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The relationship between spousal violence, maternal functioning, depression, and anxiety among Iranian postpartum mothers: a prospective study

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Abstract

Background Violence against women is a critical public health issue that adversely affects physical and mental health, contributing to injuries, chronic conditions, and mental health disorders. This study addresses the gap in understanding the relationship between spousal violence with maternal functioning and mental health in postpartum mothers.

Methods This Prospective study was conducted on 316 postpartum women who gave birth in Al-Zahra and Taleghani Educational Treatment Centers in Tabriz, Iran, from June 2023 to October 2023. Participants were selected using convenience sampling and followed up for 6–8 weeks. The data were collected using the Revised Conflict Tactics Scale (CTS2), the Edinburgh Postnatal Depression Scale (EPDS), the Postpartum Specific Anxiety Scale (PSAS), and the Barkin Index of Maternal Functioning (BIMF). A general linear model, adjusted for individual, social, and obstetric variables, was used to determine the relationship between domestic violence, maternal functioning, depression and anxiety.

Results Most women (84%) experienced one or more types of intimate partner violence (IPV), including psychological, physical, or sexual abuse. About one-third (32.9%) reported psychological abuse, 21.2% physical violence, 49.4% sexual coercion, and 6.3% reported injuries. The adjusted general linear model showed that the mean depression score was lower in individuals without any experience of violence compared to those who had experienced any violence (β : -1.75; 95% CI: -3.40 to -0.10; $p=0.038$). The mean depression score was significantly higher in homemakers compared to employed individuals ($\beta=3.53$; 95% CI = 1.22 to 5.84, $p=0.003$). The mean maternal functioning score was significantly higher in those who had not experienced mild physical violence compared to those who had ($\beta=2.94$; 95% CI = 0.34 to 5.55, $p=0.027$). The mean anxiety score was lower in individuals with high income (β : -3.38; 95% CI: -5.73 to -1.04; $p=0.005$) and moderate income (β : -2.21; 95% CI: -4.35 to -0.07; $p=0.043$) compared to those with low income.

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Conclusion The findings reveal a high prevalence of violence, particularly sexual coercion, significantly affecting maternal functioning and mental health. Socioeconomic factors also play a crucial role in postpartum mental health. These results highlight the urgent need for enhanced prevention efforts and targeted interventions that consider the socio-economic context and specific forms of violence.

Keywords Intimate partner violence, Depression, Postpartum, Anxiety, Maternal performance

Background

Violence against women encompasses any gender-based violent act that results in or is likely to result in physical, sexual, or psychological harm to women, including threats of such acts, coercion, or deprivation of liberty, whether occurring in public or private life. Family violence or domestic violence is the most common form of violence against women [1]. Domestic violence or intimate partner violence (IPV) includes any behavior by a current or former intimate partner that causes physical, emotional, or sexual harm [2]. IPV is a global public health concern that primarily affects women of reproductive age. According to World Health Organization (WHO) statistics, IPV affects one in three women throughout their lifetime [1].

In recent years, violence against women has been recognized as the most severe social problem across all cultures and societies. Globally, 35% of women experience physical or sexual violence from their spouse or intimate partner, with this rate varying from 23% in high-income countries to 38% in developing countries. According to the World Health Organization, 70% of women are abused by their husbands during their lifetime [3]. There are no precise statistics on the rate of spousal violence in Iran. However, a study by Hesami et al. reported that 68.7% of women experienced domestic violence during pregnancy, with the prevalence of physical violence at 16.9%, emotional violence at 54.3%, and sexual violence at 55.1% [4].

Research indicates that pregnancy can act as either a risk factor or a protective factor for exposure to IPV. Some researchers believe that pregnancy may lead to improved relationships between spouses and increased spousal support, thereby reducing the risk of IPV [5]. Conversely, others suggest that pregnancy might induce stress and trigger the onset or escalation of IPV [6]. According to a systematic review, more than half of Iranian women experience violence during pregnancy. The lowest rates of physical, sexual, and emotional violence have been observed in Tehran, the capital of Iran. Additionally, the rates of physical and sexual violence decrease with the increasing age of the woman and her spouse [7]. Women may be at risk of IPV postpartum as the transition to parenthood can lead to challenges and problems for new parents, increasing the family's various needs. Such challenges can lead to anxiety and stress, which may elevate the risk of IPV [8, 9]. Besides pregnancy, previous

studies have shown that 25% of newly delivered mothers worldwide are affected by IPV during the postpartum period [10]. In Iran, the rate of postpartum violence is reported to be 58% [8]. IPV during pregnancy and childbirth is more prevalent than in other periods, raising particular concerns about the potential for adverse outcomes for the mother, fetus, and child [6]. IPV is associated with several obstetric complications, including preterm birth, low birth weight, premature rupture of membranes, and miscarriage [9, 10]. It may also negatively impact child development, potentially causing cognitive and speech delays and behavioral and communication problems [11].

The relationship between pregnancy and IPV is complex. Various factors contribute to the occurrence of domestic violence against women, particularly during pregnancy, including social, economic, and cultural influences [12]. Factors associated with experiencing violence during pregnancy include maternal age, maternal education, husband's education, having multiple children, marrying at a younger age (under 20), unintended pregnancies, women's employment status, husband's unemployment, husband's smoking, low family income, and the personality traits of the husband [13].

