

ORIGINAL RESEARCH OPEN ACCESS

Comparison of Domestic Violence Among Pregnant Women in Rural and Urban Areas of Khyber Pakhtunkhwa, Pakistan

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Received: 24 February 2026 | **Revised:** 5 May 2026 | **Accepted:** 24 July 2026

Keywords: domestic violence | pregnancy | risk factors | rural–urban comparison

ABSTRACT

Objective: To compare the patterns of domestic violence among pregnant women residing in rural and urban areas of Khyber Pakhtunkhwa, Pakistan.

Methods: This cross-sectional comparative study included 500 pregnant women (250 rural, 250 urban) attending the Department of Gynecology and Obstetrics in Khyber Pakhtunkhwa, Pakistan. Domestic violence was measured using the 25-item Domestic Violence Scale, covering seven domains: neglect, psychological, spiritual, verbal, economic, physical, and sexual violence. Independent variables included residence, age, education, occupation, socioeconomic status, trimester, and awareness of support services. Group comparisons were performed using the Chi-square and the Mann–Whitney *U* tests. Linear regression analysis identified factors independently associated with domestic violence.

Results: Rural women had significantly higher domestic violence scores than urban women ($p < 0.001$), with lower awareness of support services (22.0% vs. 70.6%; $p = 0.001$). All violence domains were significantly higher in rural participants ($p < 0.001$). Regression analysis showed urban residence was associated with lower violence scores ($\beta = -7.04$; $p < 0.001$), while the third trimester was associated with higher scores ($\beta = 2.58$; $p = 0.039$); other variables were not significant after adjustment.

Conclusion: Pregnant women residing in rural areas demonstrated greater vulnerability to domestic violence. In the adjusted analysis, urban residence was associated with lower violence scores, whereas the third trimester was associated with increased scores.

Clinical Trial Registration: N/A

1 | Introduction

Domestic violence refers to any act of harm, pressure, deprivation, or threat that can lead to psychological, emotional, or physical injury [1]. It is present in various forms like physical assault, psychological abuse, and sexual violence [2]. The reported prevalence of domestic violence in pregnancy varies widely, from 1.6% to 66%, depending on cultural and social factors [3].

The World Health Organization reports that about one in three women worldwide (35%) have experienced physical or sexual violence, most often from an intimate partner [4]. Partner-related violence accounts for the majority of cases, with nearly 30% of women reporting abuse during a relationship [5]. Evidence suggests that intimate partner violence (IPV) should not be viewed as isolated acts but rather as a cluster of interrelated behaviors that often coexist and reinforce one another, with exposure to one form of violence (e.g., physical or sexual)

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significantly increasing the likelihood of experiencing other forms such as emotional, economic, and controlling behaviors [6]. Domestic violence remains a major global health concern with serious implications for maternal and child health [7]. Other population-based studies, especially in Turkey, reported that intimate partner violence is not limited to a single form but includes a range of interconnected behaviors, such as physical, emotional, and economic abuse, and controlling actions. These forms of violence are often linked to socioeconomic disadvantages, including lower levels of education and income, as well as partner-related factors like substance use and aggressive tendencies [8–10].

Pregnant women are especially vulnerable to domestic violence because this period involves major physical, hormonal, and emotional changes. Physiologically, pregnancy places stress on the body, and symptoms such as fatigue, nausea, and restricted mobility can reduce a woman's ability to protect herself or seek help [11]. Emotionally, high sensitivity, anxiety about labor and delivery, and reliance on the partner for social and financial support can increase susceptibility to abuse [12]. In addition, pregnancy may exacerbate existing power imbalances within relationships, particularly in patriarchal settings where women's autonomy is already constrained [8]. In some settings, pregnancy may also worsen existing power imbalances in relationships, making women more dependent and less able to leave unsafe situations. Violence during pregnancy has serious medical consequences, including maternal complications, miscarriage, preterm birth, low birth weight, and impaired fetal growth [13].

