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ORIGINAL ARTICLE

Racial and Ethnic Disparities in the Effects of Group Prenatal Care On Identification of Intimate Partner Violence: Findings from a Randomized Controlled Trial of CenteringPregnancy

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Abstract

Purpose Intimate Partner Violence (IPV) during pregnancy can have serious consequences for maternal, infant, and child health. Importantly, the risk and consequences of IPV are greater for Black and Hispanic pregnant individuals than for White pregnant individuals. Thus, identification of IPV and referral to services during pregnancy is important, particularly for Black and Hispanic patients. Continuity of care and patient-centered care are thought to be essential for the identification of IPV in healthcare settings. Thus, we proposed that group prenatal care, which involves prenatal care providers delivering health, education, and support services to patients in a group setting, would create an atmosphere that is conducive to the identification of IPV. We specifically expected to see this effect among Black and Hispanic patients because group prenatal care has been hypothesized to increase the quality of the provider-patient relationship and reduce clinical bias against patients of color.

Methods We conducted a secondary analysis of data from a randomized controlled trial of CenteringPregnancy ($N = 523$).

Results We found that group prenatal care does have a significant, positive effect on IPV identification among prenatal care patients, but only for White women. Members of other racial and ethnic groups, who are at increased risk of experiencing IPV and its harmful consequences, do not receive this benefit.

Conclusions Moving forward, researchers and practitioners should establish whether group prenatal care could be improved by intentionally incorporating a curriculum that directly addresses racial and ethnic disparities in quality of healthcare.

Trial Registration Number and Date NCT02640638 (Prospectively registered 12/29/2015).

Keywords Group prenatal care · Pregnancy · Intimate partner violence · Race · Ethnicity

Introduction

Intimate partner violence (IPV) is a common and dangerous complication of pregnancy. Findings from a systematic review and meta-analysis of cross-national research indicate the average prevalence of IPV during pregnancy is 18.7% for psychological abuse, 9.2% for physical abuse, and 5.5% for sexual abuse (Román-Gálvaz et al., 2021). These rates are problematic, as IPV during pregnancy is associated with a number of adverse maternal health, birth, and child health outcomes including increased risk for postpartum depression, anxiety, post-traumatic stress disorder, low birthweight, preterm birth, perinatal death, and childhood/adolescent behavior problems (Beydoun et al., 2012; Donovan et al., 2016; Hill et al., 2016; Howard et al., 2013; Pastor-Moreno et al., 2020; Shah & Shah, 2010; Silva et al., 2018).

Importantly, there is evidence of racial and ethnic disparities in both the risk and consequences of IPV during pregnancy. Past research has indicated that, compared to White people, Black and Hispanic people exhibit significantly greater risk of experiencing IPV during pregnancy

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(Bohn et al., 2004; Campbell et al., 2021; Kivisto et al., 2022; Silverman et al., 2006). Additionally, among those experiencing IPV during pregnancy, studies indicate Black and/or Hispanic people are at greater risk than White people of adverse outcomes such as hypertension, gestational diabetes, fetal growth restriction, intrauterine fetal demise, low birthweight, and preterm birth (Alhusen et al., 2014; Greely et al., 2022).

Given these adverse consequences of IPV during pregnancy, it seems reasonable to suggest that routine universal screening of prenatal care patients who present no apparent signs or symptoms may be an important first step for identification and intervention (Chisholm et al., 2017). That is, since risk factors for IPV are not always apparent to practitioners, universal screening may facilitate broader identification of IPV among prenatal care patients. Furthermore, in light of the aforementioned racial and ethnic disparities in risk and consequences of IPV during pregnancy, screening people of color may be especially important. Yet, there is a lack of consensus on the benefits of routine IPV screening in healthcare settings.

IPV Screening and Prenatal Care Patients

Currently, there is general disagreement among US-specific and global medical organizations regarding the benefits of routinely screening pregnant patients for IPV (Chisholm et al., 2017). For example, whereas the American College of Obstetricians and Gynecologists (ACOG) and the US Prevention Services Task Force have recommended routine IPV screening of prenatal care patients (ACOG, 2012; US Prevention Services Task Force, 2018), The World Health Organization has stated the available evidence does not justify routine screening (World Health Organization, 2013). This divergence in recommendations is not surprising considering the discrepancy in evidence for immediate versus long-term benefits of screening for IPV in clinical settings.

A Cochrane systematic review and meta-analysis of the available research indicates that screening women for IPV in clinical settings significantly increases the odds of identification of IPV by healthcare providers (OR = 2.95, 95% CI [1.79, 4.87]), with subgroup analyses indicating this effect is especially pronounced among prenatal care patients (OR = 4.53, 95% CI [1.82, 11.27]) (O'Doherty et al., 2015). This meta-analysis found no harmful effects of screening, but also found no significant effects on long-term benefits such as referral to IPV support services, decreases in IPV, or improvements in the health of the pregnant patient. Yet, since this meta-analysis did not include race and ethnicity as potential moderators of the effects of IPV screening, differential outcomes for subgroups are largely unknown.

Considering the mixed evidence and inconsistent recommendations for routine IPV screening, it is not necessarily surprising that a review of the literature indicated less than half of frontline healthcare providers routinely screen women (prenatal patients or otherwise) for IPV, and only 45–85% screen in the presence of injury (Alvarez et al., 2016). This particular review indicated that, when screenings are performed, approaches range widely from face-to-face formats such as posing nonthreatening questions (e.g., "How are you feeling?") or posing direct questions (e.g., "Are you a victim of domestic violence?") to using official self-guided screening tools (e.g., screening, brief intervention, and referral to treatment [SBIRT]).

