An Intimate Partner Violence Prevention Intervention in a Nurse Home Visitation Program: A Randomized Clinical Trial

Lynette Feder, PhD,^{1,*} Phyllis Holditch Niolon, PhD,^{2,*} Jacquelyn Campbell, PhD, RN,³
Daniel J. Whitaker, PhD,⁴ Jessica Brown, MPH,⁴ Whitney Rostad, PhD,² and Sarah Bacon, PhD²

Abstract

Background: Intimate partner violence (IPV) is a significant public health problem with many negative consequences, particularly for pregnant women. This randomized trial investigated the effectiveness of an IPV preventive intervention embedded within the Nurse Family Partnership (NFP) program.

Materials and Methods: Participants enrolled over a 20-month period and were interviewed at baseline and 1- and 2-year follow-up. Eligibility criteria included first pregnancy, eligible for the nutrition program Women, Infants, and Children (WIC), English or Spanish speaking, and at least 15 years of age. All women initially referred and screened were randomized to either intervention (NFP+) or control (NFP only) condition. The final sample consisted of 238 women completing baseline assessments; retention was 81% at 2-year follow-up.

Results: Analyses indicated that there were no main effects: the intervention affected participants differently depending on their baseline experience with IPV. For physical violence victimization, an interaction between baseline victimization and treatment was found; the intervention reduced victimization at 1 year (and approached significance at 2 years), but only among women who had *not* experienced past-year physical victimization at baseline. For sexual violence victimization, another interaction emerged; women in the intervention group were more likely to report sexual violence victimization at 2-year follow-up, but only among participants who had reported sexual victimization at baseline. The only effect on IPV perpetration was psychological perpetration at 2-year follow-up; again, the treatment effect was moderated by baseline perpetration. The intervention reduced psychological perpetration for participants who were nonperpetrators at baseline, but had no effect on those reporting perpetration.

Conclusions: Overall, findings suggest that the intervention was effective in reducing some forms of violence among those not experiencing IPV at baseline, but was ineffective or potentially harmful for those already experiencing IPV.

Keywords: intimate partner violence, domestic violence, IPV prevention and/or intervention, nurse home visiting, maternal-infant health

Introduction

INTIMATE PARTNER VIOLENCE (IPV) is well established as a serious health problem; Centers for Disease Control and Prevention's (CDC's) National Intimate Partner and Sexual Violence Survey (NISVS) found 32% of American women experienced physical violence, 22% experienced severe physical violence, and 9% experienced rape from an intimate

partner in their lifetimes.¹ IPV is especially prevalent and problematic for women of childbearing age and around the time of pregnancy, as indicated by population-based surveys (e.g., the Pregnancy Risk and Monitoring System [PRAMS]). Physical or sexual assault by an intimate is experienced by 4.7% of women in the year before pregnancy and by 3.7% during pregnancy.^{2,3} Women who experience violence during pregnancy are significantly more likely to incur a range of

¹Department of Criminal Justice, The University of Central Florida, Orlando, Florida.

²Division of Violence Prevention, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Georgia.

³School of Nursing, Johns Hopkins University, Baltimore, Maryland.

⁴School of Public Health, Georgia State University, Atlanta, Georgia.

*These authors contributed equally to this article and should be considered co-first authors.

health problems, including edema, vaginal bleeding, preterm delivery, and postpartum depression. Babies born to these women are more likely to suffer low birth weight and require intensive care treatment.⁴ In addition, data from PRAMS indicate that IPV tends to resume after pregnancy, suggesting that the postpartum period is also an important period for addressing IPV.⁵

Systematic reviews have indicated that there are relatively few effective IPV prevention/intervention programs, especially in terms of programs that operate around the time of pregnancy.^{6–10} The Nurse Family Partnership (NFP), an evidence-based home visiting program for promoting maternal and child health, presents an excellent opportunity to address IPV both during and after pregnancy. NFP provides regular home visits conducted by community health nurses for low-income, first-time pregnant women beginning in the second trimester and continuing through the child's second birthday. NFP promotes healthy behaviors for the mother during and after pregnancy to increase the likelihood of positive birth outcomes, sensitive and effective parenting, and a positive life course for mother and child.¹¹

NFP was chosen as the delivery mechanism for this IPV preventive intervention for three reasons. First, NFP targets pregnant women who are at increased risk for child maltreatment based on the demographic risk factors of being young, undereducated, and economically disadvantaged, all of which are also risk factors for IPV victimization.¹² A 15-year follow-up of NFP clients found that 48% reported experiencing IPV after program completion, and IPV has been noted as a problem in other home visitation programs.^{13,14} Second, NFP's positive effects are attenuated by the presence of IPV.¹³ If an intervention to prevent IPV was embedded within NFP and was successful, it would serve the dual purpose of preventing IPV and increasing the effectiveness of NFP. Finally, NFP has been implemented nationally and internationally, providing a platform for rapid dissemination.