Violence against women during pregnancy and the postpartum period negatively impacts mental health, leading to significant psychological disorders such as depression, suicidal thoughts, post-traumatic stress disorder (PTSD), and anxiety disorders in those who experience violence during pregnancy [14]. Meta-analysis of longitudinal studies has shown a connection between depression and domestic violence and abuse [15]. Women experiencing high levels of psychological violence were more likely to suffer from postnatal depression. Additionally, those reporting physical or sexual violence during pregnancy were 3.28 times more likely to experience postnatal depression [16]. A systematic review and meta-analysis reported a threefold increase in the likelihood of depressive disorders, a fourfold increase in anxiety disorders, and a sevenfold increase in PTSD among individuals who have experienced violence [7].

Postnatal depression and other perinatal mental health issues are linked to health and developmental problems in infants and children [17]. Additionally, women who experienced domestic violence demonstrated lower maternal functioning and a reduced ability to respond to their child's needs and breastfeeding [18, 19]. A mother's functioning in the postpartum period is considered

optimal when she receives appropriate social support, takes care of her physical and psychological needs (psychological well-being), cares for her baby, engages in positive interactions with her child, effectively manages her various responsibilities, and adapts to her evolving responsibilities over time [20].

Given the physical and psychological vulnerability of women during pregnancy and the postpartum period and the increased likelihood of violence during these vulnerable stages, this phase is the most appropriate time to examine violence against women. There is an urgent need to identify IPV and support women during these times because, for many women, the pregnancy-postpartum cycle represents their only opportunity to interact and communicate with healthcare facilities and professionals. Additionally, there are no formal mechanisms in Iran for screening and addressing cases of violence.

Previous findings highlight the relationship between depression and anxiety and their association with violence. Building on this foundation, the current study will examine the interplay between violence with depression, anxiety and maternal functioning, with an emphasis on socio-demographic factors. We hypothesize that violence will associate with anxiety, depression and maternal functioning. Therefore, this study aims to examine the relationship between spousal violence with maternal functioning and mental health in postpartum mothers.

Methods

Study design and participants

In this prospective study, a total of 316 women who gave birth in Al-Zahra and Taleghani Educational Treatment Centers in Tabriz, Iran, from June 2023 to October 2023, were followed up for 6 to 8 weeks. The inclusion criteria were hospitalized healthy postpartum women (without underlying diseases), mothers with term infants, and singleton deliveries. The exclusion criteria were: mothers with hospitalized infants, experiencing adverse events in the past three months (such as the death of loved ones, divorce, etc.), a prior history of mental illnesses including depression, and the presence of chronic diseases in the mother such as cardiovascular diseases, chronic hypertension, and diabetes.

Sample size calculation

The sample size was determined using the single proportion formula, based on the study by the Mohammad-Alizadeh-Charandabi study [7], which reported a 58% prevalence of violence among pregnant women, with an alpha of 0.05, and a power of 80%, the sample size was calculated to be 287. Accounting for a 10% attrition rate, the final sample size was determined to be 316. The formula for sample size is as follows:

$$N = \frac{Z^2 P (q)}{d^2}$$

Sampling

The study population comprised hospitalized postpartum mothers. Sampling was done using a convenience sampling method. The researcher visited the research environment (Al-Zahra and Taleghani hospitals) daily, meeting postpartum women in the postpartum ward. After obtaining written informed consent, the researcher thoroughly explained the study's objectives and selected eligible individuals. The sociodemographic, maternal, and infant characteristics questionnaire and the Revised Conflict Tactics Scales (CTS2) were completed in the hospital. Participants were followed up, and the Edinburgh Postnatal Depression Scale (EPDS), the Postpartum Specific Anxiety Scale (PSAS), and the Barkin Index of Maternal Functioning (BIMF) were completed six to eight weeks after delivery via telephone contact or in-person visits if possible. To maintain confidentiality, questionnaires were coded without mentioning names, and the confidentiality of the information was emphasized. Some women were hesitant to share their experiences due to shame, fear of retaliation, or other issues, making it challenging to collect accurate data on the prevalence and nature of violence against women. To resolve these issues and assist women who had experienced violence, their privacy was prioritized during data collection, thereby enabling them to feel at ease and confident in discussing their experiences. Completing the questionnaires took 20 min.

Data collection tools

In this study, data were collected using the sociodemographic, maternal, and infant characteristics questionnaire; the Revised Conflict Tactics Scales (CTS2), the Edinburgh Postnatal Depression Scale (EPDS), the Postpartum Specific Anxiety Scale (PSAS), and the Barkin Index of Maternal Functioning (BIMF). These instruments were administered through interviews.

The sociodemographic, maternal, and infant characteristics questionnaire

This questionnaire included questions about age, education level, occupation of the woman and her spouse, residency status (urban or rural), income, support received from spouse, family and spouse's family, marital satisfaction, number of pregnancies, abortions, gestational weeks, prenatal care, mode of delivery, episiotomy, pain relief during childbirth, infant details such as weight, height, head circumference, gender, and breastfeeding status and frequency. This questionnaire was validated through content and face validity. To achieve this, it was

initially sent to ten professors from Tabriz University of Medical Sciences. After collecting their feedback, necessary revisions were made accordingly.