The existing research indicates there is no significant difference in identification of IPV when screenings are conducted in face-to-face format, self-guided written format, or self-guided computer format (Hussain et al., 2015; O'Doherty et al., 2015). However, a synthesis of qualitative research indicates that women who are survivors of IPV prefer that healthcare providers raise the issue in a sensitive and confident manner; do not rush the conversation; confirm that violence is unacceptable; bolster the patient's confidence; and allow patients to progress at their own pace without pressure to disclose, leave the relationship, or press charges (Feder et al., 2006). Achieving this ideal may require sufficient provider-patient interaction to facilitate rapport between healthcare providers and their patients. In fact, the authors of a recent overview of research addressing the identification of IPV in healthcare settings concluded that continuity of care and patient-centered care are essential for IPV identification (Melendez-Torres et al., 2022). Group prenatal care, which involves prenatal care providers delivering health, education, and support services to patients in a group setting may create an atmosphere that is conducive to the identification/disclosure of IPV.

Group Prenatal Care and IPV Identification

Group prenatal care was first popularized in the United States by midwife Sharon Schindler Rising, whose CenteringPregnancy program "unifies the components of prenatal care – risk assessment, education, and support within the group – and encourages women to take responsibility for their own health" (Rising 1998, p. 46). Instead of meeting individually with their healthcare provider in a private exam room for a brief ten-minute encounter, group prenatal care patients receive a medical exam in a group setting with eight to ten other patients of similar gestational age. This is followed by educational and social activities that are facilitated by the healthcare provider over 90–120 min. Typically, ten sessions are scheduled throughout pregnancy and follow a curriculum that includes not only traditional prenatal health

and childbirth preparation topics, but also discussion related to interpersonal relationships, family dynamics, stress and relaxation, and even a specific discussion of IPV. Thus, compared to individual prenatal care (IPNC) patients, group prenatal care (GPNC) patients should receive more time with their healthcare provider, social support from other patients, and a broader range of healthcare education than what is typically included in IPNC. In fact, proponents of GPNC believe this model fosters social support benefits because "meeting in a group setting with other women of the same gestational age who are experiencing similar physiological and psychological changes of pregnancy nurtures supportive relationships among patients" (Massey et al., 2006, pp. 286–287).

Although systematic reviews and meta-analyses have indicated that the empirical evidence of GPNC's benefits for physical health outcomes is mixed (Carter et al., 2016; Catling et al., 2015; Kominiarek et al., 2019), GPNC patients do tend to exhibit greater satisfaction with prenatal care than IPNC patients (Ickovics et al., 2007; Klima et al., 2009). Importantly, GPNC patients' satisfaction is related to higher rates of prenatal care attendance (Cunningham et al., 2017). In fact, a number of studies have demonstrated that GPNC patients exhibit significantly greater prenatal care attendance than IPNC patients (Francis et al., 2019; Heberlein et al., 2020; Kilma at el., 2007; Trudnak et al., 2013). Findings from one randomized controlled trial evaluating the effects of GPNC found that group patients were less likely than IPNC patients to exhibit low prenatal care attendance, defined as attending less than five visits (Francis et al., 2019). Although these findings show promise for group prenatal care, it is important to note that group patients do tend to supplement group visits with individual visits (Cunningham et al., 2016). Thus, research addressing GPNC attendance should distinguish between the number of group and individual visits patients attend.

The higher rates of GPNC patients' satisfaction and attendance may be especially beneficial for Black and Hispanic patients, who tend to experience discrimination in prenatal healthcare settings. An analysis of data from the Listening to Mothers III survey found that, compared to White prenatal care patients, Black and Hispanic patients exhibited significantly greater odds of perceived discrimination in their care (Attanasio & Kozhimannil, 2015). These perceptions of discrimination are not unwarranted, as research indicates that Black and Hispanic patients and their newborns receive lower-quality care than their White counterparts. In fact, one retrospective analysis of maternal medical records from patients who underwent Cesarean sections indicated that healthcare providers assessed and treated pain less frequently for Black and Hispanic patients in comparison to White patients (Johnson et al., 2019). Additionally, a recent systematic review of the literature concluded that babies born to Black and Hispanic mothers receive lower-quality neonatal care than babies born to White mothers (Sigurdson et al., 2019).

One recent clinical opinion proposed that GPNC can mitigate this problem by increasing the time providers spend with prenatal care patients and, thus, bridging racial, ethnic, and cultural differences that frequently exist between providers and patients. As the authors of this opinion state, "one little examined mechanism of action of GC [group care] is increasing the quantity and quality of time and communication between patients and clinicians, thereby reducing clinician bias and improving the care alliance" (Carter et al., 2021, p. 360). This recommendation has merit, as research suggests GPNC is particularly promising for Black patients. Although recent meta-analyses indicate GPNC patients exhibit similar medical outcomes as IPNC patients (Carter et al., 2016; Catling et al., 2015; Kominiarek et al., 2019), meta-analyses of subgroup data indicate group care increases breastfeeding and lowers preterm birth among Black patients (Carter et al., 2016; Robinson et al., 2018). In fact, citing the potential for GPNC to address racial disparities in perinatal outcomes, the American College of Obstetricians and Gynecologists (ACOG, 2018) noted, "individual and group care models warrant additional study with a goal of demonstrating differences in outcomes and identifying populations that benefit most from specific care models" (p, e107).

