Predictive Validity of a Screen for Partner Violence Against Women

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Background: While public health leaders recommend screening for partner violence, the predictive value of this practice is unknown. The purpose of this study was to test the ability of a brief three-question violence screen to predict violence against women in the ensuing months.

Methods: We conducted a prospective cohort study of adult women participating in the Colorado Behavioral Risk Factor Surveillance System (BRFSS), a population-based, random-digit-dialing telephone survey. During 8 monthly cohorts, 695 women participated in the BRFSS; 409 women participated in follow-up telephone interviews approximately 4 months later. Violent events during the follow-up period, measured using a modified 28-item Conflict Tactics Scale, were compared between women who initially screened positive and those who screened negative.

Results: Among BRFSS respondents, 8.4% (95% confidence interval [CI]=6.3%–10.5%) had an initial positive screen. During the follow-up period, women who screened positive were 46.5 times (5.4–405) more likely to experience severe physical violence, 11.7 times (5.0– 27.3) more likely to experience physical violence, 3.6 (2.4–5.2) times more likely to experience verbal aggression, and 2.5 times (1.2–5.1) more likely to experience sexual coercion. In a multivariate model, separation from one's spouse and a positive screen were significant independent predictors of physical violence.

Conclusions: A brief violence screen identifies a subset of women at high risk for verbal, physical, and sexual partner abuse over the following 4 months. Women with a positive screen who are separated from their spouse are at highest risk.

Medical Subject Headings (MeSH): domestic violence, mass screening, spouse abuse, women (Am J Prev Med 2001;21(2):93–100)

Introduction

Partner violence is a major medical, social, and public health problem. Often called "domestic violence," "battering" or "spouse abuse," partner violence is defined as "a pattern of coercive control, consisting of physical, sexual, or psychological assault against [a] former or current intimate partner."[1] In the majority of cases the perpetrators are men, and the victims are women.[2–4] The consequences of partner violence may be severe. Studies have shown a relationship between partner violence and physical injuries, disabilities, homicide, sexual assaults, complications of pregnancy, major depression, suicide, alcohol and drug abuse, and economic losses.[5–9]

Partner violence is a common cause of illness and injury, and therefore, is a health concern. Victims of partner violence commonly present for care in emergency departments, hospital clinics, medical offices, prenatal clinics, family planning facilities, and other clinical settings.[6,10–13] There is evidence that physicians and nurses often do not recognize women patients suffering the effects of partner violence.[6,12] Frequently, even when partner violence is identified, physicians do not offer counseling, referrals, or other victim support.[14,15] These errors of omission may contribute to continued morbidity and risk for patients as well as for their children. Indeed, it is well known that partner violence is seldom an isolated event; more often, violence is repeated and escalates over time.[16]

The Centers for Disease Control and Prevention, the Joint Commission on Accreditation of Health Care Organizations, and numerous professional organizations have called for violence screening in healthcare settings.[17,18] Brief screening tests for partner violence

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have been shown to be easy to administer and acceptable to women,[1,11,19–21] and in cross-sectional studies, they have been validated against other scales of violence and abuse for detecting past or current abuse.[11,22,23] However, it is unknown whether a woman with a positive screen for past or current abuse is more likely to experience future assaults compared to a woman with a negative screen. Information about the risk of future violence is important in educating women who screen positive so that they may make informed decisions about choosing interventions and in enhancing provider understanding of the importance of intervening when a woman screens positive.

One important screen characteristic is that it identify a subset of patients who, without intervention, would be at risk for progressive disease- or affliction-specific morbidity or mortality.[24] Yet, as Milner and Campbell[25] stated, "Future predictive validity, often the most desirable type of validity when violence is under study, is rarely provided." Therefore, we conducted this study to test the ability of a brief violence screen to predict future partner violence. Specifically, this study addressed the following question: Are women who screen positive for violence at higher risk for repeated verbal, physical, or sexual aggression compared to women who screen negative?

Methods

This investigation was a prospective cohort study in which recurrent monthly cohorts were sampled. Women were first interviewed during administration of the Colorado Behavioral Risk Factor Surveillance System (BRFSS), and then re-interviewed after 3 months. The study protocol was approved by the Colorado Multiple Institutional Review Board and by the Colorado Department of Public Health and Environment.