Studies from Pakistan show that domestic violence during pregnancy is closely associated with poor maternal health and social risk factors [14, 15]. Women exposed to abuse are more likely to develop complications such as anemia, preterm labor, pregnancy-related morbidity, and even long-term infertility [15]. At the same time, determinants like low socioeconomic status, early age at marriage, limited education, unemployment, and rural residence increase the risk of violence [16]. Although the exact prevalence varies across regions, the trend is consistent: domestic violence in pregnancy is both a medical and social issue, where biological outcomes like obstetric complications are strongly influenced by underlying social and economic inequalities [15]. Despite this, most studies conducted in Pakistan remain descriptive and are often limited to specific populations or healthcare settings, restricting the generalizability of their findings.

Importantly, there is a lack of comparative evidence examining how domestic violence differs between rural and urban populations, particularly during pregnancy. These settings vary substantially in terms of literacy, healthcare access, economic opportunities, cultural norms, and women's autonomy, all of which may influence both the occurrence and reporting of violence. While rural women may be more exposed to structural disadvantages such as poverty and limited access to services, urban women may experience different stressors, including financial pressures and evolving family dynamics. Understanding these differences is essential for developing targeted, context-specific interventions and effective public health strategies. Therefore, this study addresses a

critical gap by providing a direct comparison of domestic violence patterns among pregnant women in rural and urban areas of Khyber Pakhtunkhwa, Pakistan. By focusing on a high-risk population and incorporating a comparative framework, this study offers novel insights into context-specific determinants of violence and contributes to the existing literature by informing tailored prevention and intervention strategies.

The objective of this study was to compare the patterns of domestic violence among pregnant women residing in rural and urban areas of Khyber Pakhtunkhwa, Pakistan.

2 | Materials and Methods

2.1 | Study Design and Setting

This cross-sectional comparative study was conducted among 500 pregnant women presenting to the Department of Gynecology and Obstetrics from both rural and urban areas of Khyber Pakhtunkhwa. Participants were recruited using a non-probability consecutive sampling technique. Before enrollment, the purpose and procedures of the study were explained in detail, and written informed consent was obtained from all participants. Ethical approval was granted by the institutional ethics committee before data collection (368/LRH/MTI). Participant confidentiality and anonymity were strictly maintained, and all collected information was used solely for research purposes in accordance with ethical and medical research standards.

2.2 | Population of the Study

Khyber Pakhtunkhwa is one of the major provinces of Pakistan, comprising a large and diverse population distributed across both rural and urban areas. According to the 2023 Census, the population of Khyber Pakhtunkhwa is 40,856,097, making it the third-most populous province in the country, with an annual growth rate of 2.38%. The population consists of approximately 51% males and 49% females, and spans an area of 101,741 km². This study was conducted at Lady Reading Hospital, Peshawar, a major tertiary care referral center that receives patients from all districts of the province. A high volume of pregnant women from different socioeconomic and geographic backgrounds present to this hospital for antenatal and obstetric care.

2.3 | Sample Size

The sample size was calculated using the prevalence of domestic violence during pregnancy reported by Sana et al., which was 41% [17]. Applying the formula for a single population proportion ($(n = Z^2 [2] (1 - p) / d [2])$ with a 95% confidence level ($Z = 1.96$), prevalence ($p = 0.41$), and margin of error ($d = 0.05$), the required sample size was 372. After accounting for a possible 10%–15% non-response rate, the final sample size was increased to 500 participants, with 250 women from rural areas and 250 from urban areas to allow a balanced comparison between groups.

2.4 | Eligibility Criteria

The study population consisted of pregnant women in any trimester who were permanent residents of the selected rural and urban regions of Khyber Pakhtunkhwa, Pakistan. Women who were willing to participate and provided written informed consent after receiving a detailed explanation of the study protocol were included. Participants with severe psychiatric or cognitive disorders that could impair their ability to comprehend or respond accurately to the questionnaire were excluded. Likewise, non-residents or temporary visitors were not enrolled to ensure the sample accurately represented the local obstetric population.