In the present study, we explore whether GPNC is associated with increased rates of IPV identification, relative to IPNC. Overall, the existing research suggests that GPNC could have both a direct and indirect effect on IPV identification. Concerning a direct effect, the format of GPNC, which involves intense provider interaction and social support, may be associated with greater probability of IPV identification. Although group settings could stifle patient disclosure of IPV in the presence of others, the close patient-provider interaction associated with GPNC may offer more opportunities for providers to observe warning signs, and could increase patients' comfort with disclosing IPV to providers outside of group sessions. Concerning an indirect effect, participating in GPNC should be associated with greater visit attendance, which in turn, may be associated with greater probability of IPV identification. Thus, we hypothesize the following:

H1 GPNC participation will be associated with greater probability of IPV identification.

H2 GPNC participation will be associated with greater levels of GPNC visit attendance which, in turn, will be associated with greater probability of IPV identification.

H3 GPNC participation will be associated with lower levels of IPNC attendance which will, in turn, be associated with greater probability of IPV identification.

As previously discussed, past research indicates that Black and Hispanic prenatal care patients are more likely than White patients to experience IPV and its adverse consequences (Alhusen et al., 2014; Bohn et al., 2004; Campbell et al., 2021; Greely et al., 2022; Kivisto et al., 2022; Silverman et al., 2006). Pairing this trend with the proposition that GPNC may mitigate providers' racial and ethnic biases towards non-White patients (Carter et al., 2020), we explore the relationship between GPNC and IPV identification separately for (1) White patients and (2) Black and Hispanic patients.

Materials and methods

This study involves secondary analysis of data collected from a randomized controlled trial (RCT) evaluating the effects of CenteringPrengancy GPNC on racial and ethnic disparities in maternal and infant health outcomes among a sample of low-risk prenatal care patients (for full details in the study protocol, see Chen et al., 2017). This five-year RCT began in 2016 and was conducted at a single site within a large South Carolina health care system. Prenatal care patients between 14 and 45 years of age who entered care before 20 weeks gestational age were eligible to participate in the trial. Patients who consented to participate in the study were randomized via computer algorithm to either a GPNC or IPNC condition, stratified by self-reported race and ethnicity. Participants were eligible to receive up to $75 in gift cards: one $25 gift card after being randomized and completing a survey and one $50 gift card after attending five prenatal care visits in their assigned condition and completing a second survey after 30 weeks of gestational age. Study participants were followed from their first/baseline prenatal care visit up until 12 weeks post-partum. The present IPV analysis was limited to the subsample of participants who enrolled during the first year of this five-year trial ($N = 558$) and, thus, completed prenatal care by the fall of 2017 prior to any effects of #MeToo and/or the COVID pandemic. Thirty-five participants were missing attendance data (likely due to dropping out) and, thus, we removed them from the analytic sample. This reduced the sample size from 558 to 523 (GPNC = 269; IPNC = 254), yielding a 93.7% retention rate. The flow of participants through the study is summarized in Fig. 1.

Treatment

Participants assigned to the IPNC condition received standard individualized care consisting of monthly visits for the first 28 weeks of pregnancy, followed by bimonthly visits until the 36th week, and then weekly visits until delivery. IPNC visits consisted of one-on-one provision of ongoing

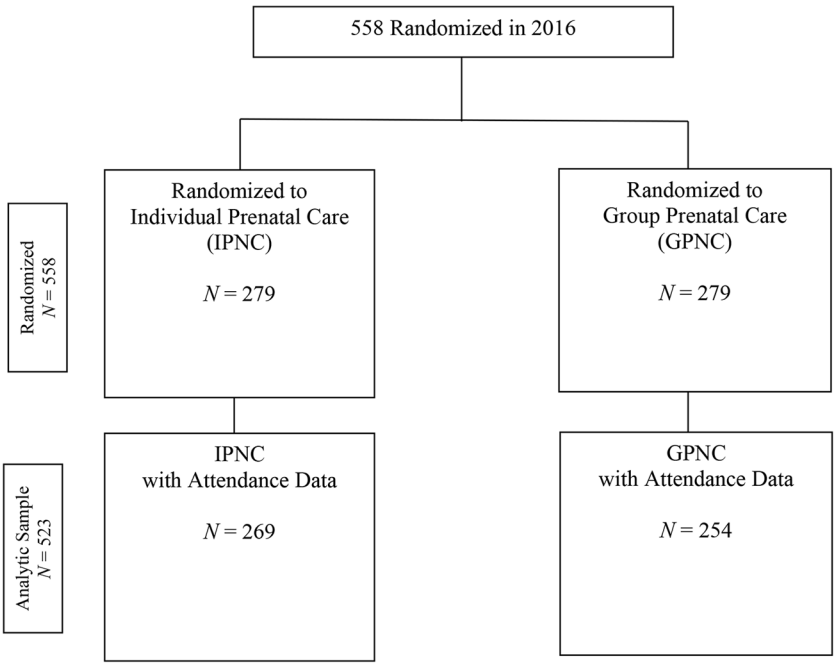

Fig. 1 CONSORT diagram depicting flow of participants through study

medical care and patient education on pregnancy (including complications), childbirth, breastfeeding, and other topics as needed.

Participants who were randomized to the treatment group met with their prenatal care provider for ten two-hour group sessions with 8 to 10 pregnant patients with similar due dates. Group sessions began around 12 to 16 weeks gestation and ran through delivery. At the beginning of each session, patients recorded their own weight and blood pressure. They then received an individual physical exam performed by their prenatal care provider, and met as a group to discuss topics outlined in the CenteringPregnancy curriculum. Topics were organized by relevancy to gestational age and included prenatal health (e.g., nutrition, body changes, gestational diabetes), relaxation/stress reduction, family relationships (e.g., family planning, violence), labor and birth (e.g., the birth experience, preterm labor), newborn care, (e.g., breastfeeding, infant safety), parenting (e.g., child development, home/family changes), and postpartum challenges. Sessions began during the second trimester and lasted for the duration of pregnancy. Patients in both the GPNC and IPNC groups were permitted to bring partners to their visits/sessions.

