

Experiences of Violence Among Puerto Rican Women Before, During and After Pregnancy: Prevalence and Associated Health Factors using Data from the Puerto Rico Pregnancy Risk Assessment Monitoring System

Enid Quintana-Torres, MD, MPH*; Paola B. Giménez-Cabranes, BS, MSMS†; Wilfredo J. Villafañe-Ortiz, MD‡; Linda Laras-Garcia, MD, MPH, MS¶;

Objective: Interpersonal violence (IPV) is associated with negative physical, mental, and reproductive health outcomes. This study described the characteristics of Puerto Rican women experiencing IPV before, during, and after the time of pregnancy and explored disparities in their health outcomes, risk factors, and healthcare utilization behaviors.

Methods: We analyzed 2017–2020 data from the Puerto Rico Pregnancy Risk Assessment Monitoring System for 3,893 respondents, calculating weighted prevalence estimates of IPV, 95% CIs, and odds ratios for IPV before, during, and after pregnancy.

Results: Overall, 8.0% of Puerto Rican women reported experiencing violence in the 12 months before or during pregnancy. Physical violence, most often perpetrated by a current or former intimate partner, was reported by 4%. Emotional violence during pregnancy was reported by 5.2% of participants, and 1.2% reported being forced to have sex while pregnant. Experiences of violence were significantly associated with age, marital status, type of health insurance at the time of delivery, symptoms of depression or anxiety 3 months before pregnancy, postpartum depressive symptoms, pregnancy intention, smoking 3 months before pregnancy, adequacy of prenatal care, and being asked by a healthcare professional about experiencing violence in the 12 months before pregnancy.

Conclusions: Puerto Rican women face a significant risk of experiencing violence before, during and after pregnancy; this violence is associated with detrimental physical and mental health outcomes and lower health care utilization. Culturally sensitive interventions and improved health care practices are critical to support affected women and enhance perinatal health outcomes.

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Interpersonal violence (IPV) against women is a major preventable public health issue with both local and global impacts and is consistently associated with negative physical, mental, and reproductive health outcomes. Experiences of IPV most often occur within intimate relationships and may involve stalking and physical, sexual, and emotional violence, often overlapping (1). The World Health Organization estimates that about 1 in 3 women worldwide have experienced physical and/or sexual violence in their lifetime (2), making experiences of violence more common than many other health-related experiences that receive greater attention from researchers.

While women can experience IPV at any time in their lives, pregnancy can be a particularly vulnerable period. According to a 6-state (Arkansas, Kansas, Pennsylvania, South Dakota, Washington, Wisconsin) aggregated report from the Pregnancy Risk Assessment Monitoring System (PRAMS), the prevalence of emotional, physical, or sexual violence during pregnancy, perpetrated by a current partner is estimated at 5.7% (3). The consequences of such violence are far-reaching, impacting physical and mental health, pregnancy outcomes, and prenatal care utilization (4). Women who experience physical violence before pregnancy are at increased risk for hypertension, vaginal bleeding, and a higher number of hospital visits than are women

who do not experience such violence (5). Furthermore, infants born to women who experienced violence during pregnancy are also at increased risk of being born prematurely, having a low birth weight, and requiring neonatal hospitalization (6).

In Puerto Rico, IPV is a serious issue that has been exacerbated by recent natural disasters, the COVID-19 pandemic, and resource scarcity due to the island's ongoing economic crisis (7). Previously published Puerto Rico PRAMS data reported a prevalence of physical violence before or during pregnancy of around 2% (8), and small-scale studies have estimated that nearly 1 in 5 Puerto Rican women have experienced sexual violence (9). Publicly available data from the Puerto Rico Police Bureau indicate that

*Department of Family Medicine, School of Medicine, University of Puerto Rico, Medical Sciences Campus, San Juan, Puerto Rico; †School of Medicine, Ponce Health Sciences University, Puerto Rico; ‡School of Medicine, University of Puerto Rico, Medical Sciences Campus, San Juan, Puerto Rico; ¶Department of Obstetrics and Gynecology, Puerto Rico Health Justice Center, San Juan Bautista School of Medicine, Caguas, Puerto Rico

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Address correspondence to: Enid Quintana-Torres, MD, MPH, Department of Family Medicine, School of Medicine, University of Puerto Rico Medical Sciences Campus. Email: enid.quintana@upr.edu

over 5,000 domestic violence reports were filed in 2023, a figure that likely underestimates the true burden of violence. In PR, this kind of violence is well documented to be underreported, possibly due to victims fearing retaliation or being stigmatized (10,11). Extreme forms of violence are also prevalent in Puerto Rico, where recent estimates indicate that 58.3% of female homicide victims were killed by a current or former spouse or intimate partner (12), with most of these victims being of reproductive age (13). Despite the significant impact of violence on women's health, current knowledge about the experiences of IPV among Puerto Rican women specifically before, during, and after their pregnancies is limited. This study aimed to describe the characteristics of Puerto Rican women who experienced sexual, emotional, and/or physical violence before, during, and after their pregnancy and to explore disparities in their health outcomes and healthcare utilization behaviors using Puerto Rico PRAMS data from 2017 through 2020.