The Colorado BRFSS

The Colorado BRFSS—an anonymous population-based, health monitoring survey administered by the Colorado Department of Public Health and Environment—provided the sampling frame and baseline data (age, marital status, race, ethnicity, income, education, and county of residence) for this study. Each month, approximately 150 Colorado residents aged ≥18 are interviewed. In 1998, the BRFSS refusal rate was 21%. BRFSS respondents do not differ from the Colorado population in gender (55% vs 50% female, respectively) or race (79.5% vs 77.7% white non-Hispanic, respectively).

Study Sample

This study included women who participated in the Colorado BRFSS between November 1997 and June 1998. Upon completion of the BRFSS, English-speaking women were asked whether they would be willing to be called again after 3 months, about "a study of women's safety issues." For those who agreed, telephone contact information was collected.

A sample size calculation (α=0.05, β=0.20, effect size=20%, estimated rate of physical violence in follow-up among women with a negative screen=5%, estimated ratio of screen-positive to screen negative women=1:19) resulted in a desired sample size of 460 women. However, the interim sample-size analysis scheduled at the halfway point indicated that a sufficient sample size had been achieved and no further cohorts were entered (revised rate of physical violence in women with a negative screen=2.5%; revised ratio of screen positive to screen negative=1:10.5; α, β, and effect size unchanged).[26]

Violence Screen

The following three questions in the Colorado BRFSS constituted the violence screen: (1) "Thinking back over the past year, on any occasion were you hit, slapped, kicked, raped, or otherwise physically hurt by someone you know or knew intimately, such as a spouse, partner, ex-spouse or partner, boyfriend, girlfriend, or date?" (All BRFSS participants answered a more general question regarding past-year exposure to physical violence. However, perpetrator information was sought only for "the most recent occasion."); (2) "Considering your current partners or friends, or any past partners or friends, is there anyone who is making you feel unsafe now?"; and (3) "In the past year, have the police ever been called to your home because of a fight or argument, no matter who was fighting or who was at fault?" A "yes" response to one or more of the three items constituted a "positive" screen. A recent study found that the test–retest reliability of the violence screening questions was high (κ>0.79).[27]

Follow-up Interview

Follow-up telephone calls were attempted after 3 months had passed since the BRFSS screen. Trained interviewers met frequently to address questions about survey data and women's responses. Interviewers were blinded to respondents' demographic data and violence screen responses. Repeated attempts at various times were made in order to reach each woman. If women could not be contacted within 5 months of the BRFSS interview, no further attempts were made and they were classified as "unable to be contacted."

Prior to the follow-up interview, each participant was asked: "Is this a quiet, private time to talk?" Then, consent was obtained and the follow-up survey administered. Interviewers were cognizant of the potential risk to study participants[28] and had a plan to assess for danger and intervene (call police) if necessary. During the study, no participants reported imminent danger. Finally, all women were offered a brief intervention that included the opportunity for education, safety information, and a community referral.

The follow-up survey included the Conflict Tactics Scale (CTS)[29–31] verbal aggression scale (6 items), physical violence scale (3 items), and severe physical violence scale (6 items). The sexual coercion scale (7 items) and injury items (6 items) from the Revised CTS2[30] were also included. CTS items range in severity from low in coerciveness (i.e., "How many times has your partner insulted or swore at you?") to severe physical violence (i.e., "How many times has your partner stabbed you with a knife or fired a gun at you?"). Women were asked to "Think back over the past months since the [earlier] survey" and to report "How many times your

partner has done each of the behaviors I will be listing." To facilitate accurate recall, women were reminded of the date of the baseline BRFSS screen, and the time period was anchored with reference to holidays and seasons.

Because CTS questions refer to a particular partner, the questions were repeated for each partner (current or past) with whom a woman had any type of contact since the BRFSS interview; scores were summed across all partners. Women were classified as "abused" based on Straus and Sweet's[31] cutoffs of 13 or more verbally aggressive events or one or more physically violent, severe physically violent, or sexually coercive events. Women who reported having had no contact with any partner in the time period since the BRFSS interview were considered "not abused" on all violence outcome measures. The circumstances for "partner contact" were broad; women were asked: "Do you have a partner, or have you had any contact, including telephone calls, since [the BRFSS interview date], with a current or past partner? By partner I mean boyfriend, husband, lover, ex-boyfriend, someone you are separated or divorced from, or a lesbian partner?" The accuracy of this response was examined by asking women without partner contact during the follow-up period if they had ever been exposed to partner violence and, if so, when the most recent occasion was. No woman in the sample without partner contact reported partner violence exposure during the follow-up period.