2.5 | Data Collection Procedure

Data were collected through structured, face-to-face interviews conducted in the participants' native language (Pashto) in a private setting to ensure confidentiality. The questionnaire was translated into Pashto and then back-translated into English to ensure linguistic accuracy. Before data collection, the instrument was pilot tested on a small sample to assess clarity and cultural appropriateness, and minor modifications were made accordingly. Responses were recorded in English using a pre-designed questionnaire. The questionnaire included sections on demographic characteristics such as age, occupation, and socioeconomic status, as well as information regarding the trimester of pregnancy and awareness of available support services for domestic violence. Urban participants were defined as pregnant women residing in municipal or metropolitan areas of Khyber Pakhtunkhwa (KP), where healthcare services, educational institutions, and transportation facilities are well established and readily accessible. Rural participants were defined as pregnant women residing in peripheral or village areas of KP, where access to healthcare, education, and other basic amenities is limited, and where the majority of the population is engaged in agriculture or daily wage work.

Awareness of support services was evaluated by asking participants whether they knew about any available resources for women experiencing domestic violence. This included awareness of hospital-based counseling units, social welfare departments, women's protection centers, helplines, legal aid programs, or non-governmental organizations offering psycho-social or medical support. Responses were categorized as "Yes" for participants who reported awareness of such services and "No" for those who had no knowledge of their availability or access within their community.

2.6 | Outcome Measures

Domestic violence was assessed using the Domestic Violence Scale (DVS), a 25-item instrument measuring multiple dimensions of abuse experienced within the past 12 months. Each statement was rated on a 5-point Likert scale ranging from 0 (Never) to 4 (Always). The scale included seven domains: neglect (three items), psychological violence (four items), spiritual violence (three items), verbal violence (three items), economic violence (three items), physical violence (four items), and sexual violence (five items). The neglect domain captured

emotional withdrawal and financial control, while psychological violence reflected threats, coercion, and humiliation. Spiritual violence measured religious ridicule or restriction, and verbal violence assessed shouting and abusive language. Economic violence involved control or denial of financial resources, whereas physical violence captured acts of hitting, restraint, or destruction of property. Sexual violence covered coercion, forced acts, and threats of a sexual nature. Total and subscale scores were obtained by summing the respective item responses, with higher scores indicating greater exposure to domestic violence. The internal consistency and reliability of the Domestic Violence Scale were evaluated using Cronbach's alpha coefficient. The overall scale demonstrated good internal consistency (Cronbach's alpha = 0.87).

Independent or explanatory variables include area of residence (rural vs. urban), age (continuous in years), education level (categorical: no formal education, primary, secondary, higher), occupation (categorical), socioeconomic status (low, middle, high), parity/trimester (categorical), and awareness of support services (yes/no).

2.7 | Statistical Analysis

Descriptive statistics, including frequencies, percentages, median, and interquartile range, summarized participant characteristics and prevalence of domestic violence. Comparative analyses were conducted using the Chi-square test for categorical variables (e.g., DV prevalence, awareness of support services) and the Mann-Whitney *U* test to compare total and subscale DV scores between rural and urban groups. Model assumptions were evaluated using diagnostic plots, including residuals versus fitted values, Q-Q plots, scale-location plots, and leverage statistics, along with variance inflation factors (VIF) to assess multicollinearity. Linear regression was used to identify risk factors associated with domestic violence while adjusting for potential confounders. Statistical significance was set at $p < 0.05$.

3 | Results

Because the continuous variables were not normally distributed, nonparametric tests (Mann-Whitney *U* test) were used for group comparisons. The study included 500 pregnant women, with equal representation from rural and urban areas ($n = 250$ each). The median age was comparable between the two groups (32.0 years; $p = 0.84$). Educational status differed significantly ($p < 0.001$), with urban women having a significantly higher proportion of secondary and higher education (36.4% each), whereas rural women had a significantly higher proportion with no formal education (38.8%) and primary education (29.6%). Occupational status also differed significantly ($p < 0.001$), with a statistically higher proportion of homemakers in rural areas (80.4%), while employment was statistically higher among urban women (33.6%). Socioeconomic status showed a significant difference ($p < 0.001$), with rural women more frequently belonging to the low socioeconomic group (60.0%), whereas urban women were predominantly in the middle socioeconomic group (57.6%). The distribution of

TABLE 1 | Distribution of characteristics between rural and urban Pregnant Women.