The revised conflict tactics scales (CTS2)

Straus and colleagues developed CTS2 as a standardized tool to assess IPV over a year. It consists of 78 questions (39 items for each partner). It measures the frequency and severity of IPV against both women and men across five subdomains: Negotiation (Emotional and Cognitive), Psychological Aggression, Physical Assault, Sexual Coercion, and Injury. Except for the Negotiation, other subdomains measure the chronicity of violence in two levels: mild and severe. The Emotional Negotiation includes three questions (items 1, 13, and 39), and the Cognitive Negotiation consists of three questions (items 3, 59, and 77). The Psychological Aggression comprises eight questions (items 5, 35, and 49 for mild psychological aggression and 25, 29, 65, 67, and 69 for severe psychological aggression). The Physical Assault consists of 12 questions (items 7, 9, 17, 45, 53 for mild physical assault and items 21, 27, 33, 37, 43, 61, 73 for severe physical assault). The Sexual Coercion includes seven questions (items 15, 51, and 63 for mild sexual coercion and items 19, 47, 57, and 75 for severe sexual coercion). Lastly, the Injury comprises six questions (items 11 and 71 for mild injury and 23, 31, 41, and 55 for severe injury). The Negotiation subscale is calculated by combining the emotional and cognitive negotiation subscales. Subscales of psychological violence, physical assault, sexual coercion, and injury are calculated separately by summing the mild and severe levels of violence in each subscale.

To assess the frequency of various dimensions of violence, selecting options 1 to 6 for questions of any specific subdomain was considered as the presence of violence. Choosing option 0 or 7 for all items within a particular subdomain was considered as an absence of violence in that specific subdomain. Choosing option 7 meant that violence did not occur during pregnancy. The overall violence score was calculated by adding all violence subdomains except the negotiation subdomain. In this study, CTS2 was used for a one-year period. The CTS2 had a high internal consistency with Cronbach α values of 0.79–0.95 recorded for each dimension in its English version [21]. Panaghi et al. examined the validity and reliability of this questionnaire in Iran and reported that Cronbach's alpha was between 0.66 and 0.86 [22].

The Edinburgh postnatal depression scale (EPDS)

This scale was designed by Cox et al. in 1987 to measure depression during pregnancy and postpartum periods. This tool consists of ten four-option questions. The options are ordered from low to high severity in some questions (items 1, 2, and 4) and from high to low severity

in others (items 3, 5, 6, 7, 8, 9, 10). Each option of the questions assigns a score from 0 to 3 based on the severity indicated, and the total score, ranging from 0 to 30, is obtained by summing the scores of all 10 questions. The validity of this scale was calculated to be 0.78 using the concurrent validity method with the Edinburgh Scale and Beck Depression Scale, and the reliability of this scale was estimated to be 0.75 using Cronbach's alpha and split-half method [23]. Montazeri et al. reported Cronbach's alpha for this questionnaire in the postpartum period between 0.77 and 0.86, with a correlation coefficient of 0.80 [24].

The postpartum specific anxiety scale (PSAS-RSF)

This scale was developed by Davies et al. in 2016, and its psychometric features were validated. This scale is a reliable tool for assessing postpartum anxiety (PPA) and consists of 51 items. This questionnaire measures four subdomains: maternal competence and attachment anxiety, concerns about infant safety and well-being, practical anxiety about infant care, and social and emotional adaptation to motherhood. Due to the large number of items, a 16-item version (PSAS-RSF) was considered the strongest theoretically and psychometrically. The PSAS-RSF 16-item version demonstrated good psychometric properties and reliability. It is the first short tool validated for measuring PPA. The findings indicate its strong theoretical significance and robust statistical validity, making it reliable and valid up to 12 months postpartum. Each factor consists of 4 items, rated on a scale of "never," "sometimes," "often," and "almost always," with scores ranging from 1 to 4. The minimum score is 16, and the maximum score is 64. The reliability of this tool showed moderate to good internal consistency, with McDonald's omega ranging from 0.65 to 0.80. For the overall tool, good reliability was indicated (McDonald's omega=0.88) [25]. Mashayekh-Amiri and colleagues examined the psychometric properties of this tool in Iran. The validity of the questionnaire was assessed using the Content Validity Index (CVI) and Content Validity Ratio (CVR), which were calculated as 0.91 and 0.97, respectively. The Cronbach's alpha coefficient was reported as 0.72, and the Intra-class Correlation Coefficient (ICC) was 0.79 [26].

The Barkin index of maternal functioning (BIMF)

This questionnaire assesses postpartum maternal functioning. Developed by Barkin et al. in 2007, this questionnaire comprises 20 items organized into seven subscales: self-care (items 2, 11, and 13), infant care (items 12 and 14), mother-infant interaction (items 4, 5, and 15), maternal psychosocial well-being (items 1, 2, 3, 5, 7, 10, 11, 16, 18, 20), social support (items 6, 8, and 9), management (items 7, 11, 13, 14, 18), and adaptation (items 17 and 19). Each item is scored from 0 to 6, with a possible range of 0 to 120. A higher score indicates better

maternal functioning. This questionnaire is used to measure maternal functioning during the 12 months following childbirth, and its essential characteristics include (a) patient-centeredness, (b) comprehensive coverage of postpartum functioning, (c) favorable psychometric properties, and (d) applicability in both research and clinical settings [27]. Mirghafourvand et al. validated this tool in Iran, confirming a 17-item Persian version with two factors: maternal needs (items 6, 7, and 8) and maternal competence (items 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 17, 19, 20). The Cronbach's alpha coefficient and the Intraclass Correlation Coefficient (ICC) were calculated as 0.88 and 0.85, respectively, indicating the reliability and validity of the instrument [28].

Data analysis

The data were analyzed using SPSS Version 24 software. The normality of quantitative data was assessed using kurtosis-skewness measures and visual diagrams (histograms), confirming normal distribution for all variables. For descriptive statistics of sociodemographic and maternal characteristics, frequency (percentage) was used for categorical variables, and mean (standard deviation) for quantitative variables. For bivariate analysis of the association between subdomains of violence, maternal functioning, postpartum depression, and anxiety, the independent samples t-test was employed. Initially, Pearson correlation, the independent samples t-test, and one-way ANOVA were conducted to assess the relationship between sociodemographic and maternal characteristics with maternal functioning, anxiety, and depression scores. Variables with a significance level of $p < 0.05$, which were significantly associated with maternal functioning, anxiety, and depression, were considered potential confounding variables. Domestic violence as the independent variable, and maternal functioning, anxiety, and depression as the dependent variables were entered into the general linear model.