Data Analysis

In this study, the predictor variable of interest was the three-question violence screen included in the BRFSS. The outcome variables were the CTS verbal aggression, physical violence, severe physical violence, and sexual coercion scale scores measured 3 to 5 months after the initial screen. We calculated relative risks and 95% confidence intervals (CIs) to test whether a positive screen for violence indicated higher risk for verbal, physical, severe physical, or sexual abuse compared to women who screened negative. In addition, we used a multivariate logistic regression model to test whether a positive screen was an independent predictor of any physical violence in the follow-up period. These results are presented as adjusted odds ratios (ORs) and 95% CIs. Finally, we tested the performance of the violence screen using standard test statistics; we calculated sensitivity, specificity, and positive and negative predictive values.

Results

A total of 695 adult women (aged 18 to 93 years) participated in the Colorado BRFSS during the 8-month study period. Of these, 679 women completed the violence screen (item response=98%). Fifty-seven women (8.4%; 95% CI=6.3–10.5) had a "positive" violence screen (Table 1); overlap among the screen items is diagrammed in Figure 1. A total of 509 women (73% of the original cohort) agreed to have their telephone number forwarded to the researcher; 409 women (59% of the original cohort) were contacted and agreed to participate in the follow-up interview. There were no demographic differences between the 409 women who participated in the follow-up interview and the 286 nonparticipants (Table 2). The percentage of women who initially screened positive for violence did not vary significantly between participants and nonparticipants (8% vs 9%, respectively, $p=0.71$).

Table 1. Results of BRFSS violence screen (n = 679)

	n	%	95% CI
Physical or sexual violence in the past year[a]	29	4.3	2.7–5.8
Feeling unsafe[b]	19	2.8	1.6–4.0
Police have been called to home[c]	30	4.4	2.9–6.0
Positive violence screen	57	8.4	6.3–10.5

[a] "Thinking back again over the past year, on any occasion were you hit, slapped, kicked, raped, or otherwise physically hurt by someone you know or knew intimately, such as a spouse, partner, ex-spouse or partner, boyfriend, girlfriend or date?"
[b] "Considering your current partners or friends, or any past partners or friends, is there anyone who is making you feel unsafe now?"
[c] "In the past year, have the police ever been called to your home because of a fight or argument, no matter who was fighting or who was at fault?"
BRFSS, Behavioral Risk Factor Surveillance System; CI, confidence interval.

Among the 409 women followed up, the length of time between the baseline BRFSS and follow-up interviews varied from 3.0 to 5.9 months; 77% of the women were contacted in the 4th month after the BRFSS (3 to 3.9 months of exposure), 18% in the 5th month (4 to 4.9 months of exposure), and 5% in the 6th month (5 to 5.9 months of exposure). Outcome data were collected regarding a single partner for 274 women (67%) and for two partners for 21 women (5%). A total of 112 women (27.5%) reported having

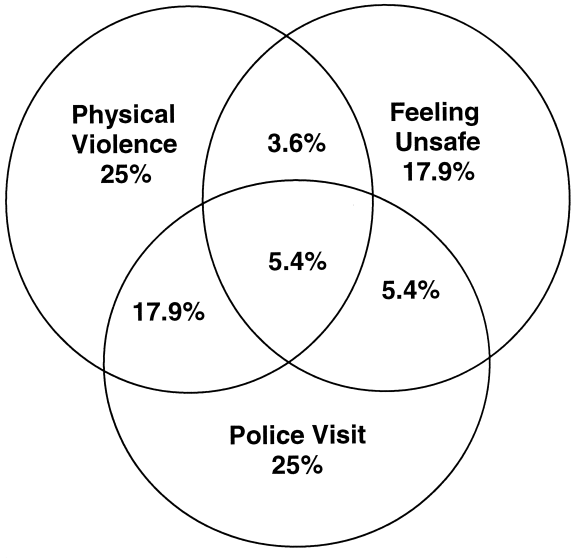

Figure 1. Positive screening profile of behavioral risk-factor surveillance respondents (n=57)