Characteristic	Rural (n = 250)	Urban (n = 250)	p value*
Age, median (IQR)	32.0 (23.0–39.0)	32.0 (24.0–39.0)	0.84
Education, n (%)			< 0.001
No formal	97 (38.8)	27 (10.8)	
Primary	74 (29.6)	41 (16.4)	
Secondary	41 (16.4)	91 (36.4)	
Higher	38 (15.2)	91 (36.4)	
Occupation, n (%)			< 0.001
Employed	49 (19.6)	84 (33.6)	
Housewife	201 (80.4)	166 (66.4)	
Socioeconomic status, n (%)			< 0.001
High	29 (11.6)	53 (21.2)	
Middle	71 (28.4)	144 (57.6)	
Low	150 (60.0)	53 (21.2)	
Trimester, n (%)			0.12
1st	42 (16.8)	58 (23.2)	
2nd	120 (48.0)	120 (48.0)	
3rd	88 (35.2)	72 (28.8)	

*Mann–Whitney *U* test.
**Pearson's χ^2 test.

participants across pregnancy trimesters did not differ significantly between the groups ($p = 0.12$) (Table 1).

The overall domestic violence score was significantly higher among rural participants compared with urban participants ($p < 0.001$) (Figure 1). Awareness of support services also differed significantly between the groups ($\chi^2 = 49.34$, $p = 0.001$), with a higher proportion of urban women reporting awareness (70.6%) (Figure 2).

Across all domains of domestic violence, rural women demonstrated statistically significantly higher median scores compared with urban women ($p < 0.001$ for all comparisons). Median neglect scores were statistically higher in rural women (3.5 vs. 2.0), as were psychological violence (5.0 vs. 3.0), verbal violence (3.0 vs. 2.0), economic violence (3.0 vs. 2.0), physical violence (4.0 vs. 3.0), and sexual violence scores (3.0 vs. 2.0). Although the median spiritual violence score was similar across groups, the distribution was wider among rural participants, suggesting comparatively greater variability (Table 2).

Model diagnostics indicated that the assumptions of linear regression were reasonably satisfied. The residuals versus fitted plot did not show any systematic pattern, supporting the assumption of linearity. The scale–location plot suggested minimal deviation from homoscedasticity. The Q–Q plot indicated a slight deviation from normality; however, given the large sample size, the estimates can be considered robust. The residuals versus leverage plot did not identify any influential observations, indicating model stability (Figure 3).



FIGURE 1 | Comparison of domestic violence scores between rural and urban participants.