Methods

Study design

This was a cross-sectional study using data from the Puerto Rico PRAMS for 2017 through 2020.

Study database

PRAMS is a joint surveillance project between state and territorial health departments and the Centers for Disease Control and Prevention that collects and analyzes population-based data on maternal behaviors and experiences before, during, and after pregnancy. Currently, PRAMS covers approximately 83% of all births in the United States, including, since 2017, births in Puerto Rico. Each month, 100 to 300 women who had a live birth in Puerto Rico were randomly selected to participate using a mixed-mode approach (mail or telephone questionnaires). The survey's complex design permitted the oversampling of women who gave birth to low birth weight infants. Survey data were weighted for sample design, nonresponse, and noncoverage to represent the total population of births. The PRAMS methodology and design have been previously described (14). The response rates for the years 2017 through 2020 were 63.0%, 80.3%, 80.9%, and 81.0%, respectively.

Study population

A total of 3,893 participants completed the Puerto Rico PRAMS questionnaire. Participants under the age of 20 years ($n = 513$) were not asked about their experiences of IPV and were therefore excluded from this study. As a result, the final sample size was 3,380, representing 66,381 women who gave birth to a live infant in Puerto Rico from 2017 through 2020. The distribution of participants by year was as follows: 888 in 2017, 824 in 2018, 891 in 2019, and 777 in 2020.

Variables

The Puerto Rico PRAMS questionnaire covers a broad range of topics, including pregnancy intention, preconception health, prenatal care, drug use during pregnancy, infant health care, healthcare utilization, and experiences of sexual, emotional, and

physical violence. The study used dichotomous variables (yes/no) to report physical violence before pregnancy and physical, emotional, or sexual violence during pregnancy. The specific survey questions used to assess physical, emotional, and sexual violence before, during, and after pregnancy are included in the Supplemental Table S1, and the core survey questionnaire is available at <https://www.cdc.gov/prams/pdf/questionnaire/Phase-8-Core-Questions-508.pdf>. Survey data were linked to selected birth certificate data to create a dataset for analysis.

Data analysis

The analysis was performed using SAS OnDemand for Academics (SAS Studio; SAS Institute Inc., Cary, NC, USA). A descriptive analysis was performed using PROC SURVEYFREQ to calculate weighted percentages, frequencies, and 95% CIs for complex survey design, and the Rao-Scott chi-square test was used to evaluate the association between participant characteristics and IPV. Unadjusted odds ratios (ORs) and 95% CIs for IPV were calculated using PROC SURVEYLOGISTIC. The unweighted sample size is presented in the tables along with weighted prevalence and corresponding CIs. Overall, missing data accounted for less than 5% of the observations, and therefore missing data were not imputed. However, to account for the possibility that data were not missing completely at random, the NOMCAR option in PROC SURVEYLOGISTIC was used; this option treats the observed cases as a domain for variance estimation. The Institutional Review Board of the San Juan Bautista School of Medicine approved the study protocol.

Results

Estimated prevalence of experiences of physical, emotional, and sexual violence before, during, and after pregnancy

As shown in Table 1, 8% of women reported IPV either in the 12 months before or during pregnancy. Slightly more women reported physical violence during pregnancy than in the 12 months before pregnancy (2.8% versus 2.6%, respectively). Combined, 4% reported physical violence before or during pregnancy. The most common perpetrator of physical violence before pregnancy was an ex-husband or ex-partner, whereas during pregnancy, the most common perpetrator was a current husband or partner. Emotional violence during pregnancy was reported by 5.2% of the participants. Feeling controlled by their husband or partner was the most common experience of violence reported by 4.5% of participants, while 1.5% reported that their husband or partner threatened them with separation from their children. Lastly, 1.2% of participants reported being forced to have sex during pregnancy.

Sample characteristics of Puerto Rico PRAMS participants

As shown in Table 2, more than half of the participants (55.6%) were aged from 25 to 34 years, and the majority (88.2%) identified as White. Over 70% (71.5%) had at least some college education, 63.7% were not married, 81.3% were Special Supplemental Nutrition Program for Women, Infants,

and Children (WIC) clients, and 62.3% had government health insurance at the time of delivery. Normal BMI (18.5–24.9) was the most common pre-pregnancy BMI category (43.0%) in the participants, and 42.7% of them had no previous live births. Additionally, 3 months before pregnancy 5.7% reported experiencing depression and 13.5% reported experiencing anxiety. Meanwhile, 12.0% reported postpartum depressive symptoms.