Table 2. Participants in follow-up interview versus all other BRFSS respondents

Demographic variables	Participant $n = 409$ (59%)	Nonparticipant $n = 286$ (41%)	p
Age (mean ± SD)	46 ± 16	48 ± 19	.10
Marital status			
Married	53%	48%	.44
Divorced	18%	15%	
Widowed	10%	15%	
Separated	2%	3%	
Never been married	14%	16%	
Unmarried couple	3%	3%	
Race			
White	91%	88%	.78
Black	4%	4%	
Asian/Pacific Islander	2%	2%	
American Indian/ Alaskan Native	1%	1%	
Other	3%	4%	
Hispanic or Spanish origin	12%	12%	.94
Region			
Denver metro	52%	57%	.10
Other metro	29%	30%	
Rural	19%	13%	
Education			
≤Grade 8	2%	5%	0.06
Grade 9–11	5%	6%	
Grade 12 or GED	24%	31%	
Some college	32%	29%	
College graduate	37%	29%	
Income (household annual)			
<$10,000	6%	7%	0.08
$10,000–$14,999	6%	7%	
$15,000–$19,999	9%	8%	
$20,000–$24,999	10%	16%	
$25,000–$34,999	17%	16%	
$35,000–$49,999	22%	17%	
$50,000–$74,999	12%	11%	
≥$75,000	16%	11%	
Don't know	3%	7%	

BRFSS, Behavioral Risk Factor Surveillance Survey; GED, general equivalency diploma; SD, standard deviation.

no contact with any current or past partner in the follow-up period and were, therefore, assigned violence outcome measures of zero (0). Item nonresponse was rare (1.5%).

Outcome Violence Data

Based on all women who participated in the follow-up interview, episodes of verbal aggression were relatively common; 19% (95% CI=15.2–22.8) of women reported verbal aggression during the follow-up period. Ten percent (9.9%, 95% CI=7.0–12.8) of women reported sexual coercion. Physical violence occurred less often (4%, 95% CI=2.4–6.4) and only five women (1.2%, 95% CI=0.2–2.3) reported severe physical violence; these five women had also reported physically violent events.

Overall, considering all four types of abuse measured (i.e., verbal aggression, physical violence, severe physical violence, and sexual coercion), 24% (n=95) of the women were exposed to partner abuse during the follow-up period. Injuries as a result of partner violence were rare. Five women reported one or more sprains, bruises, or cuts. Among the 18 women who were physically abused, five (28%) were injured; among the five women who were severely abused, three (60%) were injured.

Predictors of Violence

A positive BRFSS violence screen was a strong predictor of partner abuse during the follow-up period, as measured on all scales, including severe physical violence (relative risk [RR]=46.6), physical violence (RR=11.7), verbal aggression (RR=3.6), and sexual coercion (RR=2.5; Table 3). Associations between any physical violence in the follow-up period and demographic variables are shown in Table 4. Younger women and those who were separated were more likely to have been physically abused in the follow-up period. There was no difference in the length of time to follow-up between those who reported abuse on the CTS versus not (3.6±0.4 vs 3.6±0.6 months; p=0.75).

Multivariate logistic regression tested whether the violence screen was an independent predictor of future violence. Any physical violence (one or more episodes of physical or severe physical violence) in the follow-up period was the dependent variable. Age, marital status (separated vs all other categories), and the violence screen included in the BRFSS were the predictor

Table 3. Likelihood of abuse during the follow-up period based on an initial positive violence screen

	Violence screen					
	Negative ($n = 373$)		Positive ($n = 32$)			
	No.	%	No.	%	RR	95% CI
Verbal aggression (incidence = 19%)	59	16%	18	56%	3.6	2.4–5.2
Physical violence (incidence = 4%)	9	2%	9	28%	11.7	5.0–27.3
Severe physical violence (incidence = 1.2%)	1	0.3%	4	13%	46.6	5.4–405
Sexual coercion (incidence = 10%)	33	9%	7	22%	2.5	1.2–5.1

CI, confidence interval; RR, relative risk.