Therefore, embedding an effective IPV preventive intervention within a home visitation program has the potential of reaching an at-risk population, preventing IPV, and improving other program outcomes. In fact, in a recently published randomized clinical trial, a *secondary* prevention intervention for IPV was embedded within multiple home visitation programs, including NFP. In that trial, women who identified as having experienced IPV from a current or former partner during the perinatal period and who were enrolled in the home visitation program were randomly assigned to receive either the home visitation program as usual or the home visitation program plus the study's brochure-based intervention, which contained information on the cycle of violence, the Danger Assessment of homicide risk, safety planning, choices available to the participant, and local and national referrals. IPV decreased for all participants over time with women in the brochure-based group reporting significantly greater mean decreases in IPV than women in the usual care group.¹⁵

The trial presented in this article tested an IPV intervention having both a *primary* prevention (preventing violence before it starts) component delivered to all participants and a *secondary* prevention (preventing future violence after violence has already occurred) brochure-based intervention to those reporting IPV (similar to the brochure intervention implemented above) embedded within the NFP program. The

intervention was guided by empowerment theory,^{16,17} suggesting that individuals benefit from engaging in a process where they obtain information and acquire skills and resources that enable them to make decisions intentionally influencing the direction of their lives. The intervention was designed to help nurses understand, detect, and respond to IPV, and to empower women to understand IPV consequences for herself and her child and acquire the information, resources, and skills necessary to avoid IPV in their relationships. This article presents the primary outcomes from the randomized clinical trial designed to test this preventive intervention. Women referred to the NFP program were randomly assigned to receive either NFP with the preventive intervention embedded within service delivery of NFP (NFP+) or NFP as usually provided. We hypothesized that women receiving NFP+ would report less victimization and perpetration of psychological, physical, and sexual IPV at 2-year follow-up than women receiving NFP alone.

Methods

Intervention description

The intervention in this trial contained three main components: nurse training and screening assessment of IPV, a secondary prevention component for those reporting IPV, and a primary prevention component for all participants. Both interventions could be delivered in Spanish by Spanish-speaking nurses if preferred; a few participants in each group participated in Spanish. Nurses who were designated to deliver NFP+ (e.g., the "experimental" nurses) were specifically trained on IPV in general and on delivering each of the components of the IPV intervention. The "control" nurses, who delivered NFP as usual, did not receive any special training on IPV and were not aware of the details of the experimental intervention. The first component involved nurses administering a structured screening for IPV to their clients early in the program and at regular intervals thereafter. The second component represented a *secondary* prevention intervention; women who indicated to their nurse that they were experiencing IPV were administered the brochure intervention. Finally, a skill-based relationship curriculum represented the *primary* prevention component and was administered to all women receiving the experimental intervention. The components are briefly described in this study (a more detailed discussion of the NFP+ preventive intervention can be found elsewhere¹⁸):

1. Structured screening for IPV: the IPV screening assessment consisted of three standardized instruments capturing a range of abuse from current and past partners across time: the Abuse Assessment Screen (AAS)¹⁹, the Women's Experience with Battering scale (WEB),²⁰ and the control subscale of the Psychological Maltreatment of Women Inventory (PMWI)²¹. The nurse was to immediately deliver the brochure intervention if a client gave a positive response to any of the AAS items, two positive responses on the WEB, or a response of "frequently" or "very frequently" to any of the PMWI control items. NFP+ nurses administered the verbal assessment at designated time points (after the baseline survey had been conducted, typically at the fourth visit, at 6 weeks,

3 months, and 1 year postpartum), and as needed whenever IPV was suspected. It is important to note that the purpose of this screening was to give the participant a structured opportunity to report IPV experiences to her nurse and for the nurse to deliver the brochure intervention (described next) if IPV was reported. However, participant reports of IPV to her nurse in this component were not recorded and used as data in this research trial; baseline and follow-up research surveys were the source of data on IPV presented in this study.

2. Brochure-Driven Intervention: developed by Parker and colleagues,¹⁹ this brochure-based intervention was delivered by nurses when women reported IPV on the screening. This intervention helped women understand their level of IPV danger and then work with their nurses to develop a participant-directed coping/safety plan. The brochure intervention included: a discussion of power and control; administration of the Danger Assessment Scale²²; and the development of a client-driven safety plan, along with information on national and local resources for IPV.
3. Adaptation of Within My Reach (WMR) Curriculum²³: this skill-based relationship curriculum was adapted from the *Within My Reach* curriculum^{23,24} and was intended to help women better understand IPV and its consequences for their children and themselves, to teach women effective communication, decision-making, and conflict management skills that would reduce the risk of victimization and perpetration of IPV in their relationships, and provide women with an opportunity to both observe and practice these skills through role-playing with their nurse. WMR was modified in two ways: 1) the group format was modified so that it could be delivered individually within the nurse-to-client delivery method of the NFP program; and 2) the content was modified to emphasize the negative impacts of IPV on infants and children. The curriculum included 5 units focusing on understanding, building, and maintaining healthy relationships, and each unit included skills-based activities that created opportunities to learn and practice conflict management, communication, and decision-making skills.