Risk behaviors

Only 39.6% of women reported that their pregnancy was intended, more than half (55.2%) reported drinking 3 months before pregnancy, and 6.3% reported smoking during the same period (Table 3).

Healthcare utilization

As shown in Table 4, 7.5% received inadequate prenatal care. Most of the women (68.5%) had at least 1 health care visit 12 months before pregnancy, and 78.3% had a postpartum visit. Among those who had health care visits, approximately 1 in 4 (24.4%) were asked during a visit about experiencing emotional or physical violence before pregnancy, and around 1 in 3 (34.2%) was asked during a postpartum visit about experiencing violence. Among those who had prenatal care, fewer than half (44.2%) had a healthcare professional talk to them about IPV during a prenatal care visit. Almost all the participants (98.5%) had at least 1 well-baby checkup visit for their infant (Table 4).

Association of experiences of physical, emotional, and sexual violence with women's social demographic characteristics, risk behaviors, and health care utilization

Sociodemographic and Mental health characteristics

Age, marital status, type of health insurance at time of delivery, depression or anxiety symptoms 3 months before pregnancy, and experiencing postpartum depressive symptoms were significantly associated with IPV (Table 4). Compared with women aged 24 years or younger, women aged 25–34 years (OR = 0.6; 95% CI: 0.4–0.9; $P = .01$) and those 35 years old or older (OR = 0.6; 95% CI: 0.4–1.0; $P = .01$) had lower odds of experiencing violence. Unmarried women had higher odds of violence compared with married women (OR = 2.8; 95% CI: 1.9–4.3; $P < .0001$). Women with government health insurance at delivery had higher odds of violence than those with private insurance (OR = 1.9; 95% CI: 1.3–2.7; $P = .0006$). Women with depression 3 months before pregnancy (OR = 4.5; 95% CI: 2.9–7.0; $P < .0001$), anxiety 3 months before pregnancy (OR = 3.5; 95% CI: 2.5–4.9; $P < .0001$), and postpartum depressive symptoms (OR = 5.2; 95% CI: 3.7–7.4; $P < .0001$) all had higher odds of IPV. No significant association was found between IPV experiences and race, education, pre-pregnancy BMI, or previous live births.

Table 1. Experiences of violence before, during or after pregnancy of women with a live birth in Puerto Rico from 2017 through 2020

	Weighted n	n ^a (%)	95% CI
<i>Physical violence 12 months before pregnancy</i>			
Husband/partner	599	29 (0.9)	0.5–1.3
Ex-husband/ex-partner	736	44 (1.1)	0.7–1.6
Family member	241	11b (0.4)	0.1–0.6
Other	323	12b (0.5)	0.2–0.8
Any physical violence 12 months before pregnancy	1699	87 (2.6)	1.9–3.2
<i>Physical violence during pregnancy</i>			
Husband/partner	954	41 (1.4)	0.9–2.0
Ex-husband/ex-partner	454	29 (0.7)	0.3–1.0
Family member	360	13b (0.5)	0.2–0.9
Other	355	16b (0.5)	0.2–0.9
Any physical violence during pregnancy	1851	90 (2.8)	2.1–3.5
<i>Emotional violence during pregnancy</i>			
Husband/partner threatened to take child away	970	57 (1.5)	1.0–2.0
Felt controlled by husband/partner	2994	143 (4.5)	3.6–5.4
Any emotional abuse during pregnancy	3467	171 (5.2)	4.2–6.2
<i>Sexual violence during pregnancy</i>			
Sexual violence (forced sex) by husband/partner	772	50 (1.2)	0.7–1.6
<i>Combined experiences of violence</i>			
Any physical violence before or during pregnancy	2677	130 (4.0)	3.2–4.9
Any violence during pregnancy	4755	237 (7.6)	6.0–8.3
Any violence before or during pregnancy	5310	263 (8.0)	6.8–9.1

^a Unweighted sample size; sample sizes may vary due to missing responses.

^b Estimates derived from sample sizes smaller than 30 ($n < 30$) should be interpreted with caution due to increased variability and reduced statistical power.

Risk behaviors and Pregnancy characteristics

Pregnancy intention and smoking before pregnancy were significantly associated with IPV (Table 4). Women who smoked 3 months before pregnancy had higher odds of IPV compared with non-smoking women (OR = 3.5; 95% CI: 2.2–5.5; $P < .0001$). Women with mistimed pregnancies (OR = 1.9; 95% CI: 1.3–2.8; $P < .0001$), women with unwanted pregnancies (OR = 3.2; 95% CI: 1.9–5.5; $P < .0001$), and women who were unsure about their pregnancies (OR = 2.2; 95% CI: 1.2–3.7; $P < .0001$) had higher odds of IPV compared to women with intended pregnancies. No significant association was found between experiencing IPV and alcohol use 3 months before pregnancy.