Measures

Data for this analysis were obtained from study participants' self-reported survey responses and electronic medical records (see Table 1 for descriptive statistics). We obtained the following from participant surveys: maternal age (i.e., age in years at time of study enrollment), gravida (i.e., number of lifetime pregnancies), primary race and ethnicity identity (i.e., White, Black, and Hispanic were the only categories represented in the sample), whether English was the participant's preferred language, participant's relationship with the father of the baby, whether the participant was living with the father of the baby, and whether the participant completed high school. As a proxy for economic status, we included a measure indicating whether participants were covered by Medicaid insurance (81.8%), with the remainder of non-Medicaid participants having private insurance (12.8%), military insurance (0.4%), other (0.2%) uninsured (0.2%), or unknown (4.6%).

Our treatment variable represented whether participants were randomized to GPNC or IPNC regardless of how many sessions/visits they attended. In addition to this main treatment variable, we also included a measure of prenatal care attendance. We extracted the number of GPNC and IPNC visits that each participant attended from medical records and dichotomized these variables to indicate whether participants attended five or more of each (i.e., five or more GPNC and five or more IPNC visits). We selected five as a threshold because this represents 50% attendance of the ten-session GPNC program, which researcher-practitioners have suggested is the rate of attendance required for GPNC patients to build group cohesion (Francis et al., 2019). Additionally, past studies have used five visits as a threshold to demarcate low prenatal care attendance, at which point demonstrated benefits of GPNC diminish (Crockett et al., 2017; Francis et al., 2019; Heberlein et al., 2020; Ickovics et al., 2016). Thus, using five visits as our attendance threshold permits examination of GPNC effects at the minimum attendance threshold established by previous research and allows comparison of our findings with those from other GPNC studies.

Our main outcome variable, IPV identification, came from a thorough review of electronic medical records conducted by the first two authors. There was no designated place in the electronic medical records for providers to identify IPV. Instead, providers noted IPV in general forms such as provider notes, phone logs, etc. Thus, the first two authors independently reviewed all documents contained in participants' electronic medical records (e.g., provider notes, social worker notes, SBIRT forms, ER documents, phone call logs, messages sent via the patient portal) while adhering to a codebook.

We coded each medical record independently, indicating whether IPV was identified and then collaborated to reconcile coding, resolving disagreements via discussion and consensus. Initial coding revealed four sources of IPV identification: provider notes, social worker notes, SBIRT forms, and ER notes. The process and likelihood of identifying IPV through each of these sources were similar for GPNC and IPNC patients, as well as participants of different races/ethnicities. For both GPNC and IPNC patients, provider notes were completed after scheduled visits/sessions, capturing any medical and social information that emerged during the visit/session. As part of standard prenatal care practice at the clinical trial site, all patients were referred to a consultation with a social worker and all were asked to complete a SBIRT form. Past research has indicated that IPNC patients visit the ER more frequently than GPNC patients (Kettrey & Steinka-Frye, 2020; Marton et al., 2022), which could provide increased opportunities for IPV screening and identification among IPNC patients. However, for our sample, logistic regression analysis indicated no significant difference in the odds of GPNC and IPNC patients visiting the ER (OR = 0.27, 95% CI [0.60, 1.29]).

Our codebook defined IPV as "physical, sexual, emotional, or psychological violence or controlling behavior between current or former intimate partners." Yet, the vast majority of the violence identified in medical records was physical in nature. For the purposes of this study, IPV excluded violence perpetrated by anyone who was not a

Table 1 Descriptive Statistics for Analytic Sample by Treatment Condition, $N = 523$

	Group prenatal care (GPNC) $N = 269$		Individual prenatal care (IPNC) $N = 254$		Aggregate sample $N = 523$	
	White patients ($n = 102$)	Black/Hispanic patients ($n = 167$)	White patients ($n = 103$)	Black/Hispanic patients ($n = 151$)	White patients ($n = 205$)	Black/Hispanic patients ($n = 318$)
Participant & treatment characteristics						
Total weeks prenatal care, mean (sd)	28.92 (4.95)	29.37 (4.55)	29.85 (3.63)	29.33 (4.01)	29.39 (4.35)	29.35 (4.30)
Total prenatal care visits, mean (sd)	12.16 (3.97)	12.34 (3.48)	11.70 (2.77)	11.08 (3.17)	11.93 (3.42)	11.74 (3.39)
Total GPNC visits, mean (sd)	4.61 (3.68)	5.12 (3.56)	0.02 (0.20)	0.15 (0.97)	2.30 (3.46)	2.76 (3.64)
Total IPNC visits, mean (sd)	5.56 (3.66)	5.22 (3.84)	9.68 (2.78)	8.93 (3.17)	7.63 (3.84)	6.98 (3.99)
Attended at least 1 GPNC & IPNC, %	69.61	73.05	0.97	2.65	35.12	39.62
Maternal age, mean (sd)	25.06 (4.98)	24.76 (4.99)	25.31 (5.54)	24.76 (4.38)	25.19 (5.26)	24.76 (4.70)
Gravida, mean (sd)	2.79 (1.85)	2.63 (1.68)	2.63 (1.73)	2.77 (1.63)	2.71 (1.79)	2.70 (1.65)
White, %	100.00	0.00	100.00	0.00	100.00	0.00
Black, %	0.00	72.46	0.00	73.51	0.00	72.96
Hispanic, %	0.00	27.54	0.00	26.49	0.00	27.04
English language, %	97.06	82.42	99.02	83.22	98.04	82.80
Medicaid insurance, %	85.26	84.91	87.25	86.01	86.29	85.43
Relationship with baby's father						
No relationship, %	4.90	6.59	13.59	5.30	9.27	5.97
Friends, %	0.98	10.78	7.77	17.88	4.39	14.15
Casually dating, %	4.90	8.38	1.94	7.28	3.41	7.86
Committed relationship/engaged, %	39.22	35.33	43.69	37.09	41.46	36.16
Married, %	29.41	16.17	17.48	13.25	23.41	14.78
Separated/divorced, %	0.00	0.60	0.97	1.32	0.49	0.94
Widowed, %	0.00	0.00	0.00	0.00	0.00	0.00
Unknown, %	20.59	22.16	14.56	17.88	17.56	20.13
Lives with baby's father						
Yes, %	64.71	47.31	55.34	44.37	60.00	45.91
Unknown, %	22.55	17.37	13.59	19.21	18.05	18.24
High school graduate						
Yes, %	69.61	72.46	70.87	76.16	70.24	74.21
Unknown, %	2.94	8.98	5.83	5.30	4.39	7.23
Endogenous variables						
5 or More group visits, %	55.88	64.67	0.00	1.99	27.80	34.91
5 or More individual visits, %	50.00	46.11	95.15	90.73	72.68	67.30
IPV identification, %	20.59	4.19	9.71	5.30	15.12	4.72