Study design and setting

A 2-group design randomized women at the point of referral to either the experimental IPV intervention embedded within the NFP program (NFP+) or NFP as usually provided (NFP). The study took place within the Multnomah County, Oregon NFP program. All women at least 15 years of age starting NFP during a 20-month recruitment period were randomly assigned. Those randomized to NFP+ were assigned to NFP+-trained nurses. To guard against contamination, NFP+ and NFP nurses were located in different office buildings with different supervisors. All analyses were conducted as intent-to-treat based on random assignment, irrespective of the women's exposure (*i.e.*, dosage) to NFP+ or NFP.

Randomization process

All women contacting the Multnomah County NFP referral line during this period, who met NFP program criteria

(not past 28 weeks pregnant with first child, Women, Infants, and Children (WIC) eligible, and English or Spanish speaking), were assigned to NFP or NFP+ using a computerized randomization procedure. Women consented into the study only after agreeing to NFP services, which usually happened on the second or third home visit. Although randomizing after obtaining consent to a study is preferable,²⁵ we randomized at the point of client referral so that women could be assigned an intervention nurse or control nurse at the outset and not have to change nurses later. (A more detailed discussion of the process for evaluating the NFP+ intervention can be found elsewhere.²⁶)

Participants

One thousand fifty-six women were randomized to NFP+ ($n = 530$; 50.2%) or NFP ($n = 526$; 49.8%), and 330 agreed to NFP services. Of those who did not participate in NFP, 13% (142) could not be contacted, and the remainder was uninterested, ineligible, or in some cases referred to other programs due to lack of room on nurse caseloads (Fig. 1).

Of the 330 NFP participants (NFP $n = 162$ and NFP+ $n = 168$), 49 had no further contact with their nurse after consenting to the NFP program. Another 43 women who consented to participate in NFP refused to consent to the research study. There were no differences between consenting and declining women on all demographic variables except education: consenting women were more likely to have completed high school than those declining to be in the study. The final sample included 238 women (NFP $n = 105$; NFP+ $n = 133$). All women completed baseline surveys, 209 (88%) completed 1-year follow-up surveys, and 191 (80%) completed final surveys at 2-year follow-up. Baseline demographics for each group are presented in Table 1.

Research assessment procedures

Women consenting to the study were contacted by a research assistant who scheduled and conducted an audio computer-assisted self-interview (ACASI) baseline survey at the client's home or another private location. Clients were given the option of using ACASI or turning off the audio assistance and progressing through the interview on their own. NFP+ intervention components were not implemented until after the baseline assessment was conducted. Two follow-up assessments were conducted at 1 year and 2 years postbaseline. The study protocol was approved by the Institutional Review Boards at the CDC and the Multnomah County Health Department (MCHD).

Measures

The interview was composed of published, validated scales and a few measures created for the purpose of the study (*e.g.*, a relationship history questionnaire). Basic demographics, relationship history, relationship measures (*e.g.*, satisfaction, quality, communication patterns, and conflict resolution), risk factors and behaviors (*e.g.*, depression, trauma history, substance use, and delinquency), and perpetration and victimization of IPV were assessed. Perpetration and victimization of physical, sexual, and psychological IPV in the past 12 months were measured by the Conflict Tactics Scale Revised (CTS2).²⁷ The CTS2 asks participants to

FIG. 1. CONSORT diagram.

TABLE 1. DEMOGRAPHIC, EDUCATIONAL, AND INCOME ATTAINMENT AT BASELINE (N=238)

	NFP average (n=105)	NFP+ average (n=133)
Age	20.7 [4.705]	20.3 [4.040]
Race		
White, non-Hispanic ^a	38 (36.5%)	32 (24.1%)
African American	11 (10.6%)	15 (11.3%)
Hispanic/Latina ^b	44 (42.3%)	75 (56.4%)
Asian/Pacific Islander	3 (2.9%)	3 (2.3%)
Native American	1 (1.0%)	2 (1.5%)
Education		
Completed high school ^b	56 (53.8%)	51 (38.6%)
Some Post-HS education ^a	34 (32.7%)	20 (15.2%)
Annual household income ^c	4.32 [1.534]	4.21 [1.731]

^ap < 0.10.^bp < 0.05.^cIncome 1=less than or equal to \$3000, 2=3001–6000, 3=6001–9000, 4=9001–12,000, 5=12,001–15,000, 6=15,001–20,000, 7=20,001–30,000, 8=30,001–40,000, and 9=over 40,000.

NFP, Nurse Family Partnership.

report on their own perpetration behaviors and their partner's perpetration (their victimization) following conflict. For this study, the CTS2 subscales for psychological aggression (8 items), physical assault (12 items), and sexual coercion (7 items) were examined. Evaluation of the revised scale has found high internal consistency within scales and good validity.²⁷

Analytic approach

To model impacts of NFP+ on IPV, we dichotomized the victimization and perpetration outcomes, to indicate endorsement of any item in each subscale, and used logistic regression models to predict likelihood of victimization and perpetration of physical, psychological, and sexual IPV at each follow-up time point. The outcome variables were dichotomized because of extreme positive skewness of the distributions of these variables due to excess zeros. We tested each model using continuous outcome variables with regression, but the model results did not differ substantially; so

we opted for the use of logistic regression and dichotomized outcomes due to the zero-inflated distributions and for ease of interpreting results.

