8–15.6)	2.0	(1.2–3.3)
Marital status						
Married	3.3	(2.8–3.8)	8.0	(6.9–9.1)	2.4	(2.0–3.0)
Other	15.9	(13.6–18.2)	18.2	(16.7–19.8)	1.1	(1.0–1.4)
Medicaid status						
Not on Medicaid	2.4	(2.0–2.8)	7.0	(5.9–8.1)	2.9	(2.3–3.8)
On Medicaid	13.3	(11.7–14.9)	17.7	(16.3–19.1)	1.3	(1.2–1.5)
Household crowding						
Not crowded	4.6	(4.1–5.1)	12.6	(11.5–13.7)	2.8	(2.4–3.2)
Crowded	10.4	(7.7–13.1)	17.3	(14.4–20.2)	1.7	(1.2–2.3)
Prenatal care entry						
First trimester	4.6	(4.1–5.1)	12.1	(11.0–13.2)	2.6	(2.3–3.0)
Delayed/none	15.6	(11.7–19.5)	17.8	(15.4–20.2)	1.2	(0.9–1.5)
Smoked third trimester						
No	4.0	(3.5–4.5)	11.0	(10.0–12.0)	2.7	(2.3–3.2)
Yes	13.7	(11.2–16.2)	23.0	(19.9–26.1)	1.7	(1.3–2.1)
Baby's father said he did not want pregnancy						
No	4.4	(3.9–4.9)	10.4	(9.4–11.4)	2.4	(2.0–2.7)
Yes	21.7	(17.2–26.2)	25.0	(22.2–27.8)	1.2	(0.9–1.5)

who were at least 20 years old, had 12 or more years of education, were White, married, not on Medicaid, not living in crowded conditions, entered prenatal care during the first trimester, did not smoke during the third trimester, and for whom the father did not state that he did not want the pregnancy. Despite the statistical strength of the association between physical abuse and unintended pregnancy among these women, however, they were less likely to have experienced abuse than women who were younger, less educated, Black, unmarried, on Medicaid, living in crowded conditions, receiving delayed prenatal care, smokers, and for whom the baby's father stated he did not want the pregnancy. Among these women, prevalence of abuse was relatively high regardless of pregnancy intendedness, and the resulting risk ratios were either not statistically significant or only slightly so.

DISCUSSION

Our analysis found a relatively strong association between unintended pregnancy and abuse. However, stratified prevalence and risk ratios showed that maternal characteristics modified the association between unintended pregnancy and abuse. These findings are similar to those of two previous studies using PRAMS data. In a study of the association between unintended pregnancy and abuse using 1990–91 PRAMS data, Gazmararian *et al.* found that the association between unintended pregnancy and abuse was

modified by maternal characteristics (8). Likewise, Dietz *et al.* found that women with higher socioeconomic status (SES) showed a significant association between delayed prenatal care and abuse, whereas women with lower SES did not (11). In the authors' assessments, a possible explanation for these findings was that prevalence of violence among ''less advantaged women'' (i.e., lower SES and higher prevalence of risk factors for poor pregnancy outcome) was already so high that the relative contributions of an unintended pregnancy or of delaying prenatal care were comparatively small. This analysis seems to support a similar conclusion.

Notably, in the studies by Gazmararian and Dietz and in the present analysis the strongest associations between unintended pregnancy and physical abuse were found among the groups that comprise the majority of women who gave birth. For example, in the PRAMS sample, women aged 20 years or older comprised 87% of those who had a live birth, and women with 12 or more years of education represented 80%. On the basis of findings from our analysis, women with these characteristics had almost 2.5 times the likelihood of experiencing abuse if their pregnancy was unintended. Moreover, among large groups of childbearing women, such as mothers aged 20–29 years (52% of the women who gave birth in the PRAMS states), the risk of abuse is more than twofold for women with an unintended pregnancy, and the prevalence of abuse is also relatively high (14%). The generally high rate of unintended pregnancy among women having live births shows how important the factor of abuse is overall.

Data on timing of physical abuse showed no statistically significant association with unintended pregnancy, and therefore shed little light on the issue of how unintended pregnancy may be temporally related to abuse. It is important, however, that almost half of the abused women reported physical abuse both before and during the pregnancy. For some women, abuse and unintended pregnancy may be parts of an ongoing climate or cycle of risk factors and may both be factors associated with relationship or family dysfunction.

This analysis was conducted using a unique, population-based data source, which allows us to make inferences about the entire population of women giving birth in the states included in the analysis. The large number of women sampled allowed us to consider issues such as timing of the abuse, and how abuse differed according to whether the pregnancy was mistimed or unwanted. The availability of a variety of covariates allowed us to conduct stratified analysis to identify effect modifiers.

Some factors also limit the findings of this analysis. PRAMS data are self-reported and therefore may not accurately reflect the true magnitude of the problem of abuse. Willingness to report abuse on a mail or telephone survey may vary according to women's subjective definitions of what acts constitute abuse, fears about confidentiality, or stigma associated with reporting abuse. However, we expect that these factors would most likely contribute to underreporting of abuse rather than to exaggeration of the true prevalence of the problem. Since the PRAMS questionnaire asked women only about physical abuse, other forms of abuse (e.g., sexual or verbal) were excluded. Additionally, our definition of ''violence around the time of pregnancy'' includes the 12 months prior to conception; the relative length of this time period may mean that some women were included for whom physical abuse and conception occurred up to 12 months apart. PRAMS data can be generalized only to populations of new mothers in the states where data were collected. Women whose pregnancies did not result in live births, comprising an estimated 54% of unintended pregnancies in the United States in 1994 (5), were not included. Since several studies have indicated a possible association between elective abortion and abuse (14, 15) and since the majority of pregnancies terminating in elective abortion were unintended, this omission may seriously limit our ability to examine the true magnitude of the association between abuse and unintended pregnancy. Finally, PRAMS data do not provide sufficient information on circumstances and timing of physical abuse (including frequency) to examine the issue of causality. We were unable, using these data, to determine the extent to which abuse before pregnancy was directly or indirectly linked to the occurrence of an unintended pregnancy. Conversely, we did not have sufficient data to determine whether abuse might have occurred as a direct or indirect result of having an unintended pregnancy. These questions are important and merit further research.