current or former intimate partner (e.g., childhood abuse, violence perpetrated by parents/siblings, violence perpetrated by non-family members). IPV identification could have generated from a variety of informants including patient disclosure, provider observation, family/support person disclosure, law enforcement, etc. For example, patient disclosure is illustrated in the following ER note:

> Pt. [patient] Arrives to triage With 3 sheets of paper that state she was a victim, victim assistance program, and her statement to the [local] sheriffs office. She states that her contractions started at 1800 today after the FOB [father of baby] hit her in the stomach and "hit her stomach pressing/punching on her abdomen to get the baby out". She states that she called the police and was waiting for them prior to coming to the hospital. She states that in June/July he hit her as well. Pt. Educated on risk of domestic violence. She states that she is safe at this time bc she will go home with her sister and mother [original grammar and punctuation].

In an example of a family member disclosing IPV committed against a patient, one provider note indicated, "Patient's mother states that patient's boyfriend hit patient in the face and has also hit her niece, she asked what she should do. Advised her to contact police. Also gave her SW [social worker] number to call for other measures ie OOP [order of protection] or RO [restraining order]. In a follow-up note recorded two months later, a social worker stated:

> FOB was staying with his brother which was next door to pt. He is no longer staying there and pt seldom sees him. Nurse did talk to pt and inquired about and [sic] domestic violence with fob, pt denied any abuse by him. She was given counseling info and info on [local domestic violence agency] anyway [original grammar and punctuation].

Here, a family member of the patient disclosed IPV, which the patient denied. For the purpose of our analysis, any suspicion of IPV that was noted in patient medical records constituted IPV identification regardless of whether the patient confirmed this suspicion. For example, the following ER note indicates that a patient was brought to the hospital by a sheriff who responded to an IPV call. Although the patient denied any IPV, we coded this as a positive IPV identification.

> Brought to triage by EMS, sheriff reports a call for DV [domestic violence]. Discussing with patient (alone) she states there was no alternation, no falls and denies trauma. She reports feeling very safe and states that there were two separate calls made, one by her other family member for EMS to bring her here because they were worried she was in labor and a neighbor called about some other altercation she is unaware of the details and states she was not involved [original grammar and punctuation].

Our coding of electronic medical records indicated that only 10.3% of study participants' records ($n = 54$) included an IPV identification. As a result, IPV identification across document formats (i.e., provider notes, social worker notes, SBIRT forms, ER notes) was too infrequent to permit separate statistical analyses. Considering this, along with the fact that we commonly found IPV identifications in multiple documents for a single participant, we report IPV Identification as a dichotomous variable (0 = no; 1 = yes).

Data Analysis

It is important to note that our analysis relies on the assumption that the randomization process distributed risk of IPV similarly between the GPNC and IPNC groups. By using IPV identification as our main outcome we assume that the incidence of IPV should be evenly distributed between groups and, thus, any effects of GPNC on IPV identification is assumed to represent acknowledgement of IPV rather than the actual occurrence of IPV.

The hypothesized relationships between prenatal care format (GPNC or IPNC), prenatal care attendance, and IPV identification are outlined in Fig. 2. We specifically hypothesized that GPNC would have a direct, positive relationship with IPV identification. We also hypothesized that GPNC would be positively associated with group visit attendance and negatively associated with individual visit attendance, and that both group and individual visit attendance would be positively associated with IPV identification. This figure accounts for a proposed correlation between the residual errors for group prenatal visit attendance and individual prenatal visit attendance.

To test the hypothesized relationships depicted in Fig. 2, we employed path analysis methods (Asher, 1983). We estimated path coefficients using the weighted least square means and variances (WLSMV) estimator with the probit link function for categorical outcomes in the lavaan package in R (Rosseel, 2021). We conducted this analysis on three samples: (1) the full sample, (2) the subsample of White patients, and (3) the subsample of Black and Hispanic patients. We combined Black and Hispanic patients into one subsample because the Hispanic subsample was too small for analysis by itself.