Health care utilization

Prenatal care adequacy and IPV screening by health professionals were associated with IPV experiences (Table 4). The odds of IPV decreased as prenatal care adequacy improved. Compared with women with inadequate prenatal care, lower odds of IPV were observed among those with intermediate (OR = 0.5; 95% CI: 0.2–1.0; $P < .0001$), adequate (OR = 0.3; 95% CI: 0.2–0.5; $P < .0001$), and adequate-plus prenatal care (OR = 0.3; 95% CI: 0.2–0.5; $P < .0001$).

No significant association was found between experiencing IPV and IPV screening during prenatal care or postpartum care. However, among women with a health care visit 12 months before pregnancy, those screened for IPV had higher odds of having

Table 2. Sociodemographic characteristics of women with a live birth in Puerto Rico from 2017 through 2020 by experiences of violence before, during, or after pregnancy

Sociodemographic characteristic	Total				Did not experience violence				Experienced violence				P value	OR	95% CI
	n ^a	Weighted n	%	95% CI	n ^a	Weighted n	%	95% CI	n ^a	Weighted n	%	95% CI			
<i>Age group (years)</i>													.01		
20–24	1011	19866	29.9	27.9–31.8	900	17743	89.3	86.9–91.7	111	2123	11.0	9.1–12.9	-	-	
25–34	1861	37020	55.6	53.5–57.8	1740	34494	93.2	91.7–94.6	121	2526	6.8	5.4–8.3	0.6	0.4–0.9	
35+	508	9650	14.5	12.9–16.0	477	8990	93.2	90.3–96.0	31	661	6.8	4.0–9.7	0.6	0.4–1.0	
<i>Race^b</i>													.50		
Non-White	392	7811	11.8	10.4–13.2	356	7100	90.9	87.3–94.5	36	711	9.1	5.4–12.8	1.2	0.7–1.9	
White	2967	58341	88.2	86.8–89.6	2742	53776	92.2	90.9–93.4	225	4566	7.8	6.6–9.1	-	-	
<i>Education^c</i>													.16		
No high school	197	4131	6.2	5.2–7.3	172	3728	90.2	85.1–95.4	25 ^d	402	9.8	4.6–14.8	1.0	0.5–1.9	
High school	740	14779	22.3	20.5–24.1	672	13326	90.2	87.4–92.9	68	1453	9.8	7.1–12.6	-	-	
Some college	2437	47481	71.5	69.6–73.5	2267	44028	92.7	91.4–94.0	170	3453	7.3	6.0–8.6	0.7	0.5–1.0	
<i>Marital status</i>													<.0001		
Married	1211	24144	36.3	34.3–38.3	1169	23202	96.1	94.7–97.5	42	942	3.9	2.5–5.3	-	-	
Other	2168	42386	63.7	61.7–65.8	1947	39018	89.7	88.1–91.3	221	4368	10.3	8.7–11.9	2.8	1.9–4.3	
<i>WIC participant</i>													.17		
No	579	12391	18.7	17.0–20.4	547	11627	93.8	91.0–96.3	32	764	6.2	3.7–8.6	-	-	
Yes	2791	53927	81.3	79.6–83.0	2562	49448	91.7	90.4–93.0	229	4478	8.3	7.0–9.6	0.7	0.5–1.5	
<i>Health insurance^e</i>													.0006		
Government	2111	41121	62.3	60.2–64.3	1910	37195	90.5	88.8–92.1	201	3927	9.5	8.0–11.1	1.9	1.3–2.7	
Private/self-pay	1246	24929	37.7	35.7–39.8	1186	23609	94.7	93.1–96.3	60	1320	5.3	3.7–6.9	-	-	
<i>Pre-pregnancy BMI^f</i>													.60		
Underweight	210	3725	5.7	4.7–6.7	185	3352	90.0	84.7–95.2	25 ^d	373	10.0	4.8–15.2	1.3	0.7–2.3	
Normal	1355	28059	43.0	40.8–45.1	1246	25759	91.8	90.0–93.6	109	2300	8.2	6.4–10.0	-	-	
Overweight	887	17411	26.7	24.8–28.6	829	16222	93.2	91.1–95.3	58	1189	6.8	4.7–8.9	0.8	0.5–1.2	
Obese	844	16103	24.7	22.8–26.5	780	14764	91.7	89.3–94.1	64	1340	8.3	5.9–10.7	1.0	0.7–1.5	
<i>Previous live births</i>													.55		
0	1530	28240	42.7	40.6–44.8	1414	25828	91.5	89.6–93.3	116	2412	8.5	6.7–10.4	-	-	
1	1243	26276	39.7	37.6–41.8	1152	24393	92.8	91.1–94.6	91	1884	7.2	5.4–8.9	0.8	0.6–1.2	
≥2	587	11647	17.6	16.0–19.2	532	1066	91.6	88.7–94.4	55	981	8.4	5.6–11.3	1.0	0.6–1.5	
<i>Depression 3 months before pregnancy^g</i>													<.0001		
No	3166	62644	94.3	93.3–95.2	2948	58290	93.0	91.0–94.2	218	4354	7.0	5.8–8.1	-	-	
Yes	208	3815	5.7	4.8–6.7	163	2860	75.0	67.3–82.6	45	955	25.0	17.4–32.7	4.5	2.9–7.0	
<i>Anxiety 3 months before pregnancy^h</i>													<.0001		
No	2867	57463	86.5	85.1–88.0	2692	53854	93.7	92.6–94.8	175	3608	6.3	5.2–7.4	-	-	
Yes	505	8960	13.5	12.1–14.9	418	7264	81.1	76.6–85.6	87	1696	18.9	14.4–23.4	3.5	2.5–4.9	
<i>Postpartum depressive symptomsⁱ</i>													<.0001		
No	2906	57907	88.0	86.6–89.4	2738	54548	94.2	93.1–95.3	168	3359	5.8	4.7–6.8	-	-	
Yes	428	7876	12.0	10.6–13.4	334	5963	75.7	70.4–81.0	94	1913	24.3	19.0–29.6	5.2	3.7–7.4	