Results

Participants were enrolled in the study from June 2023 to October 2023, spanning eight months. A total of 405 postpartum women were considered for entry into the study, with 89 individuals excluded for various reasons such as lack of willingness to participate (10 individuals), illiteracy (3 individuals), underlying illness (35 individuals), infant hospitalization (30 individuals), and twin pregnancy (7 individuals). Additionally, four participants were excluded due to their spouses' unwillingness to continue collaboration. The participant response rate was 98.73%.

The average (SD: standard deviation) age of the women was 28.61 (6.73) years, and the average (SD) age of their spouses was 33.98 (6.19) years. Most women (94.9%)

were homemakers, and most spouses (73.7%) were self-employed. Approximately one-third of the women (33.2%) had a diploma. Less than one-fifth of the spouses (17.7%) and women (12.7%) had a university degree. Most women (72.5%) reported having a moderate economic status. About one-third of the participants (32.9%) received considerable support from their spouses, while less than one-fifth of the women (17.4%) received considerable support from their families. Most women (75.9%) expressed complete satisfaction with their marital life. Around 80% of the women received help in caring for their infants. Approximately one-fourth of the participants (24.7%) lived with their spouse's family (Table 1).

More than two-fifths of the women (40.5%) experienced their first childbirth. Approximately half of the women (48.4%) had a vaginal delivery. About one-third of the participants (28.1%) experienced unplanned pregnancies (Table 2).

The majority of women (84.8%) reported experiencing one or more types of IPV, including psychological, physical, or sexual abuse. Approximately one-third (32.9%) reported psychological abuse, 21.2% reported physical violence, 49.4% reported sexual coercion, and 6.3% reported injuries (Table 3).

The mean (SD) of maternal functioning scores was 106.46 (9.32) in women with experience of violence and 110.10 (8.39) in women without experience of violence. According to the independent t-test, the mean maternal functioning score in women without experience of violence was significantly higher than in those with experience of violence (MD=3.64, 95% CI=6.47 to 0.80, $p=0.012$). The mean (SD) depression score was 6.75 (4.84) in women with experience of violence, and 4.16 (3.85) in women without violence experience, showing that women without experience of violence had significantly lower depression scores than those with experience (MD = -2.59, 95% CI = -4.04 to -1.13, $p=0.01$). Similarly, for the anxiety variable, the mean (SD) anxiety score was 22.91 (4.37) in women with experience of violence and 20.91 (4.07) in women without experience, indicating that women without experience of violence had significantly lower anxiety scores compared to those with experience (MD = -1.99, 95% CI = -3.30 to -0.68, $p=0.006$) (Table 3).

According to the independent t-test, subdomains of violence, including mild and severe psychological injury, severe and mild physical violence, and mild injuries, were significantly associated with maternal functioning scores (Table 4). Additionally, based on the bivariate tests (Pearson correlation, independent t-test, and one-way ANOVA), variables such as the age of women, BMI, and prenatal care provider showed significant associations with maternal functioning. These variables, along with the violence variable, were included in a general

Table 1 Sociodemographic characteristics of participants ($n = 316$)

Variables	Mean (SD) ^a	Variables	Number (Percent)
Age	(6.73) 28.61	Job	
Husband age	33.98 (6.19)	Housewife	300 (94.9)
Gestational age	38.38 (1.23)	Employed	16 (5.1)
BMI(Kg/m²)	25.71 (4.48)	Husband's Family support	
Education		Too much	31 (9.8)
Illiterate	2 (0.6)	Much	74 (23.4)
Elementary	30 (9.2)	Moderate	83 (26.3)
Secondary school	115 (36.4)	Low	42 (13.3)
High school	24 (7.6)	Very little	86 (27.2)
Diploma	105 (33.2)	Marital Satisfaction	
Academic	40 (12.7)	Completely satisfied	240 (75.9)
Husband's job		Relatively satisfied	52 (16.5)
Unemployed	3 (0.9)	Neither satisfied nor dissatisfied	20 (6.3)
Worker	50 (15.8)	Relatively dissatisfied	3 (0.9)
Employee	22 (7.0)	Completely dissatisfied	1 (0.6)
Shopkeeper	8 (2.5)	Help to take care of the baby	
Others ^b	233 (73.7)	Yes	253 (80.0)
Husband's education		No	63 (19.9)
Elementary	36 (11.4)	Housing status	
Secondary school	100 (31.6)	Private	210 (66.5)
High school	22 (7.0)	Rental	106 (33.5)
Diploma	102 (32.3)	Living with the spouse's family	
Academic	56 (17.7)	Yes	78 (24.7)
Sufficiency of income for expenses		No	238 (75.3)
Completely enough	68 (21.5)	Location	
Somewhat enough	229 (72.5)	City	205 (64.9)
Not enough	19 (6.0)	Village	111 (35.1)
Husband's support level		Family's support level	
Too much	104 (32.9)	Too much	55 (17.4)
Much	96 (30.4)	Much	137 (43.4)
Moderate	104 (32.9)	Moderate	87 (27.5)
Low	10 (3.2)	Low	15 (4.7)
Very little	2 (0.6)	Very little	22 (7.0)

^a Standard Deviation; ^b It means driver, baker, hairdresser, builder

linear model, which indicated that the mean maternal functioning score was significantly higher in individuals who did not experience mild physical violence compared to those who did ($\beta = 2.94$, 95% CI = 0.34 to 5.55, $p = 0.027$). Similarly, the mean maternal functioning score was significantly higher in individuals with prenatal care controlled by a physician ($\beta = 5.24$, 95% CI = 1.93 to 8.52, $p = 0.002$) and controlled by a private midwife ($\beta = 7.48$, 95% CI = 2.61 to 12.35, $p = 0.003$) compared to those controlled by a health caregiver (Table 5).