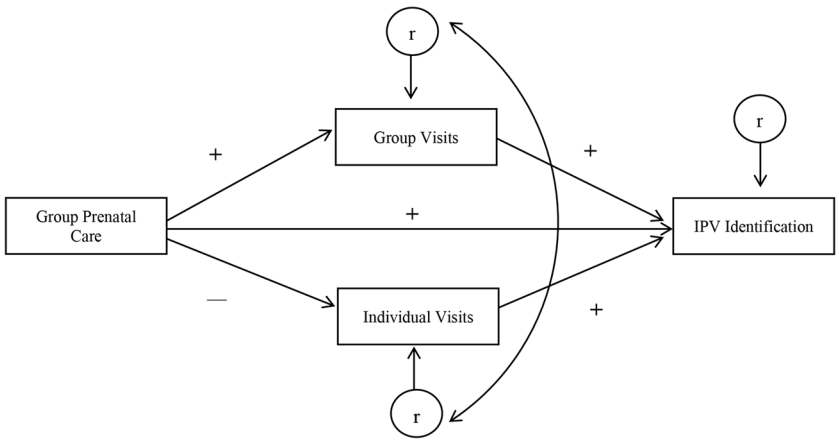

Fig. 2 Path model depicting the hypothesized relationship between group prenatal care, group and individual visit attendance, and IPV identification

Results

As presented in Table 1, IPV identification was made for 15.12% of White patients and 4.72% of Black and Hispanic patients in the aggregate sample. Within the GPNC condition, an IPV identification was made for 20.59% of White patients and 4.19% of Black and Hispanic patients. Within the IPNC condition, an IPV identification was made for 9.71% of White patients and 5.30% of Black and Hispanic patients.

Figure 3 summarizes the probit coefficients for the modeled paths using the full sample of participants ($N = 523$). Consistent with Hypothesis 1, the direct path from GPNC to IPV identification was significant and positive. However, Hypothesis 2 was only partially supported, as the path from GPNC to group visit attendance was significant and positive, but the path from group visit attendance to IPV identification was non-significant. Consistent with Hypothesis 3, the path from GPNC to individual visit attendance was significant and negative, and the path from individual visit attendance to IPV identification was significant and positive. Thus, the direct effect of GPNC on IPV identification was significant and positive (0.80 z-score units), and the indirect effect of GPNC on IPV through individual visits was significant and negative [i.e., $(-1.50)*(0.35) = -0.53$ z-score units], yielding a total negative effect of GPNC on IPV identification [i.e., $(0.80)*(-0.53) = -0.42$ z-score units]. This model fit the data well, according to Hu and Bentler's (1999) standards, with RMSEA = 0.00 and TLI = 1.00. The residual variance for IPV identification was 0.87, indicating that the model explained 13% of the variance in probability of IPV identification.

Subsample of White Patients

The probit coefficients for the modeled paths using the subsample of White patients ($N = 205$) are summarized in Fig. 4. Consistent with Hypothesis 1, the direct path from GPNC to IPV identification was significant and positive. However, Hypothesis 2 was only partially supported, as the path from GPNC to group visit attendance was significant and positive, but the path from group visit attendance to IPV identification was non-significant. Hypothesis 3 was also partially supported, as the path from GPNC to individual visit attendance was significant and negative, but the path from individual visit attendance to IPV identification was non-significant. Thus, for the subsample of White patients, the direct effect GPNC on IPV identification was significant and positive (2.70 z-score units), but both indirect effects were non-significant. This yields a total positive (2.70 z-score unit) effect of GPNC on IPV identification. This model fit the data well, according to Hu and Bentler's (1999) standards, with RMSEA = 0.00 and TLI = 1.00. The residual variance for arrest was 0.79, indicating that the model explained 21% of the variance in probability of IPV identification.

Subsample of Black and Hispanic Patients

The probit coefficients for the modeled paths using the subsample of patients of color ($N = 318$) are summarized in Fig. 5. Hypothesis 1 was not supported, as the direct path from GPNC to IPV identification was non-significant and negative. Hypotheses 2 was partially supported. The path from GPNC to group visit attendance was significant and positive, but the path from group visit attendance to IPV identification was only marginally significant. Hypothesis 3 was fully supported, as the path from GPNC to individual visit attendance was significant and negative, and the path from individual visit attendance to IPV identification was significant and positive. Thus, for the subsample of Black and Hispanic patients, the direct effect of GPNC on IPV identification was non-significant, and the indirect effect of GPNC on IPV through individual visits was significant and negative [i.e., (-1.42)*(0.73) = -1.04 z-score units], yielding a total negative (-1.04 z-score unit) effect of GPNC on IPV identification. This model fit the data well, according to Hu and Bentler's (1999) standards, with RMSEA = 0.00

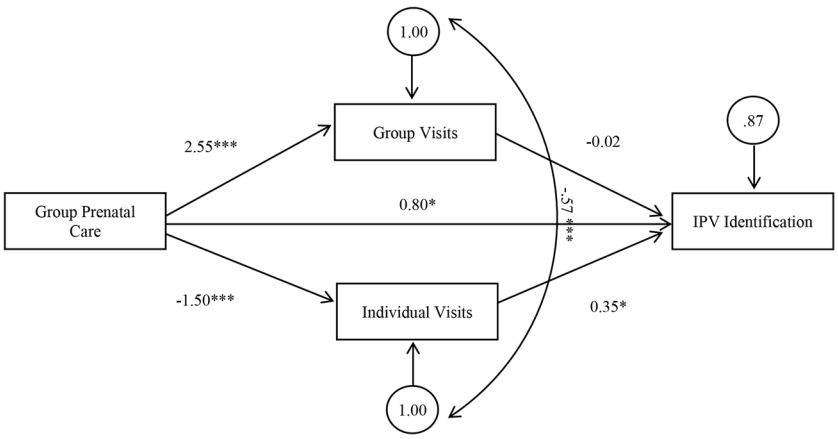

Fig. 3 Path coefficients for the relationship between group prenatal care, group and individual visit attendance, and IPV identification among full sample of patients ($N = 523$). *Note* Coefficients are probits. $+p < .10$, $*p < .05$, $**p < .10$, $***p < .01$. TLI = 1.00; RMSEA = 0.00