Abbreviations: BMI, body mass index; OR, odds ratio; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

^a Unweighted sample size; sample sizes may vary due to missing responses.^b Race reported as: White or non-White (Black, American Indian, Alaska Native, Chinese, Japanese, Filipino, Hawaiian, Mixed race, other race).^c Education reported as: No high school (less than 8th grade, 9–12th grade, with no high school diploma, high school (high school graduate or GED), and some college (some college, associate degree, bachelor's, master's, doctoral, or professional degree).^d Estimates derived from sample sizes smaller than 30 (n < 30) should be interpreted with caution due to increased variability and reduced statistical power.^e Insurance at time of delivery reported as: Government (Medicaid or other government) and private/self-pay (private insurance, self-pay, Indian Health Services, CHAMPUS/TRICARE, other).^f Pre-pregnancy BMI reported as: Underweight (<18.5), normal weight (18.5–24.9), overweight (25.0–29.9) or obese (≥30.0).^g Respondent indicated “yes” to depression when asked: “During the 3 months before you got pregnant with your new baby, did you have any of the following health conditions?”^h Respondent indicated “yes” to anxiety when asked: “During the 3 months before you got pregnant with your new baby, did you have any of the following health conditions?”ⁱ Respondent indicated “always” or “often” feeling down, depressed, or hopeless or having little interest or pleasure in doing things she usually enjoyed since delivery.

Table 3. Risk behaviors of women with a live birth in Puerto Rico from 2017 through 2020 by experiences of violence before, during, or after pregnancy

	Total				Did not experience violence				Experienced violence						
Risk behavior	n ^a	Weighted n	%	95% CI	n ^a	Weighted n	%	95% CI	n ^a	Weighted n	%	95% CI	P value	OR	95% CI
Pregnancy intention															
Mistimed	1412	28016	42.5	40.4–44.6	1287	25463	90.9	89.0–92.8	125	2553	9.1	7.2–11.0	<.0001	1.9	1.3–2.8
Intended	1327	26088	39.6	37.5–41.7	1257	24784	95.0	93.5–96.5	70	1304	5.0	3.5–6.5	-	-	-
Unwanted	261	5194	7.9	6.7–9.0	226	4445	85.6	80.2–91.0	35	748	14.4	9.1–19.8	-	3.2	1.9–5.5
Unsure	345	6612	10.0	8.7–11.3	314	5939	89.8	85.7–94.0	31	672	10.2	6.0–14.3	-	2.2	1.2–3.7
Drinking 3 months before pregnancy															
No	1903	36543	55.2	53.1–57.3	1760	33691	92.2	90.7–93.7	143	2852	7.8	6.3–9.3	.78	-	-
Yes	1457	29640	44.8	42.7–46.9	1338	27228	91.9	90.1–93.6	119	2412	8.1	6.4–9.9	-	1.1	0.8–1.4
Smoking 3 months before pregnancy															
No	3141	62143	93.7	92.7–94.7	2921	57713	92.9	91.7–94.0	220	4430	7.1	6.0–8.3	<.0001	-	-
Yes	223	4180	6.3	5.3–7.3	180	3301	79.0	72.0–85.9	43	879	21.0	14.1–28.0	-	3.5	2.2–5.5

^a Unweighted sample size; sample sizes may vary due to missing responses.

experienced violence compared with those who had not been screened (OR = 1.6; 95% CI: 1.1–2.4; $P = .02$).