Furthermore, regarding the variable of depression, according to the independent t-test, subdomains of violence, including mild psychological injury, mild physical violence and mild sexual coercion were significantly associated with depression (Table 4). Also, based on the bivariate tests, variables such as the occupation of women, spouse support, family support, marital satisfaction, assistance in infant care, and residential location

showed significant associations with depression. These variables, along with the violence variable, were entered into a general linear model, which showed that the mean depression score was significantly lower in individuals who did not experience violence compared to those who did ($\beta = -1.75$, 95% CI = -3.40 to -0.10, $p = 0.038$). Similarly, the mean depression score was significantly lower in individuals who did not experience mild physical violence compared to those who did ($\beta = -1.51$, 95% CI = -2.91 to -0.10, $p = 0.035$). The mean depression score was significantly higher in homemakers compared to those employed ($\beta = 3.53$, 95% CI = 1.22 to 5.84, $p = 0.003$) (Table 6).

According to the independent t-test, subdomains of violence, including severe psychological injury and severe physical violence, were significantly associated with postpartum anxiety (Table 4). Additionally, based on the two-variable tests (Pearson correlation, independent t-test,

Table 2 Obstetrics and newborns characteristics of participants ($n = 316$)

Variable	Number (Percent)	Variable	Number (Percent)
Parity		Drug analgesia	
1	128 (40.5)	Yes	91 (59.4)
2	132 (41.8)	No	62 (40)
3	44 (13.9)	Prenatal care provider	
4 & 5	12 (3.8)	Obstetrician	239 (75.6)
Abortion		Midwife	22 (7.0)
Yes	245 (77.5)	Health center	55 (17.4)
No	71 (5.3)	Characteristics of newborns	
Unwanted pregnancy		Variable	Mean (SD) ^b
No	227 (71.8)	Weight	3188 (408)
Yes	89 (28.1)	Height	50.47 (1.93)
Type of delivery		Head circumference	34.65 (1.28)
Vaginal	153 (48.4)	Duration of skin contact (Minute)	10.48 (19.78)
Elective C/S ^a	130 (41.1)	Apgar	
Emergency C/S ^a	33 (10.4)	First minute	8.89 (0.77)
Assessment of childbirth		The fifth minute	9.97 (0.216)
Easy	44 (14)	Variable	Number (Percent)
Medium	120 (38)	Child Sex	
Hard	152 (48.1)	Female	169 (53.5)
Episiotomy		Boy	147 (46.5)
Yes	79 (25)	Skin contact with the baby	
No	40 (13)	Yes	215 (68)
Childbirth attendant		No	101 (32)
Obstetrician	41 (13.0)	First breastfeeding	
Resident	245 (77.4)	Up to an hour after delivery	165 (52.2)
Midwife	12 (3.8)	Up to two hours after delivery	78 (24.7)
Midwifery instructor with student	18 (5.7)	After the second hour after delivery	73 (23.1)

^a Cesarean section, ^b standard deviation

Table 3 Status of intimate partner violence, depression, anxiety and maternal functioning ($n = 316$)

Variable	Number (Percent)
Psychological Aggression	104 (32.9)
Physical assault	67 (21.2)
Sexual coercion	156 (49.4)
Injury	20 (6.3)
Overall violence^a	268 (84.8)
Variable (Score range)	Mean (SD) ^b
Maternal functioning (Score range: 0-120)	107.01 (9.26)
Depression (Score range: 0-30)	22.61(4.69)
Anxiety (Score range: 16-64)	6.36 (4.79)

^a experience of one or more instances of any form of violence (psychological, physical, sexual, or injury); ^b standard deviation

and one-way ANOVA), spouse occupation, prenatal care provider, income level, and assistance in infant care showed significant associations with postpartum anxiety. These variables and the violence variable were included in a general linear model. The results of the general linear model indicated that the mean anxiety score was significantly lower in individuals with high income ($\beta = -3.38$, 95% CI = -5.73 to -1.04, $p=0.005$) and moderate-income ($\beta = -2.21$, 95% CI = -4.35 to -0.07, $p=0.043$) compared

to those with low income. Furthermore, the mean anxiety score was significantly higher in individuals whose spouses were employees compared to those with freelance spouses ($\beta=3.05$, 95% CI=1.03 to 5.07, $p=0.003$). Additionally, the mean anxiety score was significantly lower in individuals whose prenatal care was managed by a physician ($\beta = -1.98$, 95% CI = -3.64 to -0.31, $p=0.020$) or by a private midwife ($\beta = -2.76$, 95% CI = -5.22 to -0.29, $p=0.028$) compared to those whose prenatal care was managed by a pregnancy health center (Table 7).