Table 4. Association between demographic variables and physical violence

Demographic variables	Physical violence: Positive 18 (4.5%)	Physical violence: Negative 387 (95.5%)	*p*
Age (mean ± SD)	37 ± 15	46 ± 16	0.03
Marital status			
Married	50%	53%	<0.01
Divorced	11%	17%	
Widowed	0%	11%	
Separated	22%	1%	
Never married	11%	14%	
Unmarried couple	6%	2%	
Race			
White	89%	91%	0.89
Black	5%	4%	
Asian/Pacific Islander	0%	2%	
Am Indian/Alaskan Native	0%	1%	
Other	5%	3%	
Hispanic or Spanish origin	17%	11%	0.49
Region			
Denver metro	61%	51%	0.70
Other metro	22%	29%	
Rural	17%	20%	
Education			
≤Grade 8	0%	2%	0.42
Grade 9–11	11%	6%	
Grade 12 or GED	17%	24%	
Some college	50%	31%	
College graduate	22%	38%	
Income (household annual)			
<$10,000	6%	6%	0.97
$10,000–$14,999	6%	5%	
$15,000–$19,999	11%	7%	
$20,000–$24,999	17%	10%	
$25,000–$34,999	11%	17%	
$35,000–$49,999	22%	22%	
$50,000–$74,999	6%	12%	
≥$75,000	16%	16%	
Don't know	6%	3%	

GED, general equivalency diploma; SD, standard deviation.

variables entered into the model. The adjusted ORs, indicating that a positive screen and separation from a partner are predictors of physical violence, remained large and highly significant (Table 5). Women with both characteristics were at highest risk; among women who screened positive for partner violence and were separated, 67% experienced physical violence in the follow-up period, compared to a baseline rate of 2%.

Table 5. Logistic regression model to predict physical violence[a]

	β	SE	OR	95% CI
Intercept	−2.6906	0.8914		
Positive violence screen	2.1558	0.5974	8.6	7.7–9.7
Age (continuous)	−0.0237	0.0199	1.0	0.94–1.0
Marital status (separated)	1.8208	0.8675	6.2	1.1–33.8

[a] Model χ^2 (61.86 with 3 degrees of freedom) testing the combined effect of age, violence screen, and marital status (separated) is significant with a *p* value <.001.
CI, confidence interval; OR, odds ratio; SE, standard error.

Screen Accuracy

The sensitivity of the BRFSS-administered violence screen in predicting exposure to abuse in the months immediately following the screen was high for severe physical violence (80%), but marginal to poor for the other CTS scales (Table 6). Specificity was >90% for each abuse outcome measure. Nine women with a negative violence screen experienced physical violence in the follow-up period (false negatives); eight of the nine were married at the time of the baseline interview and reported violence by a husband in the follow-up period. While 23 women with a positive BRFSS screen did not report physical violence during the follow-up period, only 13 were not exposed to any partner abuse (verbal aggression, physical violence, or sexual coercion).

Discussion

This study provides new data about the predictive validity of a brief violence screen. Using a representative, population-based sample, we found that (after adjusting for age and marital status) women who screened positive for violence were 8.6 times more likely to experience one or more physically violent assaults from a current or past intimate partner in the next 4 months. The violence screen we studied consisted of simple questions about a woman's exposure to physical assaults by a partner in the preceding year, her perceptions of safety, and police visits to her home. Prior studies of brief violence screens had demonstrated that such questions are easy to administer and are readily accepted by women.[1,11,19–21] This study extends those observations by showing that positive replies to the screening questions forecast future violence.

Our results also underscore the need to collect demographic information (age and marital status) simultaneously with any violence screen. In our study, two thirds of separated women with positive violence screens were victims of violence in the follow-up period. Thus, even though abused women separate from their partners, they do not automatically become safe. While others have similarly found a temporal association between separation and partner violence,[32–34] it is unknown whether postseparation violence is an extension of escalating violence or in direct response to a woman's decision to leave. In either case, further research is warranted, and enforcement, adjudication, and sentencing of perpetrators may need to be re-

Table 6. Accuracy of a positive violence screen in predicting partner abuse

	Incidence (%)	Sensitivity (%)	Specificity (%)	Predictive value	
				Positive (%)	Negative (%)
Verbal aggression	19	23.4	95.7	56.3	82.3
Physical violence	4	50	94	28	98
Severe physical violence	1.2	80	93	12.5	99.7
Sexual coercion	10	17	93	22	91
Any partner abuse	24	20	96	60	79

examined to help ensure women's safety at this critical time.