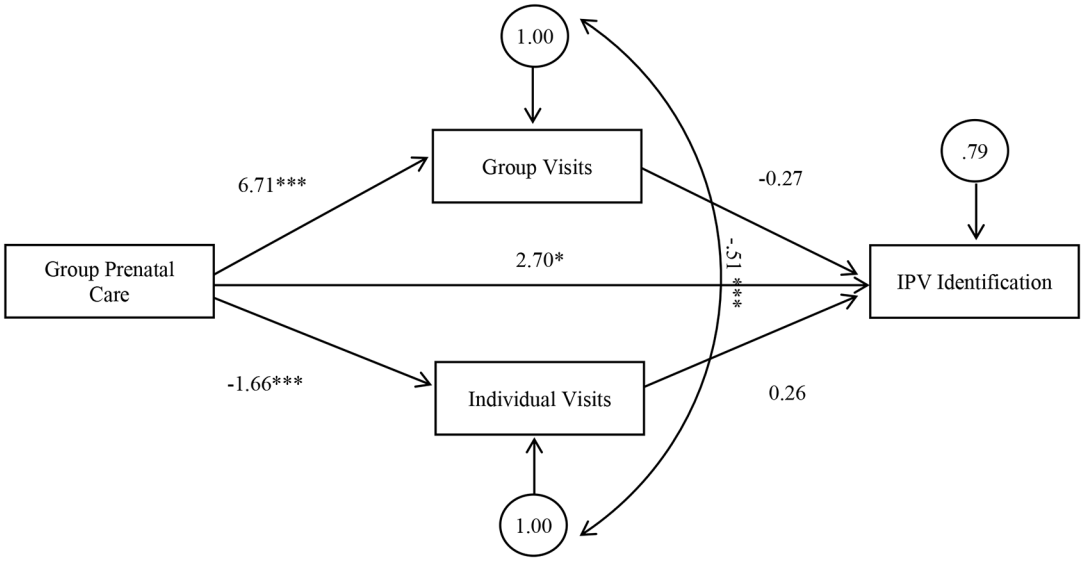

Fig. 4 Path coefficients for the relationship between group prenatal care, group and individual visit attendance, and IPV identification among white patients ($N = 205$). *Note* Coefficients are probits. $+p < .10$, $*p < .05$, $**p < .10$, $***p < .01$. TLI = 1.00; RMSEA = 0.00

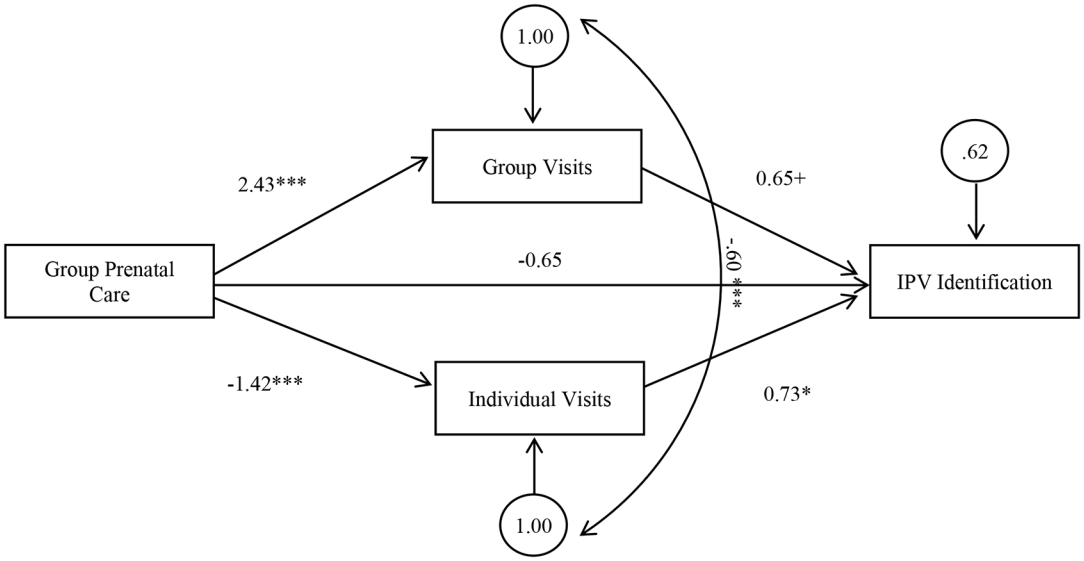

Fig. 5 Path coefficients for the relationship between group prenatal care, group and individual visit attendance, and IPV identification among black and hispanic Patients ($N = 318$). *Note* Coefficients are probits. $+p < .10$, $*p < .05$, $**p < .10$, $***p < .01$. TLI = 1.00; RMSEA = 0.00

and TLI = 1.00. The residual variance for arrest was 0.62, indicating that the model explained 38% of the variance in probability of IPV identification.