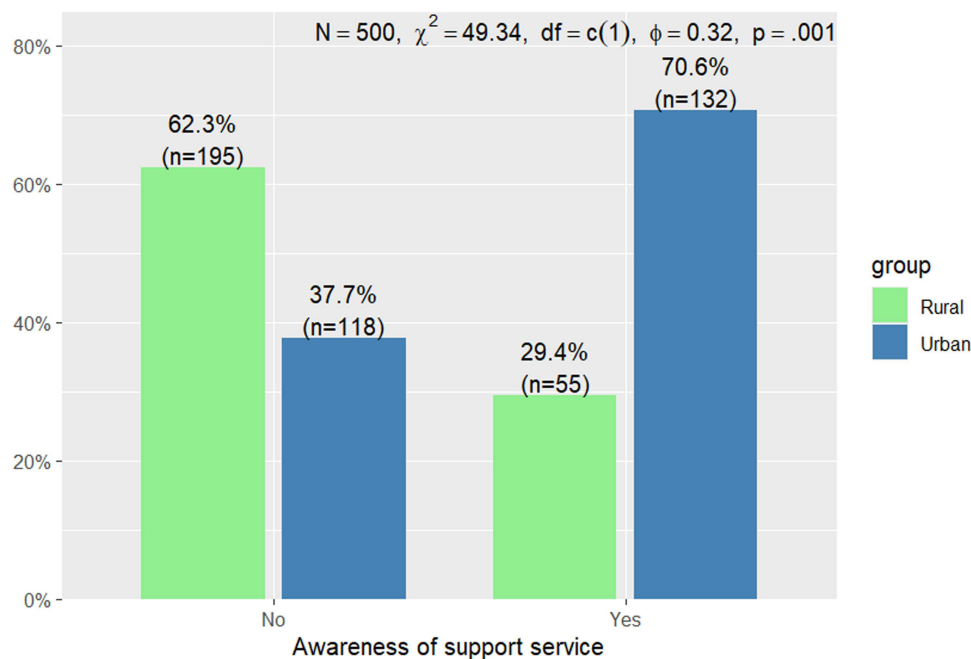


FIGURE 2 | Comparison of awareness between rural and urban participants.

TABLE 2 | Comparison of score of domestic violence pattern between rural and urban participants.

Characteristic	Rural (<i>n</i> = 250) Median (IQR)	Urban (<i>n</i> = 250) Median (IQR)	<i>p</i> value*
Neglect score	3.5 (2.0–6.0)	2.0 (1.0–4.0)	< 0.001
Psychological violence score	5.0 (3.0–8.0)	3.0 (2.0–5.0)	< 0.001
Spiritual violence score	1.0 (1.0–3.0)	1.0 (0.0–2.0)	< 0.001
Verbal violence score	3.0 (2.0–5.0)	2.0 (1.0–3.0)	< 0.001
Economic violence score	3.0 (2.0–5.0)	2.0 (1.0–4.0)	< 0.001
Physical violence score	4.0 (2.0–6.0)	3.0 (1.0–4.0)	< 0.001
Sexual violence score	3.0 (2.0–5.0)	2.0 (1.0–4.0)	< 0.001

*Mann–Whitney *U* test.

Linear regression analysis demonstrated that urban residence was statistically significantly associated with lower total violence scores compared with rural residence in both unadjusted ($\beta = -7.67$, 95% CI: -9.37 to -5.97 ; $p < 0.001$) and adjusted models ($\beta = -7.04$, 95% CI: -9.21 to -4.87 ; $p < 0.001$). Age was not significantly associated with violence scores ($p > 0.05$). Educational level showed a statistically significant association in the unadjusted model, with secondary and higher education associated with lower violence scores; however, this association was no longer statistically significant after adjustment ($p > 0.05$). Occupation and socio-economic status were not statistically significantly associated with violence scores in the adjusted model. Regarding pregnancy stage, women in the third trimester had statistically significantly higher violence scores compared with those in the first trimester ($\beta = 2.58$, 95% CI: 0.13 to 5.03 ; $p = 0.039$), whereas the second trimester was not significantly associated with violence scores. Awareness of support services was statistically significantly associated with lower violence scores in the unadjusted model ($\beta = -3.35$; $p < 0.001$), but this association was not retained after adjustment ($p = 0.304$). The model demonstrated modest explanatory power ($R^2 = 0.16$; adjusted $R^2 = 0.14$) (Table 3).

4 | Discussion

In this study, we compared pregnant women from rural and urban areas; rural participants had significantly higher median scores on the domestic violence scale ($p < 0.001$). Higher scores were observed across all domains of domestic violence, including neglect, psychological, spiritual, verbal, economic, physical, and sexual violence. In the adjusted model, only urban residence and the third trimester remained statistically significant predictors.

These findings are consistent with recent population-based studies demonstrating that intimate partner violence is a multidimensional phenomenon in which different forms of abuse frequently coexist and reinforce one another [8]. Similar evidence also indicates that exposure to one form of violence significantly increases the likelihood of experiencing others, highlighting the cumulative burden of abuse across domains [6].