The BRFSS-administered violence screen accurately identified women who went on to experience severe physical violence; the negative predictive value was high for all CTS outcomes. However, the screen's sensitivity was less than ideal for identifying women who went on to experience sexual coercion, verbal aggression, and physical (not severe) violence. Intimate partner violence screens continue to be developed and tested,[35–37] with increasing attention being paid to the context in which screening is conducted.[37] This study was conducted in the community using telephone interviews, not in a healthcare setting using face-to-face interviews. The 1-year period for prevalence of physical partner violence was 4.3% among participants in this study, similar to that found in other population-based studies,[38] yet compares to rates as high as 30% in office, prenatal clinic, and emergency department studies.[6,11,12,14,39]

Strengths and Limitations

The design and methods of this study have two important strengths. First, the use of a prospective cohort design enabled us to calculate rates of violence in the follow-up period and to estimate relative risks. Second, the study took advantage of the BRFSS, a standardized, population-based survey used nationally. Our crude estimate of 8.5% for a positive violence screen compares to a weighted (for probability of selection) and age-adjusted estimate of 7.9% for Colorado women (1996–1998).[40]

There are several important limitations to this study. First, the data are based on self-reports. While the study was designed to create a safe environment, some women may have chosen not to disclose the violence in their lives. In addition, some women may have been unable to distinguish violent events as occurring before or after the baseline BRFSS interview.

Second, the overall participation rate was 59%. Although the rate of a positive violence screen did not vary between participants and nonparticipants and the two samples were similar in demographic characteristics, the results could have been affected by nonresponse bias. For example, women in abusive situations might relocate more often than non-abused women, therefore becoming lost to follow-up.

Third, this study was limited to English-speaking women residing at homes with working telephones. This study does not apply to non-English speaking women, nor to migrant, incarcerated, or homeless women—marginalized groups with higher rates of violence compared to the general population.[2] As noted above, the results of this study may not be generalizable to patients seeking care in clinical, medical offices, emergency departments, or other healthcare settings.

Fourth, cautious interpretation is necessary because of small sample sizes. The number of women in some demographic strata (5-year age, marital status, and income groups) was often less than five, prohibiting adequate examination. The 95% CIs around some estimates were wide (e.g., adjusted odds of violence among separated women=6.2; 95% CI=1.1–33.8). Relatively small numbers of respondents had positive violence screens, and even smaller numbers reported physical violence in the ensuing months.

Fifth, exposure to partner violence was measured using the CTS. Although widely used, the CTS does not examine the meaning or motive behind behaviors, nor does it include stalking or harassment (behaviors commonly included in models of partner violence).

Finally, the screening items varied in their time reference. Past physical violence and police visits were assessed in the past year, whereas the perception of fear was current. In addition, police visits were not limited to calls for violence between partners and people may vary in their interpretation of "current partner or friend." On the other hand, perhaps the different dimensions imbedded in these three questions constitute a strength. While the past-year, physical-violence screening item was somewhat more sensitive than the other two items (28% vs 22% and 22%, respectively), the three items collectively performed better (50% sensitivity) than any other combination in predicting physical violence during the follow-up period.

Implications

This study indicates that a brief violence screen identifies women at heightened risk for future partner violence. That women with positive screens go on to

experience continuing violence reflects the well-known pattern of repeated abuse that many women endure. There are several implications for clinical practice and public health. First, the information from this study may be shared with women who screen positive in order to help them better understand their risk. For example, women may be told: "Among women who answered as you did, one out of every four went on to be pushed, grabbed, shoved, slapped, or had something thrown at them in the next 3 months." This information can assist women to identify the pattern of abuse in their lives and to make informed decisions for themselves and their children, consistent with objectives for empowering women as described by Campbell et al.[16] and Yam.[41] Second, the results of this study provide tentative support for routine screening for partner violence. Physicians and nurses often do not ask women about assaults, battering, or violence, even when treating injuries.[6,13,35] Numerous public health and professional organizations have issued "calls to action" asking that clinicians ask patients routinely about exposure to partner violence. We believe that violence screening should be included in routine health interviews because screening helps identify a subset of women at high risk of repeated abuse. Asking about violence is a strong message that health professionals believe that partner violence is a problem and that they are willing to identify and properly intervene.

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