Women who experienced IPV had higher odds of not attending a postpartum visit compared with those who did not experience IPV (OR = 2.2; 95% CI: 1.6–3.1; $P < .0001$). No significant differences were observed between groups regarding having at least 1 health visit 12 months before pregnancy or at least 1 well-baby checkup for their infant.

Discussion

This study found that 8.0% of Puerto Rican women reported experiencing violence in the 12 months prior to or during pregnancy. Approximately two-thirds (63.7%) of women in this study were unmarried, and those experiencing IPV were less likely to be married than were those without IPV. This finding aligns with research linking poor social support, exemplified by the absence of a marital partner or paternity acknowledgment, with IPV (3). This might be particularly significant in some Latin American countries, where marriage has been identified as a protective factor against violence due to perceived mutual commitment and stability (15). Conversely, other studies suggest that married women may be less likely to report violence because of stigma, the normalization of abuse, the prioritization of their children's needs, and societal expectations of marriage (16, 17).

Consistent with previous research, Puerto Rican women who experienced IPV were more likely to have unintended pregnancies than those without IPV (18–20). Unintended pregnancies in this context may be partly explained by reproductive coercion,

the reduced use of condoms or oral contraceptives, behaviors previously associated with IPV (21). Among postpartum Puerto Rican women who did not use contraception, 30% cited partner refusal as a contributing factor (22). Systemic and political barriers to abortion access also intersect with IPV and unintended pregnancies (23), and higher rates of IPV among women seeking abortion services compared to those seeking contraceptive care (24) further illustrate the constraints on reproductive autonomy faced by women experiencing violence. Although abortion is legal in Puerto Rico, the access to and availability of services have declined, and women face challenges in obtaining emergency contraception and abortion services, partly due to limited awareness of available resources (25).

Self-reported anxiety and depression 3 months before pregnancy were significantly associated with experiencing IPV, with women reporting these conditions having more than 3-fold higher odds of experiencing IPV than those without them did. This finding aligns with research linking IPV during pregnancy to increased risk of depression, anxiety, post-traumatic stress disorder, and suicide (1, 26, 27). A previous small cross-sectional study reported the prevalence of postpartum depression to be as high as 53.4% among Puerto Rican women (28). The current study supports this finding, as women experiencing IPV were disproportionately affected, having 5.2 times higher odds of experiencing depressive symptoms than their counterparts. Notably, self-reporting may affect the accuracy of mental health assessment as validated scales specific to pregnancy are limited (29).

Women who had experienced IPV were less likely to access postpartum care, although their children were as likely as children of women without IPV to receive at least 1 well-baby

Table 4. Healthcare utilization behaviors of women with a live birth in Puerto Rico from 2017 through 2020 by experiences of violence before, during, or after pregnancy

Health care	Total				Did not experience violence				Experienced violence				P value	OR	95% CI
	n ^a	Weighted % n	95% CI		n ^a	Weighted % n	95% CI		n ^a	Weighted % n	95% CI				
Adequacy of prenatal care utilization ^b															
Inadequate	258	4950	7.5	6.3–8.6	216	4021	81.2	74.9–87.5	42	930	18.8	12.5–25.1	-	-	-
Intermediate	190	4032	6.1	5.1–7.1	174	3646	90.4	85.2–95.6	16 ^c	386	9.6	4.4–14.8	-	0.5	0.2–1.0
Adequate	1235	29690	44.8	42.7–47.0	1149	27651	93.1	91.5–94.8	86	2039	6.9	5.2–8.5	-	0.3	0.2–0.5
Adequate Plus	1680	27559	41.6	39.5–43.7	1562	25610	92.9	91.3–94.6	118	1949	7.1	5.4–8.7	-	0.3	0.2–0.5
Health care visit 12 months before pregnancy ^d															
No	1018	20812	31.5	29.5–33.5	931	19053	91.5	89.4–93.7	87	1759	8.5	6.3–10.6	-	1.1	0.8–0.5
Yes	2340	45337	68.5	66.5–70.5	2166	41796	92.2	90.8–93.6	174	3541	7.8	6.4–9.2	-	-	-
Screened for IPV 12 months before pregnancy ^e															
No	1721	33956	75.6	73.4–77.9	1603	31586	93.0	91.5–94.5	118	2370	7.0	5.5–8.5	-	-	-
Yes	602	10934	24.4	22.2–26.6	545	9758	89.2	86.0–92.5	57	1176	10.8	7.5–14.0	-	1.6	1.1–2.4
Screened for IPV during prenatal care ^f															
No	1955	38642	58.6	56.4–60.7	1764	35370	91.5	90.0–93.1	161	3272	8.5	5.9–8.5	-	-	-
Yes	1387	27329	41.4	39.3–48.5	1287	25334	92.7	91.0–94.4	100	1996	7.3	3.76–7.3	-	.85	0.6–1.2
Educated about physical IPV during prenatal care ^g															
No	1861	36803	55.8	53.7–57.9	1716	33742	91.7	90.1–93.3	145	3061	8.3	6.7–9.9	-	0.90	0.7–1.2
Yes	1481	29169	44.2	42.1–46.3	1366	26967	92.4	90.8–94.1	115	2202	7.6	5.9–9.3	-	-	-
Had a postpartum checkup ^h															
No	729	14363	21.7	19.9–23.5	645	12457	86.7	83.6–89.9	84	1906	13.3	10.1–16.4	-	2.2	1.6–3.1
Yes	2621	51851	78.3	76.6–80.1	2442	48448	93.4	92.2–94.6	179	3403	6.6	5.4–7.8	-	-	-
Screened postpartum for IPV															
No	1720	34007	65.8	63.5–62.1	1603	31792	93.5	92.0–95.0	117	2215	6.5	5.0–8.0	-	0.9	0.6–1.4
Yes	897	17692	34.2	31.9–36.5	835	16504	93.3	91.2–95.3	62	1188	6.7	4.7–8.8	-	-	-
Had a well-baby checkup ⁱ															
No	45	980	1.5	1.0–2.0	2738	54548	90.1	80.5–99.7	6 ^c	96	9.9	0.3–19.5	-	1.3	0.4–3.8
Yes	3229	64519	98.5	98.0–99.0	334	5963	92.1	90.9–93.3	247	5096	7.9	6.7–9.1	-	-	-