The original models tested the hypothesized main effects of the intervention on the six outcome variables, controlling for baseline experience with perpetration or victimization of the type of violence being examined in that model (*e.g.*, in the model predicting victimization of physical IPV at 2-year follow-up based on exposure to the intervention, we controlled for baseline reports of victimization of physical IPV). Because of the amount of variance accounted for in each model by baseline victimization or perpetration on the outcome variable, additional exploratory models that were not originally hypothesized tested the interaction of baseline (last 12 months) reports of the particular type of IPV with treatment group. Predictors were baseline perpetration or victimization of the particular type of IPV, treatment group, and the interaction term between baseline perpetration/victimization and treatment group. While the decision to test the interaction of baseline level of that type of IPV with intervention status was made based on the amount of variance that baseline levels accounted for in each of the models, there is precedent in the literature for this decision; other IPV prevention interventions have found that effects of the intervention on certain types of violence were moderated by prior experience with that type of IPV.²⁸ In addition, the intervention package contained two different interventions, one targeting all participants and the other targeting women who were experiencing severe violence. Thus, it made conceptual sense that the intervention package could have a different impact on women who were versus were not experiencing violence at baseline.

Results

Table 1 compares NFP+ and NFP women on basic demographics. Significant between-group differences were found for ethnicity and educational attainment; women in the NFP group were less likely to be Hispanic and more likely to have completed high school. All subsequent analyses controlled for ethnicity and education; however, results were not different from the more basic, parsimonious analyses, and these variables were subsequently dropped from the model in the interest of parsimony and preserving statistical power.

Table 2 reports the proportion of women reporting each type of IPV victimization and perpetration, respectively. It is important to note that most women reporting victimization of each type of violence at each time point also reported perpetration of that type of violence, indicating that much of the reported IPV in this survey seems to be reciprocal. For example, of the 207 women who reported IPV victimization at baseline, 94.7% also reported perpetrating IPV against their partners.

Table 3 shows victimization and perpetration rates for each type of violence by treatment condition and baseline victimization or perpetration status. Nonvictims were those reporting no IPV victimization at baseline and victims were those reporting any victimization at baseline. Thus, the rows of the tables show percent of nonvictims (or nonperpetrators) who became victims (or perpetrators) at 1- and 2-year follow-up.

Tables 4 and 5 report the results of logistic regression analyses, predicting the dichotomous outcomes of physical,

TABLE 2. PROPORTION OF SAMPLE REPORTING VICTIMIZATION AND PERPETRATION

	NFP	NFP+
Victimization		
Psychological IPV		
Baseline	66.7% (68/102)	61.4% (81/132)
Year 1 follow-up	67.7% (63/93)	66.4% (77/116)
Year 2 follow-up	65.9% (56/85)	60.9% (64/105)
Physical IPV		
Baseline	31.4% (32/102)	23.4% (31/132)
Year 1 follow-up	36.6% (34/93)	26.7% (31/116)
Year 2 follow-up	31.8% (27/85)	27.6% (29/105)
Sexual IPV		
Baseline	30.3% (31/102)	22.7% (30/132)
Year 1 follow-up	31.2% (29/93)	27.6% (32/116)
Year 2 follow-up	23.5% (20/85)	26.7% (28/77)
Perpetration		
Psychological IPV		
Baseline	71.6% (73/102)	68.9% (91/132)
Year 1 follow-up	66.7% (62/93)	69.0% (80/116)
Year 2 follow-up	68.2% (58/85)	62.9% (66/105)
Physical IPV		
Baseline	33.3% (34/102)	28.8% (38/132)
Year 1 follow-up	38.7% (36/93)	31.0% (36/116)
Year 2 follow-up	31.8% (27/85)	26.7% (28/105)
Sexual IPV		
Baseline	21.6% (22/102)	9.8% (13/132)
Year 1 follow-up	19.3% (18/75)	16.4% (19/116)
Year 2 follow-up	14.1% (12/73)	13.3% (14/105)

IPV, intimate partner violence.

psychological, and sexual IPV victimization and perpetration, respectively, at the 1- and 2-year follow-up assessments. In Model 1, we included treatment group (NFP/NFP+) and baseline victimization (yes/no). A significant treatment effect would indicate differences between the control (NFP) and intervention (NFP+) groups with a negative coefficient indicating reduced violence in the NFP+ group relative to the NFP group. Model 2 added the interaction between treatment group and baseline victimization; a significant interaction term would indicate that treatment effect differed as a function of initial victimization status.

Hypothesized models

As indicated in Tables 4 and 5, there were no main effects of the NFP± intervention on any of the three IPV victimization or on any of the three IPV perpetration outcomes after controlling for baseline experience with the IPV outcome variable. NFP± and NFP participants did not differ significantly on physical, sexual, or psychological victimization or perpetration in the hypothesized models.