Our baseline demographics showed that urban women had higher levels of education, employment, and higher income. Urban areas provide greater access to schools,

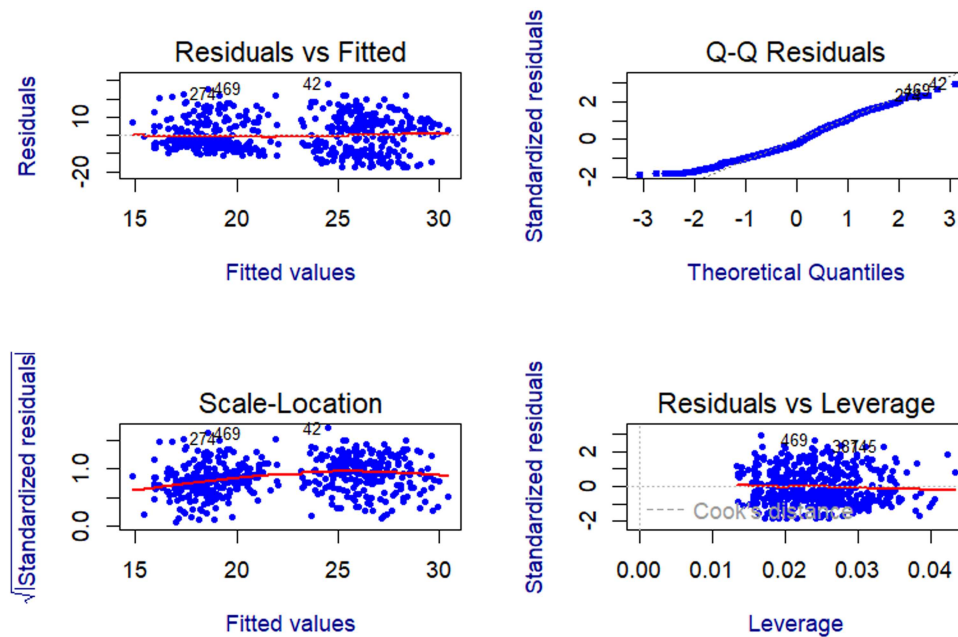


FIGURE 3 | Linear regression diagnostic plots.

TABLE 3 | Linear regression showing association of sociodemographic factors with total violence score.

Variable	Unadjusted coefficient (95% CI)	<i>p</i> value	Adjusted coefficient (95% CI)	<i>p</i> value
Group				
Rural (Ref)	—	—	—	—
Urban	−7.67 (−9.37 to −5.97)	< 0.001	−7.04 (−9.21 to −4.87)	< 0.001
Age (years)	0.06 (−0.05 to 0.17)	0.264	0.05 (−0.05 to 0.15)	0.359
Education				
No formal (Ref)	—	—	—	—
Primary	−2.10 (−4.69 to 0.49)	0.112	−1.18 (−3.65 to 1.29)	0.349
Secondary	−5.00 (−7.50 to −2.50)	< 0.001	−1.68 (−4.24 to 0.88)	0.198
Higher	−5.37 (−7.88 to −2.85)	< 0.001	−1.91 (−4.48 to 0.67)	0.146
Occupation				
Working (Ref)	—	—	—	—
Housewife	1.72 (−0.35 to 3.78)	0.103	0.53 (−1.43 to 2.50)	0.594
Socioeconomic status (SES)				
High (Ref)	—	—	—	—
Middle	−0.84 (−3.48 to 1.80)	0.533	−0.81 (−3.28 to 1.66)	0.521
Low	1.35 (−1.31 to 4.02)	0.319	−1.91 (−4.51 to 0.69)	0.150
Trimester				
1st (Ref)	—	—	—	—
2nd	1.04 (−1.38 to 3.45)	0.400	0.68 (−1.60 to 2.96)	0.558
3rd	3.29 (0.70 to 5.88)	0.013	2.58 (0.13 to 5.03)	0.039
Awareness of support services				
No (Ref)	—	—	—	—
Yes	−3.35 (−5.21 to −1.48)	< 0.001	−0.97 (−2.83 to 0.89)	0.304