Abbreviation: IPV, interpersonal violence.

^a Unweighted sample size; sample sizes may vary due to missing responses.^b The Adequacy of Prenatal Care Utilization Index uses the initiation of prenatal care and the number of prenatal visits from when prenatal care began until delivery to assess whether prenatal care was adequate. A ratio of observed to expected visits was calculated and grouped into 4 categories: inadequate (received fewer than 50% of expected visits), intermediate (50%–79%), adequate (80%–109%), and adequate plus (110% or more).^c Estimates derived from sample sizes smaller than 30 (n < 30) should be interpreted with caution due to increased variability and reduced statistical power.^d Respondent indicated “yes” when asked: “In the 12 months before you got pregnant with your new baby, did you have any health care visits with a doctor, nurse, or other health care worker, including a dental or mental health worker?”^e Respondent indicated “yes” when asked: “During any of your health care visits in the 12 months before you got pregnant, did a doctor, nurse, or other health care worker ask you if someone was hurting you emotionally or physically?”^f Respondent indicated “yes” when asked: “During any of your prenatal care visits, did a doctor, nurse, or other health care worker ask you if someone was hurting you emotionally or physically?”^g Respondent indicated “yes” when asked: “During any of your prenatal care visits, did a doctor, nurse, or other health care worker talk with you about physical abuse by a partner or husband?”^h Respondent indicated “yes” when asked: “After your new baby was born, did you have a postpartum checkup?” A postpartum checkup is the regular checkup a woman has about 4–6 weeks after she gives birth.ⁱ Respondent indicated “yes” when asked “during any of your postpartum care visits, did a doctor, nurse, or other health care worker ask you if someone was hurting you emotionally or physically?”^j Respondent indicated “yes” when asked: “Has your new baby had a well-baby checkup?” A well-baby checkup is a regular health visit for a baby, usually at 2, 4, or 6 months of age.

checkup. This finding suggests that there are barriers specific to women's healthcare that do not apply to children's healthcare. Although the U.S. Preventive Services Task Force recommends screening women of reproductive age for IPV and providing support services to those who screen positive or referring those who screen positive to support services, evidence indicates that screening is not consistently implemented, with fewer than half of clinicians reporting routine screening (30). This study indicates that IPV screening is not universal among women in Puerto Rico before, during, or after pregnancy. Only 25% of all Puerto Rican women reported being asked by a health care professional about being emotionally or physically harmed during the 12 months before pregnancy. Women experiencing violence were more likely to have been screened before pregnancy, suggesting that selective screening may be prompted by observable risk factors. Among women receiving prenatal care, fewer than half (44.2%) were screened for IPV during prenatal care visits, and approximately one-third (34.2%) were screened during postpartum visits, with no significant differences in screening rates based on IPV exposure. Research suggests that isolation, economic dependence, abuse severity, and lack of direct inquiring by providers may limit healthcare access and IPV disclosure (31). Systematic reviews indicate that among individuals who screen positive for IPV, the referral rate to follow-up psychosocial services is low (32%), and only half of those referred actually attend or receive those services (32). These findings highlight opportunities for pediatricians and primary care physicians to increase IPV screening during well-child and primary care visits. Together, these findings underscore the importance of strengthening access to health services during the perinatal period and establish connections with community resources that can provide timely assistance to women experiencing unsafe situations.