Conclusions

IPV during pregnancy can have serious consequences for maternal, infant, and child health (Beydoun et al., 2012; Donovan et al., 2016; Hill et al., 2016; Howard et al., 2013; Pastor-Moreno et al., 2020; Shah & Shah, 2010; Silva et al., 2018). Both the risk and consequences of IPV are greater for Black and Hispanic pregnant patients than for White patients (Alhusen et al., 2014; Bohn et al., 2004; Campbell et al., 2021; Greely et al., 2022; Kivisto et al., 2022; Silverman et al., 2006). Thus, identification of IPV and referral to services during pregnancy is important, particularly for Black and Hispanic patients.

Continuity of care and patient-centered care are essential for the identification of IPV in healthcare settings (Melendez-Torres et al., 2022). Thus, we proposed that GPNC, which involves prenatal care providers delivering health, education, and support services to patients in a group setting, would create an atmosphere that is conducive to the

identification of IPV. We specifically expected to see this effect among Black and Hispanic patients. We based this on the assumption that GPNC would increase the quality of the provider-patient relationship and reduce racial and ethnic bias in clinical care (Carter et al., 2021), essentially serving as a buffer against noted racial disparities in prenatal healthcare (Attanasio & Kozhimannil, 2015; Johnson et al., 2019; Sigurdson et al., 2019).

Contrary to our expectations, when examining the study sample as a whole, GPNC was associated with lower probability of IPV identification. However, this negative effect appears to be largely driven by the effect of GPNC on IPV identification among Black and Hispanic patients. Specifically, when analyzing data from the subsample of White patients, the total effect of GPNC on IPV identification was significant and positive. This resulted from a direct program effect on identification, as indirect effects that modeled group and individual visit attendance as mediators were not significant. Conversely, among the subsample of Black and Hispanic patients, the total effect of GPNC on IPV identification was negative. This resulted from an indirect effect of GPNC care through its effect on number of individual visits.

Taken together, these findings indicate that the format of GPNC has a positive impact on IPV identification among White patients, but not among Black or Hispanic patients. This is surprising, considering that GPNC has been suggested as a means of improving the quality of prenatal care that patients of color receive (ACOG, 2018; Carter et al., 2021). Interestingly, findings also indicate that, among Black and Hispanic patients, greater individual visit attendance is associated with increased probability of IPV identification; yet, group prenatal care has a negative effect on individual visit attendance. Thus, GPNC actually has a negative effect on IPV identification among Black and Hispanic patients.

There are a few potential explanations for these findings, none of which can be tested with our available data. First, since GPNC format did not have a direct effect on IPV identification among Black and Hispanic patients, it is possible that providers overlook these patients in group settings containing a mix of races and ethnicities. In fact, results of one study of GPNC suggest that Black women exhibit benefits of this program model when they are in homogenous groups composed of other Black patients (Kettrey & Steinka-Fry, 2020). However, we cannot be sure of this. Although some prenatal care groups in this study were conducted exclusively in Spanish, most groups were not segregated by race and ethnicity. The available data do not identify the racial and ethnic composition of groups nor the race and ethnicity of providers.

Second, it is important to consider the fact that, by itself, increased time with patients may not increase the quality of the provider-patient relationship or reduce clinical bias against patients of color. That is, exposure alone may not mitigate bias without directed efforts to confront racial inequality in healthcare systems. In the future, GPNC models may benefit from provider training that specifically addresses racial bias and racial inequality. Moving forward, patients and providers may benefit from the integration of content on racial/ethnic maternal health disparities into GPNC curricula. Additionally, regardless of whether prenatal care patients are enrolled in GPNC or IPNC, their quality of care might be improved by organizational policies that educate providers about racial/ethnic bias and integrate regular quality-control analyses of patient care that account for patient race/ethnicity.

It is important to interpret findings of this study within the confines of a few important limitations. First, we limited our analysis to those patients who enrolled in an RCT evaluating the effects of GPNC during the first year of that trial. Although this eliminated any intervening effects of #MeToo or COVID, it also decreased our sample size. For example, our sample was too small to permit analysis of Hispanic patients separately from White or Black patients. Additionally, due to the low frequency of IPV identification in our sample, we used a dichotomous measure of our main outcome variable and, thus, were unable to perform a nuanced analysis that considered source of IPV identification.

Second, as previously mentioned, we do not know the racial/ethnic composition of prenatal care groups, and we do not know the racial/ethnic or gender identity of providers. These are factors that could influence the disclosure or identification of IPV, as provider-patient rapport and communication may be stronger in demographically matched pairings.

Third, our study measured the identification of IPV rather than actual occurrences of IPV. Thus, our analysis relied on the assumption that the randomization process distributed risk of IPV similarly between the GPNC and IPNC groups and each group had equal chances of IPV identification. Readers should be mindful of this when interpreting results. Relatedly, our review of comments in medical records indicated that physical IPV was identified with greater frequency than other forms of IPV, such as psychological or sexual. Thus, findings from our study are largely limited to the identification of physical violence.

Finally, although the research site was certified to implement CenteringPregnancy by the Centering Healthcare Institute, we do not have any program fidelity data and, thus, do not know whether providers implemented the program as directed. Relatedly, we cannot assume that findings from our analysis of CenteringPregnancy may be generalized to other group prenatal care programs. Thus, future research should examine IPV identification in samples of patients participating in other GPNC frameworks.

Despite these limitations, findings from this study have important implications. Specifically, our findings indicate GPNC increases the probability of IPV identification, but only among White patients. Black and Hispanic patients, who are at increased risk of experiencing IPV and its harmful consequences, do not receive this benefit. Moving forward, researchers and practitioners should establish whether GPNC delivered by providers trained in a curriculum that directly addresses racial/ethnic disparities in quality of healthcare has an effect of IPV identification among patients of color.

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Declarations

Competing Interests The authors have no conflicts of interest or competing interests to declare that are relevant to the content of this article.

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