Exploratory models

Table 4 indicates that for physical victimization, an interaction between baseline victimization and treatment group was statistically significant at both the 1- ($b = 1.754$) and 2-year ($b = 1.892$) follow-up. Probes of these interactions showed that, at 1-year follow-up, intervention participants with no victimization at baseline were less likely to be victimized at the

TABLE 3. VICTIMIZATION AND PERPETRATION RATES FOR PHYSICAL, PSYCHOLOGICAL, AND SEXUAL VIOLENCE BY TREATMENT GROUP AND BASELINE VICTIMIZATION OR PERPETRATION

	<i>Physical IPV</i>		<i>Psychological IPV</i>		<i>Sexual IPV</i>	
	<i>% victim or perpetration at 1 year</i>	<i>% victims perpetration at 2 years</i>	<i>% victim or perpetration at 1 year</i>	<i>% victim or perpetration at 2 years</i>	<i>% victim or perpetration at 1 year</i>	<i>% victim or perpetrations at 2 years</i>
Baseline nonvictims (0% at baseline)						
NFP+	15.6%	17.1%	31.1%	27.5%	22.0%	17.5%
NFP	31.7%	29.8%	43.7%	44.8%	20.3%	21.1%
Baseline victims (100% at baseline)						
NFP+	68.0%	68.2%	88.9%	81.3%	50.0%	58.3%
NFP	48.1%	40.0%	82.8%	77.4%	53.8%	28.0%
Baseline nonperpetrators (0% at baseline)						
NFP+	15.7%	13.3%	29.4%	22.6%	15.2%	11.6%
NFP	29.51%	26.8%	31.0%	52.0%	12.9%	9.7%
Baseline perpetrators (100% at baseline)						
NFP+	71.9%	62.1%	85.1%	79.5%	30.0%	33.3%
NFP	62.1%	42.3%	83.6%	75.4%	40.0%	25.0%

1-year follow-up (NFP+ = 15.6% vs. NFP = 31.7%, OR = 0.40, 95% CI = 0.18–0.86). At 2-year follow-up, a similar pattern emerged and approached statistical significance: intervention participants without baseline victimization trended toward reduced victimization (NFP+ = 17.1% vs. NFP = 29.8%; OR = 0.48, 95% CI = 0.22–1.09, $p = 0.08$), whereas intervention participants with baseline victimization trended toward increased victimization (NFP+ = 68.2% vs. NFP = 40.0%; OR = 3.2, 95% CI = 0.97–10.69, $p = 0.06$).

No significant intervention effect (alone or in interaction with baseline victimization) was found for psychological victimization at either time point. For sexual victimization, no intervention effects were found at 1-year follow-up, but at 2-year follow-up, there was a significant interaction. Probes of the interaction showed that for intervention participants

without baseline sexual violence victimization, there was no change in likelihood of victimization (NFP+ = 17.5% vs. NFP = 21.0%; OR = 0.79, 95% CI = 0.34–1.88, $p = 0.60$). However, for intervention participants with baseline victimization, there was an increased risk of sexual victimization (NFP+ = 58.3% vs. NFP = 28.0%; OR = 3.60, 95% CI = 1.09–11.86, $p = 0.03$).

Table 5 presents the results for perpetration of IPV. For physical perpetration, no treatment effect was found at follow-up. For psychological perpetration, no treatment effect was found at 1-year follow-up, but at the two 2-year follow-up, a Treatment $\times$ Baseline Perpetration interaction was found. Probes of the interaction showed that among intervention participants without baseline perpetration, the intervention was associated with reduced perpetration of

TABLE 4. LOGISTIC REGRESSIONS PREDICTING VICTIMIZATION (COEFFICIENT [STANDARD ERROR])

	<i>1-Year follow-up</i>		<i>2-Year follow-up</i>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 1</i>	<i>Model 2</i>
Physical victimization				
Baseline victimization	1.536 (0.343) ^a	0.691 (0.471)	1.363 (0.358) ^a	0.450 (0.501)
Treatment (ref = NFP)	−0.355 (0.321)	−0.926 (0.397) ^b	−0.113 (0.337)	−0.748 (0.412) ^c
Interaction		1.754 (0.700) ^b		1.892 (0.739) ^b
Pseudo R^2	0.105	0.133	0.078	0.112
Psychological victimization				
Baseline	2.368 (0.348) ^a	1.812 (0.498) ^a	1.981 (0.341) ^a	1.436 (0.497) ^a
Treatment (ref = NFP)	−0.064 (0.350)	−0.544 (0.480)	−0.210 (0.343)	−0.762 (0.515)
Interaction		1.023 (0.702)		0.999 (0.689)
Pseudo R^2	0.232	0.240	0.184	0.193
Sexual victimization				
Baseline	1.389 (0.346) ^a	1.521 (0.501) ^a	1.199 (0.366) ^b	0.377 (0.551)
Treatment (ref = NFP)	0.016 (0.3261)	0.099 (0.401)	0.316 (0.366)	−0.229 (0.438)
Interaction		−0.254 (0.694)		1.510 (0.750) ^b
Pseudo R^2	0.077	0.077	0.058	0.078

^a $p < 0.001$.