Discussion

Using a prospective design, this study thoroughly examined the relationship between violence with anxiety, depression, and maternal functioning, while also focusing on potential influencing variables. The majority of women (84%) reported experiencing one or more forms of psychological, physical, or sexual violence. The highest prevalence of violence was related to the domain of sexual coercion, reported by approximately half of the participants (49.4%). The average maternal functioning score was significantly lower among women who experienced IPV compared to those who did not. The average scores for depression and anxiety were significantly

Table 4 The relationship between domestic violence dimensions, maternal functioning, depression and anxiety in participants ($n = 316$)

Domestic violence dimensions	Maternal functioning		Depression		Anxiety	
	Mean (SD) ^a	P^b	Mean (SD)	P	Mean (SD)	P
Negotiation Emotional						
Yes	100.50 (13.78)	0.082	8.16 (6.01)	0.353	25.83 (3.54)	0.089
No	107.14 (9.14)		6.32 (4.77)		22.54 (4.69)	
Negotiation Cognitive						
Yes	102.42 (13.59)	0.186	6.85 (4.74)	0.784	24.28 (4.53)	0.340
No	107.11 (9.15)		6.35 (4.8)		22.57 (4.69)	
Psychological Aggression (Minor)						
Yes	106.29 (9.02)	0.044	6.99 (4.86)	0.001	23.01 (4.66)	0.240
No	108.54 (9.63)		5.02 (4.36)		21.74 (4.64)	
Psychological Aggression (Sever)						
Yes	105.97 (9.48)	0.023	5.78 (4.84)	0.057	32.18 (4.72)	0.014
No	108.33 (8.83)		6.81 (4.71)		21.88 (4.56)	
Physical assault (Minor)						
Yes	103.94 (10.22)	0.001	8.15 (4.56)	< 0.001	23.36 (4.62)	0.124
No	107.90 (8.79)		5.84 (4.74)		22.39 (4.69)	
Physical assault (Sever)						
Yes	101.30 (14.55)	0.015	7.68 (5.48)	0.258	24.93(4.54)	0.042
No	107.56 (8.84)		6.29 (4.75)		22.48 (6.69)	
Sexual coercion (Minor)						
Yes	106.55 (9.28)	0.570	6.94 (4.58)	0.028	22.75 (4.99)	0.370
No	107.49 (9.25)		5.76 (4.58)		22.45 (4.36)	
Sexual coercion (Sever)						
Yes	107.00 (9.30)	0.811	10.00 (4.47)	0.087	22.62 (4.71)	0.770
No	108.00 (6.89)		6.3 (4.78)		22.00 (2.91)	
Injury (Minor)						
Yes	100.89 (12.71)	0.003	8.26 (4.56)	0.075	23.73 (5.18)	0.281
No	107.40 (8.88)		6.24 (4.78)		22.53 (4.65)	
Injury (Sever)						
Yes	99.00 (23.89)	0.051	9.00 (8.42)	0.216	25.80 (8.40)	0.126
No	107.14 (8.87)		6.32 (4.72)		22.55 (4.61)	
Overall violence						
Yes	106.46 (9.32)	0.012	6.75 (4.84)	0.001	22.91 (4.73)	0.006
No	110.10 (8.39)		4.16 (3.85)		20.91 (4.07)	

^a standard deviation; ^b independent t- test

higher among women who experienced IPV. Analysis using a general linear model and controlling for sociodemographic and maternal factors showed that women who experienced any violence had significantly higher depression scores and lower maternal functioning scores.

The current study found that 84% of women experienced one or more forms of intimate partner violence (IPV), which is higher than the 68.7% reported by Hesami et al. regarding domestic violence during pregnancy [4]. Similarly, Amiri et al. noted that over half (58%) of women faced psychological, physical, or sexual violence in the first year postpartum [16]. Supporting these findings, Desmarais et al. reported that 84% of postpartum women experienced violence before pregnancy, with over two-thirds (70%) experiencing it during pregnancy [29]. A study in West Azerbaijan Province (which shares more

cultural similarities with East Azerbaijan Province) with a sample of 1,300 pregnant women aged 18 to 39 showed that 72.8% of women experienced IPV in their last pregnancy [30]. This high prevalence of spousal violence among the study population underscores the critical need to enhance prevention and intervention strategies to protect the health and well-being of women, particularly during the vulnerable periods of postpartum and pregnancy.

The prevalence of domestic violence and its types varies based on the study population, the culture of the society, the screening tools used, and the timing and methods of research [31]. Multiple factors contribute to the high prevalence of IPV in this study, including the use of the CTS2 scale for assessing IPV, which has led to calculating higher rates of violence compared to other common

Table 5 Relationship of maternal functioning and violence based on general linear model

Variable	β (95% confidence interval)	<i>p</i>
Violence (Reference: Yes)		
No	0.91 (-2.92 to 4.75)	0.639
Psychological Aggression (Minor) (Reference: Yes)		
No	0.69 (-2.09 to 3.48)	0.624
Psychological Aggression (Sever) (Reference: Yes)		
No	1.02 (-1.27 to 3.32)	0.382
Physical assault (Sever) (Reference: Yes)		
No	3.99 (-0.68 to 8.66)	0.094
Physical assault (Minor) (Reference: Yes)		
No	2.94 (0.34 to 5.55)	0.027
Injury (Minor) (Reference: Yes)		
No	3.35 (-1.44 to 8.16)	0.017
Injury (Sever) (Reference: Yes)		
No	3.32 (-5.59 to 12.24)	0.464
Prenatal care provider (Reference: Health center)		
Obstetrician	5.24 (1.93 to 8.52)	0.002
Midwife	7.48 (2.61 to 12.35)	0.003
Age	0.05 (-0.09 to 0.20)	0.492
BMI	-0.22 (-0.45 to 7.83)	0.050