Experiencing violence before, during, and after pregnancy may be associated with an increased risk of subsequent, possibly severe, violence (33). Although we could not examine associations between pregnancy-associated deaths, homicide, and perinatal violence, research estimates that pregnant and postpartum women face a 35% higher risk of homicide than non-pregnant, non-postpartum women of reproductive age (33). Data on violent pregnancy-associated deaths in Puerto Rico are limited, but non-governmental reports indicate that most femicides in Puerto Rico occur in women of reproductive age and are perpetrated by intimate partners (34). According to the National Violent Death Reporting System, 42.5% of the female homicides in participating U.S. jurisdictions in 2019 were considered to be related to IPV (12).

This study has several limitations. First, self-reporting introduces social desirability and recall biases (31, 35) that may affect participants' willingness or ability to disclose experiences of violence. Second, participants' ability to report violence depends on recognition of violent behaviors, which is influenced by culturally specific gender roles and expectations. Third, the study included only adult participants, excluding underage mothers and thereby invisibilizing their experiences of violence and associated health outcomes. Fourth, the binary nature of the survey questions allowed only the assessment of the presence of

violence experiences, not their frequency, duration, or severity. And lastly, because this was a cross-sectional study, causal inference between experiences of IPV and other factors could not be established.

Conclusion

Puerto Rican women face a significant risk of experiencing violence before, during, and after pregnancy. This study described the sociodemographic characteristics of Puerto Rican women affected by IPV and identified specific disparities in their physical health, mental health, and healthcare utilization. These findings can inform the development of targeted interventions to improve perinatal health outcomes for women in Puerto Rico.

Resumen

Objetivos: La violencia interpersonal repercute negativamente en la salud física, mental y reproductiva de las mujeres. Este estudio describe las características de las mujeres puertorriqueñas que experimentaron violencia antes, durante y después de su embarazo y explora las disparidades en su salud, factores de riesgo y el uso de servicios de salud. **Métodos:** Analizamos datos de 3,893 participantes del Sistema de Evaluación y Monitoreo de Riesgos en el Embarazo correspondiente a los años 2017–2020 para calcular prevalencias ponderadas, intervalos de confianza al 95% y razones de probabilidades de violencia alrededor del embarazo. **Resultados:** El 8.0% de las mujeres informaron haber experimentado violencia en los 12 meses antes o durante su embarazo. El 4% experimentó violencia física, mayormente por una pareja íntima actual o pasada. El 5.2% reportó violencia emocional y el 1.2% reportó haber sido forzada a tener relaciones sexuales durante el embarazo. La violencia se asoció con la edad, el estado civil, el seguro de salud al momento del parto, síntomas depresivos o de ansiedad pre y posparto, intención de embarazo, tabaquismo prenatal, cuidado prenatal y si un profesional de la salud le preguntó si experimentaban violencia en los 12 meses antes de su embarazo. **Conclusiones:** Las mujeres puertorriqueñas están en riesgo de experimentar violencia antes, durante y después del embarazo, lo que afecta negativamente su salud física, mental y su utilización de servicios de salud. Abordar este problema de salud pública requiere de intervenciones culturalmente sensibles y mejoras en las prácticas de atención médica para mejorar la salud de las mujeres en el periodo perinatal.

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Supplemental table S1. Puerto Rico Risk Assessment Monitoring System (Puerto Rico PRAMS) survey questions on physical, emotional, and sexual violence before, during, or after pregnancy

Puerto Rico PRAMS survey question	Analysis indicator
-In the 12 months before you got pregnant with your new baby, did any of the following people push, hit, slap, kick, choke, or physically hurt you in any other way? [For each person, check No if they did not hurt you during this time or Yes if they did.] -My husband or partner -My ex-husband or ex-partner -Another family member -Someone else	-Any affirmative response was considered an indication of physical violence before pregnancy.
-During your most recent pregnancy, did any of the following people push, hit, slap, kick, choke, or physically hurt you in any way? [For each person, check No if they did not hurt you during this time or Yes if they did.] -My husband or partner -My ex-husband or ex-partner -Another family member -Someone else	-Any affirmative response was considered an indication of physical violence during pregnancy.
-During your most recent pregnancy, did any of the following things happen to you? [For each one, mark No if it didn't happen or Yes if it did.] -Did your husband or partner try to control your daily activities, for example, controlling who you could talk to or where you could go? -Did your husband or partner force you to participate in touching or sexual activities when you didn't want to? -Did your husband or partner threaten to take your child(ren) away from you?	-Any affirmative response was considered an indication of emotional violence during pregnancy. -Any affirmative response was considered an indication of sexual violence during pregnancy. -Any affirmative response was considered an indication of emotional violence during pregnancy.