^b $p < 0.05$.

^c $p < 0.10$.

TABLE 5. LOGISTIC REGRESSIONS PREDICTING PERPETRATION (COEFFICIENT [STANDARD ERROR])

	1-Year follow-up		2-Year follow-up	
	Model 1	Model 2	Model 1	Model 2
Physical perpetration				
Baseline	2.007 (0.341) ^a	1.752 (0.395) ^a	1.548 (0.350) ^a	1.230 (0.406) ^b
Treatment (ref = NFP)	-0.362 (0.327)	-0.553 (0.363)	-0.191 (0.346)	-0.468 (0.391)
Interaction		0.717 (0.593)		0.928 (0.606)
Pseudo R ²	0.176	0.182	0.105	0.116
Psychological perpetration				
Baseline	2.535 (0.360) ^a	2.428 (0.530) ^a	1.849 (0.351) ^a	1.042 (0.505) ^b
Treatment (ref = NFP)	-0.038 (0.356)	-0.077 (0.550)	-0.322 (0.342)	-1.312 (0.587) ^b
Interaction		0.197 (0.721)		1.542 (0.723) ^b
Pseudo R ²	0.247	0.247	0.152	0.173
Sexual perpetration				
Baseline	1.259 (0.449) ^b	1.508 (0.580) ^a	1.222 (0.511) ^b	1.135 (0.672)
Treatment (ref = NFP)	0.049 (0.388)	0.198 (0.448)	0.257 (0.460)	0.201 (0.536)
Interaction		-0.639 (0.941)		0.205 (1.026)
Pseudo R ²	0.036	0.038	0.028	0.028

^a $p < 0.001$.^b $p < 0.05$.

psychological violence (NFP+ = 22.6% vs. NFP = 52.0%; OR = 0.27, 95% CI = 0.08–0.85, $p = 0.02$), whereas for intervention participants with baseline perpetration, no association was found (NFP+ = 79.4% vs. NFP = 75.4%; OR = 1.26, $p = 0.59$). No treatment effect or interaction was found for sexual violence perpetration.

Discussion

The purpose of this study was to develop, implement, and rigorously evaluate an experimental intervention targeting the primary and secondary prevention of IPV. We hypothesized that women in the NFP ± intervention would report less physical, sexual, and psychological perpetration and victimization than women in NFP as usually delivered, and the results did not fully support this hypothesis, as there was no main effect of the intervention on any of these outcomes. Exploratory findings examining interaction effects suggest two positive *primary* prevention effects for violence; NFP+ reduced the likelihood of physical IPV victimization and psychological abuse perpetration among women reporting no instances of those behaviors at baseline. However, the intervention failed to demonstrate a *secondary* prevention effect; it was not effective among those who had experience with IPV at the beginning of the study. In fact, for one outcome, it appeared to have a significant iatrogenic effect; the intervention was associated with a significant increased likelihood of reporting sexual violence victimization among women already reporting sexual violence victimization at baseline.

There are several potential explanations for the differential effects of the intervention for women who had not yet experienced IPV at baseline and those who had. One possibility is that by providing a curriculum designed, in part, to enhance relationship skills, women in the NFP ± intervention were more likely to stay with their partners and work on their relationships in comparison to those in the control group (e.g., women not in violent relationships would be more

likely to stay with those nonviolent partners, and women already experiencing violence might be more likely to stay with those partners, even if the relationship remained violent). There is some indication that this may be the case; we asked women at each follow-up point whether they were still in a relationship with their baby's father, and although we cannot be sure that these were exclusive relationships (some women reported also being in relationships with other partners as well), a greater percentage of women in the intervention group responded that they were still in a relationship with the baby's father than women in the control group, giving some credit to this explanation.

Another possibility is that, women who had not already experienced violence were better able to absorb the content and engage in the relationship skills taught in the Within My Reach curriculum than women who were already experiencing violence at the start of the study. Alternatively, it may be that despite training, the NFP ± nurses were less comfortable delivering the IPV content to women whom they perhaps knew were already experiencing IPV, leading to a differential effect of the intervention.

It is also possible that the brochure-driven intervention component directed at women reporting IPV to their nurses was not sufficiently effective to meet the needs of those women. The content of the brochure-driven intervention did not focus directly on sexual IPV, and did not offer specific strategies for staying safe from sexual violence, and this was the type of IPV victimization for which the intervention appeared to have an iatrogenic effect. It is also possible, with regard to this finding, that women receiving the intervention were better able to properly identify and therefore endorse some of the sexual violence behaviors included in the CTS (e.g., pressured sex) than women not receiving the intervention, thus resulting in higher rates of reporting these behaviors at follow-up.