Adjusted R²: 0.07 R²:0.10

tools [32]. Also, the high prevalence of violence in the studied society, along with the conducted research, indicates a significant direct relationship between experiencing violence and socioeconomic vulnerability, as well as cultural factors. Socioeconomic, sociodemographic, and behavioral characteristics frequently contribute to the risk of individuals being both perpetrators and victims of violence against women during pregnancy [33]. The socioeconomic status of the participants offers critical insight into the dynamics of IPV within this population. Women's economic independence is recognized as a protective factor against IPV in developing countries [34]. With a majority of women identifying as homemakers (94.9%), there may be limited financial independence, which can create a power imbalance in relationships. Furthermore, the educational background of the participants and their spouses is noteworthy. This level of education can influence perceptions of gender roles and relationships, potentially perpetuating cycles of violence. Lower educational attainment is often associated with limited awareness of rights and resources available to victims of IPV [12]. This lack of knowledge can hinder women's ability to seek help or escape abusive situations, further entrenching them in cycles of violence. 35% of the participants resided in the village, while the city dwellers primarily came from the outskirts and less privileged areas, relying on government services due to their economic circumstances. This socioeconomic status may contribute to the high prevalence of domestic violence [35].

In the present study, the highest prevalence of violence was related to the domain of sexual coercion, reported by approximately half of the participants (49.4%). In

Amiri et al.'s study, the prevalence of sexual violence was reported as 21%, which is lower than in the current study [16]. The prevalence of sexual violence during pregnancy in Iran was reported as 28%, which is 11% higher than the global prevalence [36]. Moreover, Hassan et al. reported a prevalence of sexual violence as 30.2% [30]. The highest reports of sexual violence domain were related to unwanted sexual intercourse without physical violence (40.8%). In Naghizadeh et al.'s study, the primary type of sexual violence was reported as sexual coercion without consent [37]. According to the World Health Organization (WHO), sexual health requires "a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences free of coercion, discrimination, and violence." Emphasis on unwanted sexual intercourse is considered a form of violence that can have psychological and social consequences on individuals' lives [38].

Sexual violence is caused by a variety of interpersonal, relational, societal, and sociocultural factors. Social and cultural factors include traditional gender norms, social norms, patriarchal culture that allows men to impose sexual relations, taboos and cultural restrictions on discussing sexual relationships, and insufficient education and awareness regarding sexual consent and marital rights. Individual factors include a lack of understanding and respect for the partner's desires, inadequate communication skills, and lack of conflict resolution between couples, which can contribute to the high prevalence of sexual coercion. Additionally, mental disorders such as impulse control disorders in violent individuals, substance abuse, and alcohol misuse can lead to violent

Table 6 Relationship of depression and violence based on general linear model

Variable	β (95% confidence interval)	<i>p</i>
Violence (Reference: Yes)		
No	-1.75 (-3.40 to -0.10)	0.038
Physical assault (Minor) (Reference: Yes)		
No	-1.51 (-2.91 to -0.10)	0.035
Injury (Sever) (Reference: Yes)		
No	-5.49 (-11.85 to 0.84)	0.090
Psychological Aggression (Minor) (Reference: Yes)		
No	-0.76 (-1.96 to 0.43)	0.212
Sexual coercion (Minor) (Reference: Yes)		
No	-0.31 (-1.43 to 0.81)	0.588
Husband's support (Reference: Very little)		
Too much	-1.68 (-8.25 to 4.89)	0.615
Much	-1.48 (-8.05 to 5.09)	0.657
Moderate	-0.45 (-6.96 to 6.05)	0.890
Low	-2.14 (-9.43 to 5.06)	0.553
Family support (Reference: Very little)		
Too much	-1.24 (-3.26 to 0.77)	0.225
Much	-0.95 (-2.52 to 0.62)	0.234
Moderate	-0.96 (-2.38 to 0.46)	0.196
Low	-1.43 (-3.19 to 0.32)	0.185
Marital Satisfaction (Reference: Completely dissatisfied)		
Completely satisfied	1.06 (-8.78 to 10.91)	0.832
Relatively satisfied	2.29 (-7.52 to 12.12)	0.646
Neither satisfied nor dissatisfied	1.98 (-7.97 to 11.94)	0.695
Relatively dissatisfied	0.82 (-9.82 to 11.47)	0.878
Help to take care of the baby (Reference: Yes)		
No	1.17 (-0.15 to 2.51)	0.084
Location (Reference: The suburbs)		
City	2.20 (-1.10 to 5.51)	0.191
Village	0.95 (-2.40 to 4.31)	0.576
Job (Reference: Employed)		
Housewife	3.53 (1.22 to 5.84)	0.003

Adjusted R²: 0.16 R²: 0.23

behaviors [39]. These individual and cultural factors play a crucial role in shaping and perpetuating this violent behavioral pattern and should be addressed in prevention and treatment programs.

In women who experienced violence, there was a significantly lower average maternal functioning score compared to those who did not experience violence. Similar studies have indicated that women who experienced IPV during the perinatal period were less likely to breastfeed and discontinued breastfeeding by four weeks postpartum [40]. Additionally, exposure to IPV during pregnancy may have adverse effects on mother-child interactions or attachment. IPV during the perinatal period is associated with less favorable responsiveness to infants, negative beliefs about parental competence, reduced maternal responsiveness, and potentially increased risk of hostile caregiver-child interactions and permissive parenting practices [32].