Note: Linear regression was used to estimate unadjusted and adjusted coefficients. Multicollinearity was low (VIF < 5). Model fit was modest ($R^2 = 0.16$; adjusted $R^2 = 0.14$).

universities, and formal job markets, enabling women to achieve higher educational and economic status. In contrast, rural women face limited educational infrastructure, fewer employment opportunities, and restrictive social

norms that constrain participation in paid work. Several studies from Pakistan have reported similar rural–urban disparities in female education and socioeconomic status [18, 19].

These findings can be interpreted through well-recognized structural, cultural, and resource-related mechanisms. Rural women in Pakistan often face stronger patriarchal norms, limited decision-making autonomy, and greater social isolation, which increase their susceptibility to intimate partner violence [20]. Restricted mobility, limited employment opportunities, and lack of access to legal, psychosocial, and shelter services further reduce their capacity to resist or report abuse. Low educational level, unemployment, and poverty reinforce dependency and diminish women's negotiating power within households, creating an environment conducive to coercion and control [21]. This interpretation is further supported by recent studies showing that partner-related characteristics—such as alcohol consumption, aggressive behavior, and infidelity—are significant predictors of violence, particularly during pregnancy [22]. Additionally, controlling behaviors have been identified as a central component of intimate partner violence, often co-occurring with emotional and economic abuse and reinforcing patterns of dominance and restriction [23].

The association between lower awareness of available support services and higher violence scores indicates that access to information plays a protective role—women who are informed about available resources are more likely to seek help or interrupt cycles of abuse [24]. The observed increase in violence scores during the third trimester may reflect cumulative physical and emotional stress, financial strain, and more dependence as childbirth approaches, all of which can intensify interpersonal conflict and partner aggression [25]. Recent evidence further supports that violence during pregnancy is strongly associated with socioeconomic disadvantage, limited education, and partner-related risk factors such as substance use [9]. Moreover, emotional and psychological violence frequently coexist with physical and economic abuse, reinforcing the interrelated nature of intimate partner violence [10].

Our findings align with previous evidence regarding domestic violence during pregnancy, especially in low- and middle-income countries. A recent systematic review and meta-analysis reported that approximately one-third (33.4%) of pregnant women residing in rural areas worldwide experience domestic violence, with psychological violence being the most prevalent form (34.2%), followed by physical (14.1%) and sexual violence (13.5%) [26]. Similarly, a large-scale study from the United States utilizing data from the Pregnancy Risk Assessment Monitoring System (PRAMS) demonstrated that rural women had a higher prevalence of perinatal intimate partner violence (4.6%) than their urban counterparts (3.2%) and were less frequently screened for abuse during antenatal or perinatal health visits [27].

Studies from sub-Saharan Africa and comparable low-resource settings have demonstrated that limited education and socioeconomic deprivation are significant determinants of violence during pregnancy. A pooled analysis of Demographic and Health Survey data from 23 sub-Saharan African countries reported that women with lower economic status and adverse partner-related characteristics had higher odds of experiencing intimate partner violence (IPV) during pregnancy [28]. In Nigeria and Ghana, the prevalence of IPV among pregnant women was approximately 26%, with rural residence identified

as a significant risk factor, whereas higher educational attainment appeared to exert a protective effect [29].

5 | Strengths and Limitations

Our findings should be interpreted in view of both strengths and limitations. One important strength is the detailed assessment of different domains of abuse—psychological, physical, sexual, economic, and neglect—which provides a clearer understanding of the patterns and severity of violence during pregnancy. The use of multivariable regression analysis, adjusting for relevant covariates, helps to identify the independent effects of residence and other sociodemographic factors.