However, our failure to find an intervention effect among women who had experienced some form of IPV at baseline is interesting, given the findings of the DOVE study where a

similar brochure-based intervention was tested and found effective among women reporting IPV at baseline.¹⁵ Perhaps NFP and other home visitation programs should consider combining the *primary* prevention component of NFP+ (the adapted Within My Reach curriculum) only for participants not reporting a history of IPV and the training and intervention structure of the DOVE trial for secondary prevention purposes for the next test of effectiveness. Since women can easily be assessed in terms of having been victims of IPV, they can be provided with the program best fitting their histories.

This study has several important limitations. First, because of the service setting, women were randomized at referral rather than after consent. NFP+ nurses obtained a higher consent rate than NFP nurses, which might have biased the results. A lack of information about those who did not participate in NFP, and those who did not consent to participate in the study even if they participated in NFP, prevents attrition analysis at the consent stage. Second, the sample size places limits on the range of analytic approaches possible and limits our ability to detect intervention effects. In addition, we conducted separate tests for the three types of IPV and for perpetration and victimization, resulting in multiple models; it is possible that multiple tests explain our handful of significant findings, although given our low sample size, spurious findings due to multiple testing seem an unlikely explanation of findings. Third, because of low base rates of IPV reporting, we dichotomized our measure to indicate presence/absence of violence, allowing the examination of changes in levels or frequency of IPV. Fourth, because this was an effectiveness trial—conducted in a real-world setting with some flexibility in delivery—it was difficult to obtain quality measures of fidelity. We could not use the nurses' and supervisors' notes about intervention delivery due to the vast variability in the existence and quality of these notes.

Despite these limitations, the study has several strengths. Implementing an RCT in the field as part of an existing service delivery system is a challenge, but the study design was rigorous and appeared to be implemented robustly. No cases were misassigned during the randomization process. NFP+ nurses were supervised and located separately from control nurses, and there was no evidence of treatment contamination. Retention rates (88% and 81% at 1- and 2-years, respectively) were excellent for a high-risk difficult to track community-based sample.

Conclusion

The presence of a *primary* prevention effect for physical IPV and psychological IPV perpetration provides initial support for the utility of NFP+ for preventing some forms of IPV among a high-risk sample of women who are not already experiencing IPV, but it is clear that NFP+ is not appropriate, given these findings, for women who are already experiencing IPV. The NFP program is one of several home-based programs promoting maternal and child health, preventing child abuse and neglect, and fostering school readiness. Many in these programs have noted the need to address IPV as a barrier to intervention effectiveness,²⁹ and recent federal initiatives (*i.e.*, the Maternal, Infant, and Early Childhood Home Visiting Program) have expanded funding for evidence-based home visiting programs. Thus, there is a strong need to identify effective interventions for preventing IPV, which

could be implemented within a home-based setting. The rigorous research trials testing the effectiveness of this intervention and the brochure intervention evaluated by Sharps et al.¹⁵ present two interventions that could potentially be combined to address IPV in home visitation programs among women not yet versus those already experiencing IPV. However, given the mixed results of this trial, rigorous testing of any further use of any of the NFP+ intervention components is critical.

Acknowledgments

We would like to thank all the people who were involved in assisting with this study. First and foremost, we would like to offer our sincerest thanks to the women who participated in this study as well as the wonderful nurses in the Nurse Family Partnership (NFP) at Multnomah County Health Department (MCHD) in Portland Oregon. The nurses with whom we worked were dedicated to their clients and clients' children, as well as being very committed to our research methodology, design, and delivery of the intervention. We offer special thanks to Jan Walinder, Hattie Larrouy, and Robin Nelson at MCHD's NFP, who supervised the research project from the NFP side and made sure that the intervention was developed and implemented with high integrity. We offer our sincerest appreciation to David Olds and Scott Stanley, who consulted with us at the outset of this study. Finally, we would like to thank all the amazing research assistants who conducted the interviews, and our project coordinators, Sarah Chivers and Kathleen Howell, who ensured that the entire study ran smoothly. We feel fortunate to have been part of such an amazing and collaborative team. Centers for Disease Control and Prevention, Trial Registration: Clinicaltrials.gov (Identifier NCT01811719).

Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Author Disclosure Statement

No competing financial interests exist.

References

1. Breiding MJ, Smith SG, Basile KC, Walters ML, Chen J, Merrick MT. Prevalence and characteristics of sexual violence, stalking, and intimate partner violence victimization—National intimate partner and sexual violence survey, United States, 2011. *MMWR Surveill Summ* 2014;63:1–18.
2. Silverman JG, Decker MR, Reed E, Raj A. Intimate partner violence victimization prior to and during pregnancy among women residing in 26 US states: Associations with maternal and neonatal health. *American J Obstet Gynecol* 2006;195:140–148.
3. Campbell JC, Garcia-Moreno C, Sharps P. Abuse during pregnancy in industrialized and developing countries. *Violence Against Women* 2004;10:770–789.
4. Brett K, Barfield W, Williams C. Prevalence of self-reported postpartum depressive symptoms—17 states, 2004–2005. *MMWR Morb Mortal Wkly Rep* 2008;57:361–366.