In the United States in 1995, an estimated 1.2 million births to women of all ages resulted from unintended pregnancies (4). In the 14 states represented in this study, women whose pregnancies were unintended had more than double the risk of experiencing abuse around the time of pregnancy compared with women whose pregnancies were intended. Nevertheless, prevalence of abuse was high among some groups of women regardless of intendedness (up to

24% among women for whom the baby's father stated that he did not want the pregnancy). Moreover, physical abuse occurred among 5% of women whose pregnancies were intended.

Physical abuse and unintended pregnancy are both public health issues that can affect the health and well-being of women and their children. Although it is unclear whether a causal association exists, reductions in high rates of unintended pregnancy could contribute to a reduction in violence against women, or vice versa. Unintended pregnancy is not the only risk factor for a woman's experience of physical abuse, but it may be an issue that clinicians can use to open a discussion of physical, sexual, or emotional abuse. Before routine screening and interventions addressing violence against women are widely adopted and implemented in reproductive health care settings, however, further research is necessary to establish best practices in screening for violence and intervention or referral of abused women to appropriate social services. Although much attention has been focused on the clinician's role, determining effective measures to address violence against women within reproductive health care settings will also require a better understanding of what happens to women after the clinical encounter.

REFERENCES

1. Tjaden P, Thoennes N. Prevalence, incidence, and consequences of violence against women: Findings from the National Violence Against Women Survey. *Research in brief*. Washington, DC, and Atlanta GA: National Institute of Justice, and Centers for Disease Control and Prevention, 1998.
2. Bachman R, Saltzman LE. *Violence against women: Estimates from the redesigned survey*. Bureau of Justice Statistics Special Report. Washington, DC: U.S. Department of Justice, 1995.
3. Gazmararian JA, Lazorick S, Spitz AM, Ballard TJ, Saltzman LE, Marks JS. Prevalence of violence against pregnant women: A review of the literature. *JAMA* 1996;275:1915–20.
4. Abma J, Chandra A, Mosher W, Peterson L, Piccinino L. Fertility, family planning and womens health: New data from the 1995 National Survey of Family Growth, National Center for Health Statistics. *Vital Health Stat* 1997;23(19).
5. Henshaw SK. Unintended pregnancy in the United States. *Fam Plann Perspect* 1998;30:24–9, 46.
6. Institute of Medicine. *The best intentions: Unintended pregnancy and the well-being of children and families*. Washington, DC: National Academy Press, 1995.
7. Campbell JC, Pugh LC, Campbell D, Visscher M. The influence of abuse on pregnancy intention. *Womens Health Issues* 1995;5:214–23.
8. Gazmararian JA, Adams MM, Saltzman LE, Johnson CH, Bruce FC, Marks JS, Zahniser SC. The relationship between pregnancy intendedness and physical violence in mothers of newborns. *Obstet Gynecol* 1995;85:1031–8.
9. Amaro H, Fried LE, Cabral H, Zuckerman B. Violence during pregnancy and substance use. *Am J Public Health* 1990;80:575–9.
10. Cokkinides V, Coker A, Sappenfield W. *Prevalence and correlates of physical violence during pregnancy*. Paper presented at the Annual Meeting of the American Public Health Association, New York, November 20, 1996.
11. Dietz PM, Gazmararian JA, Goodwin MM, Bruce FC, Johnson CH, Rochat RW. Delayed entry into prenatal care: Effect of physical violence. *Obstet Gynecol* 1997;90:221–4.
12. Hillard PJA. Physical abuse in pregnancy. *Obstet Gynecol* 1985;66:185–90.
13. Stewart DE, Cecutti A. Physical abuse in pregnancy. *Can Med Assoc J* 1993;149:1257–63.
14. Evins G, Chescheir N. Prevalence of domestic violence among women seeking abortion services. *Womens Health Issues* 1996;4:204–9.
15. Glander SS, Moore ML, Michielutte R, Parsons LH. The prevalence of domestic violence among women seeking abortion. *Obstet Gynecol* 1998;91:1002–6.
16. Adams MM, Shulman HB, Bruce C, Hogue C, Brogan D, The PRAMS Working Group. The Pregnancy Risk Assessment Monitoring System: Design, questionnaire, data collection and response rates. *Paediatr Perinat Epidemiol* 1991;5:333–46.
17. Rogers MM, Ahluwalia IB, Melvin CL. The Pregnancy Risk Assessment Monitoring System (PRAMS). *Womens Health* 1998;7(7):799–801.
18. Census of Housing 1980. *Characteristics of housing units*. Washington, DC: U.S. Department of Commerce, 1982:1(A).
19. Shah BV, Barnwell BG, Beiler GS. *SUDAAN user's manual: Software for analysis of correlated data. Release 6.40.* Research Triangle Park, NC: Research Triangle Institute, 1998.