However, the cross-sectional design limits the ability to draw causal conclusions or observe changes in violence across different stages of pregnancy. The use of self-reported data may have led to underestimation of the true prevalence, as women may withhold disclosure due to fear, stigma, or social desirability. Differences in reporting between rural and urban participants may also affect the accuracy of comparisons. Moreover, the study did not include information on perpetrator characteristics—such as substance use, mental health, or previous violent behavior—or community-level influences like cultural norms, law enforcement response, and service availability. These unmeasured factors likely play a role in shaping risk. The findings may also have limited generalizability beyond the study area.

6 | Implications and Future Recommendations

This study adds to the existing literature by showing that domestic violence during pregnancy is not a single form of abuse but involves multiple, overlapping dimensions influenced by social and contextual factors. The clear differences observed between rural and urban populations highlight how factors such as limited resources, reduced autonomy, and socioeconomic disadvantage can increase women's vulnerability, particularly during pregnancy.

From a practical perspective, the findings suggest several important actions. Antenatal care services, especially in rural areas, should include routine screening for domestic violence in all its forms, not just physical abuse. Improving awareness of available support services is also critical and can be achieved through community health workers, local outreach programs, and integration into maternal healthcare services. Efforts to improve women's education, financial independence, and social support systems may help reduce the risk of violence. At the policy level, there is a need to strengthen access to support services, such as legal aid, shelters, and counseling, while addressing barriers such as transportation, privacy, and social stigma that may prevent women from seeking help.

Future research should focus on longitudinal designs to better understand how domestic violence changes over the course of pregnancy and after childbirth. Including information on partner-related and community-level factors, such as substance

use, cultural norms, and availability of services, would provide a more complete picture of the issue. In addition, qualitative studies are needed to explore women's experiences, social expectations, and challenges in reporting abuse, particularly in rural settings.

7 | Conclusion

Pregnant women residing in rural settings demonstrated greater vulnerability to domestic violence compared with those in urban areas. In the adjusted analysis, urban residence remained independently associated with lower violence scores, while the third trimester was associated with increased scores. These findings underscore the role of contextual and gestational factors in shaping vulnerability to domestic violence during pregnancy. Strengthening access to support services and integrating routine screening into antenatal care—particularly in rural settings—may help mitigate this burden.

Author Contributions

Saima Khattak: conceptualization, methodology, writing – original draft, validation, writing – review and editing, funding acquisition, visualization, investigation, software, project administration, formal analysis, data curation, resources, supervision. **Syeda Sitwat Fatima:** conceptualization, methodology, investigation, validation, funding acquisition, visualization, writing – review and editing, writing – original draft, project administration, formal analysis, software, data curation, supervision, resources. **Sumayya Asif:** conceptualization, investigation, writing – original draft, funding acquisition, methodology, validation, visualization, writing – review and editing, software, formal analysis, project administration, data curation, supervision, resources. **Sundas Taj Hamid:** conceptualization, investigation, writing – original draft, methodology, visualization, funding acquisition, writing – review and editing, validation, software, formal analysis, project administration, data curation, supervision, resources. **Ale Azad Othman:** conceptualization, methodology, investigation, funding acquisition, visualization, writing – original draft, writing – review and editing, validation, software, formal analysis, project administration, data curation, supervision, resources. **Waqas Naseem:** conceptualization, investigation, writing – original draft, funding acquisition, methodology, validation, visualization, writing – review and editing, software, formal analysis, project administration, data curation, supervision, resources. **Shehroz Khan:** conceptualization, investigation, writing – original draft, funding acquisition, methodology, validation, visualization, writing – review and editing, software, formal analysis, project administration, data curation, supervision, resources. **Asif Rehman:** conceptualization, investigation, funding acquisition, writing – original draft, methodology, validation, visualization, writing – review and editing, software, formal analysis, project administration, data curation, supervision, resources.

Funding

The authors have nothing to report.

Ethics Statement

Ethical Approval was taken by the Institutional Review Board of the Lady Reading Hospital, Peshawar, Pakistan and our research was conducted in compliance with the Helsinki Declaration. Reference No: 368/LRH/MTI.

Consent

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Transparency Statement

The authors affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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