5. Saltzman LE, Johnson CH, Gilbert BC, Goodwin MM. Physical abuse around the time of pregnancy: An examination of prevalence and risk factors in 16 states. *Matern Child Health J* 2003;7:31–43.
6. Kiely M, El-Mohandes AA, El-Khorazaty MN, Gantz MG. An integrated intervention to reduce intimate partner violence in pregnancy: A randomized trial. *Obstet Gynecol* 2010;115(2 Pt 1):273.
7. Ramsay J, Carter Y, Davidson L, et al. Advocacy interventions to reduce or eliminate violence and promote the physical and psychosocial well-being of women who experience intimate partner abuse. *The Cochrane Library*. 2009.
8. Tiwari A, Leung W, Leung T, Humphreys J, Parker B, Ho P. A randomised controlled trial of empowerment training for Chinese abused pregnant women in Hong Kong. *BJOG* 2005;112:1249–1256.
9. Wathen CN, MacMillan HL. Interventions for violence against women: Scientific review. *J Am Med Assoc* 2003; 289:589–600.
10. Whitaker DJ, Morrison S, Lindquist C, et al. A critical review of interventions for the primary prevention of perpetration of partner violence. *Aggress Violent Behav* 2006; 11:151–166.
11. Olds DL, Eckenrode J, Henderson CR, et al. Long-term effects of home visitation on maternal life course and child abuse and neglect. Fifteen-year follow-up of a randomized trial. *J Am Med Assoc* 1997;278:637–643.
12. King PA, Chalk R. Violence in families: Assessing prevention and treatment programs. National Academies Press, 1998.
13. Eckenrode J, Ganzel B, Henderson CR, Jr., et al. Preventing child abuse and neglect with a program of nurse home visitation: The limiting effects of domestic violence. *J Am Med Assoc* 2000;284:1385–1391.
14. Duggan A, Fuddy L, Burrell L, et al. Randomized trial of a statewide home visiting program to prevent child abuse: Impact in reducing parental risk factors. *Child Abuse Negl* 2004;28:625–645.
15. Sharps PW, Bullock LF, Campbell JC, et al. Domestic violence enhanced perinatal home visits: The DOVE randomized clinical trial. *J Women's Health (Larchmt)* 2016; 25:1129–1138.
16. Rappaport J. Terms of empowerment/exemplars of prevention: Toward a theory for community psychology. *Am J Community Psychol* 1987;15:121–148.
17. Zimmerman MA. Empowerment theory. *Handbook of community psychology*. Springer, 2000:43–63.
18. Niolon PH, Whitaker DJ, Feder L, et al. A multicomponent intervention to prevent partner violence within an existing service intervention. *Prof Psychol Res Pract* 2009;40:264.
19. McFarlane J, Parker B, Soeken K, Bullock L. Assessing for abuse during pregnancy: Severity and frequency of injuries and associated entry into prenatal care. *JAMA* 1992;267: 3176–3178.
20. Smith PH, Smith JB, Earp JAL. Beyond the measurement trap: A reconstructed conceptualization and measurement of woman battering. *Psychol Women Q* 1999;23:177–193.
21. Tolman RM. The development of a measure of psychological maltreatment of women by their male partners. *Violence Vict* 1989;4:159–177.
22. Campbell JC, Webster DW, Glass N. The danger assessment: validation of a lethality risk assessment instrument for intimate partner femicide. *J Interpers Violence* 2009; 24:653–674.
23. Pearson M, Stanley S, Kline G. Within my reach instructor manual. Greenwood Village, CO: PREP, 2005.
24. Markman HJ, Stanley S, Blumberg S, Jenkins N, Whiteley C. Twelve hours to a great marriage. San Francisco: Jossey-Bass, 2004.
25. Boruch RF. Randomized experiments for planning and evaluation: A practical guide, vol. 44. Thousand Oaks, CA: Sage, 1997.
26. Feder L, Niolon PH, Campbell J, Wallinder J, Nelson R, Larrouy H. The need for experimental methodology in intimate partner violence: Finding programs that effectively prevent IPV. *Violence Against Women* 2011;17:340–358.
27. Straus MA, Hamby SL, Boney-McCoy S, Sugarman DB. The revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *J Fam Issues* 1996;17: 283–316.
28. Foshee VA, Bauman KE, Ennett ST, Linder GF, Benefield T, Suchindran C. Assessing the long-term effects of the Safe Dates program and a booster in preventing and reducing adolescent dating violence victimization and perpetration. *Am J Public Health* 2004;94:619–624.
29. Duggan A, McFarlane E, Fuddy L, et al. Randomized trial of a statewide home visiting program: Impact in preventing child abuse and neglect. *Child Abuse Negl* 2004;28:597–622.

Address correspondence to:
 Phyllis Holditch Niolon, PhD
 Division of Violence Prevention
 Centers for Disease Control and Prevention
 4770 Buford Highway, MS F-63
 Atlanta, GA 30341
 E-mail: pnionol@cdc.gov