Women who experience intimate partner violence (IPV) have significantly higher average scores of depression and anxiety. Research by Howard et al. demonstrates a consistent association between IPV and elevated levels of perinatal mental health disorders, such as pre- and postnatal anxiety and depression [41]. Similarly, Ferrari et al. found that individuals exposed to violence report anxiety symptoms at nearly three times the rate of non-exposed individuals [42]. Halim et al. (2018) highlighted that IPV during pregnancy increases the risk of pre- and postnatal depression, with the risk varying based on the type and severity of IPV [43]. Depressed mothers often struggle with relationship stress and mental health challenges, resulting in decreased maternal involvement and ineffective parenting, which can lead to difficult infant temperaments. This creates a vicious cycle where IPV during pregnancy contributes to mother-to-infant bonding failure, which may, in turn, lead to abusive parenting behaviors, negatively affecting the child's

Table 7 Relationship of anxiety and violence based on general linear model

Variable	β (95% confidence interval)	<i>p</i>
Violence (Reference: Yes)		
No	-0.60 (-2.53 to 1.32)	0.539
Physical assault (Sever) (Reference: Yes)		
No	-1.77 (-4.11 to 0.56)	0.137
Psychological Aggression (Sever) (Reference: Yes)		
No	-0.85 (-2.02 to 0.31)	0.151
Husband's Job (Reference: Others)		
Unemployed	0.69 (-4.50 to 5.89)	0.793
Worker	0.04 (-1.34 to 1.44)	0.946
Employee	3.05 (1.03 to 5.07)	0.003
Shopkeeper	-0.68 (-3.89 to 2.52)	0.675
Prenatal care provider (Reference: Health center)		
Obstetrician	-1.98 (-3.64 to -0.31)	0.020
Midwife	-2.76 (-5.22 to -0.29)	0.028
Income (Reference: Not enough)		
Completely enough	-3.38 (-5.73 to -1.04)	0.005
Somewhat enough	-2.21 (-4.35 to -0.07)	0.043
Help to take care of the baby (Reference: Yes)		
No	-1.02 (-0.27 to 2.31)	0.121

Adjusted R²: 0.09 R²:0.12

development [44]. Research suggests that working outside the home may serve as a protective factor against postpartum depression [45]. The study's findings underscore that employment status and women's roles at home also influence their levels of depression. This highlights the urgent need to pay special attention to the mental health of women affected by domestic violence, including homemakers.

Women from low-income families showed higher anxiety scores, indicating a connection between socioeconomic status, gender-based violence, and mental health [30]. In contrast, those who received prenatal care from private obstetricians and midwives experienced lower postpartum anxiety and better maternal functioning, likely due to the superior support offered by private clinics, typically linked to higher socioeconomic status. Additionally, sufficient social support during pregnancy is associated with increased self-efficacy and improved maternal outcomes [46, 47]. Research indicates that social support plays a crucial role in reducing stress and enhancing maternal mental health [48]. The analysis reveals a negative relationship between anxiety and receiving help with baby care, highlighting the importance of support systems for new mothers. The interplay between income and anxiety, coupled with the protective effect of receiving help, underscores the complexity of maternal mental health. It highlights the need for comprehensive support systems that address both economic factors and the necessity for social support in promoting maternal well-being.

Strengths, limitations, and future research

The use of standard tools for data collection was one of the strengths of this study. The present study has certain limitations. Firstly, convenience sampling method was the limitation of the current study, which involved recruitment from two public hospitals, where patients predominantly came from nearby rural areas and urban outskirts. This reduces the generalizability of the findings. Also, the present study was conducted on postpartum women of Azeri ethnicity. Thus, the results cannot be generalized to Iranian women of other ethnicities and to other countries. Secondly, the reliance on self-reported questionnaires for sensitive topics such as domestic violence and mental health can result in underreporting, influenced by stigma, fear of retaliation, and social desirability bias. Future studies should explore alternative data collection methods, such as anonymous online surveys or indirect questioning techniques, to reduce the risks associated with self-reporting. Additionally, future interventions should prioritize providing accessible resources for new mothers, especially those facing financial stress, to improve their mental health outcomes and overall quality of life.

Conclusion

The results indicate the negative impact of IPV on maternal functioning, as well as on women's depression and anxiety during the critical postpartum period. The high prevalence of spousal violence in this study underscores the urgent need for comprehensive, multi-sectoral approaches to address this public health crisis. Strategies should include strengthening legal protections,

improving access to support services, and implementing community-based interventions aimed at challenging social norms that perpetuate violence against women.

In addition, the focus of this study on the relationship between spousal violence and maternal functioning and mental health is highly significant, as the health and well-being of mothers have considerable long-term implications for the physical, cognitive, and emotional development of children. Interventions aimed at supporting and empowering women during the postpartum period while also addressing the root causes of gender-based violence are crucial for enhancing overall family health and well-being in communities.

Abbreviations

BIMF	The Barkin Index of Maternal Functioning
CTS2	Revised Conflict Tactics Scale
EPDS	The Edinburgh Postnatal Depression Scale
IPV	Intimate Partner Violence
PSAS	The Postpartum Specific Anxiety Scale
PTSD	Post-Traumatic Stress Disorder
WHO	World Health Organization

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Author contributions

MM and LAN contributed to the design of the study. LAN have written the first draft of this article and MM provided supervision to the manuscript drafting and revisions. MM and LAN analyzed data. Authors have critically read the text and contributed with inputs and revisions, and approved the final manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study was approved by the ethics committee of Tabriz University of Medical Sciences (IR.TBZMED.1402.387). A written informed consent was obtained from all participants after explaining the objectives and procedure of the study. All the study procedures were carried out in accordance with the principles in Declaration of Helsinki 1964 and its amendments later on.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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