ORIGINAL ARTICLE

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Cesarean delivery and postpartum depression in new mothers in Trujillo, Peru

Vía de parto por cesárea y depresión posparto en puérperas de Trujillo, Perú

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ABSTRACT

Introduction: Postpartum depression affects approximately one in five women in the postpartum period and represents a public health issue. Given the rising frequency of cesarean sections, it is necessary to evaluate the potential association between this delivery method and the condition. Objective: To determine the association between cesarean delivery and postpartum depression among women in Trujillo in 2025. Methods: A quantitative, applied, non-experimental case-control study was conducted. Data were collected via a survey using the Edinburgh Postnatal Depression Scale (EPDS) to measure the postpartum depression variable. Statistical analysis involved the Chi-square test (with significance set at $p<0.05$) and the calculation of the Odds Ratio (OR) with a 95% confidence interval. Results: Cesarean section was significantly associated with postpartum depression ($X^2=10.868$; $p=0.001$). Women who underwent a cesarean section showed an OR of 3.78 (95% CI) compared to those who had a vaginal delivery. Conclusion: Women who delivered via cesarean section showed an association of 3.78 with postpartum depression compared to those who had a vaginal delivery; additionally, young age, urban residence, and primiparity were also significantly associated with postpartum depression.

Key words: Cesarean section, Postpartum Depression, Postpartum Period, Maternal Health, Mental Health (Source: MeSH)

RESUMEN

Introducción: La depresión posparto afecta aproximadamente a una de cada cinco puérperas y representa un problema en el área de la salud colectiva. Ante el incremento de la frecuencia del parto por cesárea, resulta necesario evaluar su posible asociación con esta condición. Objetivo: Determinar la asociación entre la vía de parto por cesárea y la depresión posparto en las puérperas de Trujillo en el año 2025. Métodos: Se realizó un estudio cuantitativo, aplicado, no experimental, de casos y controles; se logró la obtención de los datos mediante encuesta utilizando la Escala de Depresión Posnatal de Edimburgo (EPDS) para la variable depresión posparto. Las técnicas estadísticas empleadas fueron el Chi cuadrado considerándose significativo un $p<0,05$ y la prueba de Odds Ratio con su intervalo de confianza al 95%. Resultados: La cesárea se asoció significativamente con depresión posparto (X2=10,868; p =0,001). Las mujeres sometidas a cesárea presentaron un OR=3,78 IC95% frente al parto vaginal. Conclusión: Las puérperas que dieron a luz mediante el parto por cesárea presentaron una asociación de 3,78 con la depresión posparto en comparación con aquellas cuyo parto fue vaginal; asimismo la edad joven, procedencia urbana y primiparidad también se asociaron significativamente con depresión posparto.

Palabras clave: Cesárea, Depresión posparto, Periodo posparto, Salud Materna, Salud Mental (Fuente: DeCS BIREME)

Introduction

Worldwide, more than 21% of births in 2020 were by cesarean section, and this proportion is expected to rise to 29% by 2030[(1)].

Pregnancy and the postpartum period are associated with physical and emotional changes that can contribute to the development of postpartum depression (PPD), whose global prevalence is estimated at 17.7%[(2)].

In India, researchers compared postpartum depression at 6 weeks and found a higher incidence among women who had cesarean sections than among those who had vaginal deliveries (3.79% versus 2.35%), with women under 25 years of age at particularly high risk[(3)].

In Sweden, Eckerdal and colleagues conducted a longitudinal study in which they determined that emergency cesarean sections increase the risk of depression due to complications, postpartum physical symptoms, and negative experiences[4].

In Poland, Ilska and her team demonstrated that acute pain at hospital discharge following an emergency cesarean section is associated with a higher incidence of early depressive symptoms[5].

Postpartum depression is defined as a mood disorder that develops during the postpartum period and represents one of the most common complications of the postpartum period.

This condition has been linked to various risk factors, including stress, a history of depression, lack of breastfeeding, being a first-time mother, a conflict-ridden relationship, and low socioeconomic status.

In contrast, skin-to-skin contact, breastfeeding, healthy habits, and the use of vitamin supplements (especially vitamin D), zinc, and calcium have been described as protective factors[6].

Depression manifests clinically through sleep disturbances, loss of appetite, anxiety associated with caring for the newborn, persistent sadness and crying, feelings of hopelessness and helplessness, loss of interest in daily activities and hobbies, difficulty concentrating, and thoughts of self-harm, death, and suicide[7].

This problem not only affects the mother's physical and mental well-being but also poses significant risks to the newborn and affects the family's socio-emotional dynamics; this underscores the imperative need for proactive care and effective interventions[8].

Although various studies have evaluated the association between cesarean delivery and the development of postpartum depression, the results remain inconsistent. Furthermore, in the Peruvian context, there are few studies exploring this association, especially in the La Libertad region.

Therefore, the purpose of this study was to determine the association between cesarean delivery and postpartum depression in postpartum women treated in Trujillo during 2025.

Materials and methods

Study Design and Location: This was an observational, analytical, case-control, quantitative study. It was conducted at La Noria Basic Specialties Hospital between January and May 2025.

Population and Sample: The population consisted of postpartum women attending follow-up appointments. The sample size was calculated using the OpenEpi software, resulting in 55 cases and 55 controls. Sampling was non-probabilistic and based on convenience. (Figure 1).

Inclusion and Exclusion Criteria: The inclusion criteria were: postpartum women with a singleton pregnancy, a live newborn at the time of the last follow-up visit, and signed informed consent. The exclusion criteria were: postpartum women with a multiple pregnancy, schizophrenia, psychosis, neonatal death, or HIV infection.

Variables Analyzed: The independent variable was mode of delivery, categorically divided into vaginal delivery and cesarean delivery. Vaginal delivery is defined as the birth of the fetus through the natural birth canal, while cesarean delivery refers to the surgical procedure to extract the fetus through an abdominal and uterine incision[9].

The dependent variable: postpartum depression. Defined as a mood disorder that begins in the postpartum period and affects the mother after childbirth, characterized by depressive symptoms assessed using the Edinburgh Postnatal Depression Scale.

Tools: Data were collected via a survey using the Edinburgh Postnatal Depression Scale. This is a self-report instrument consisting of 10 items designed to detect symptoms of mood disorders during the perinatal period.

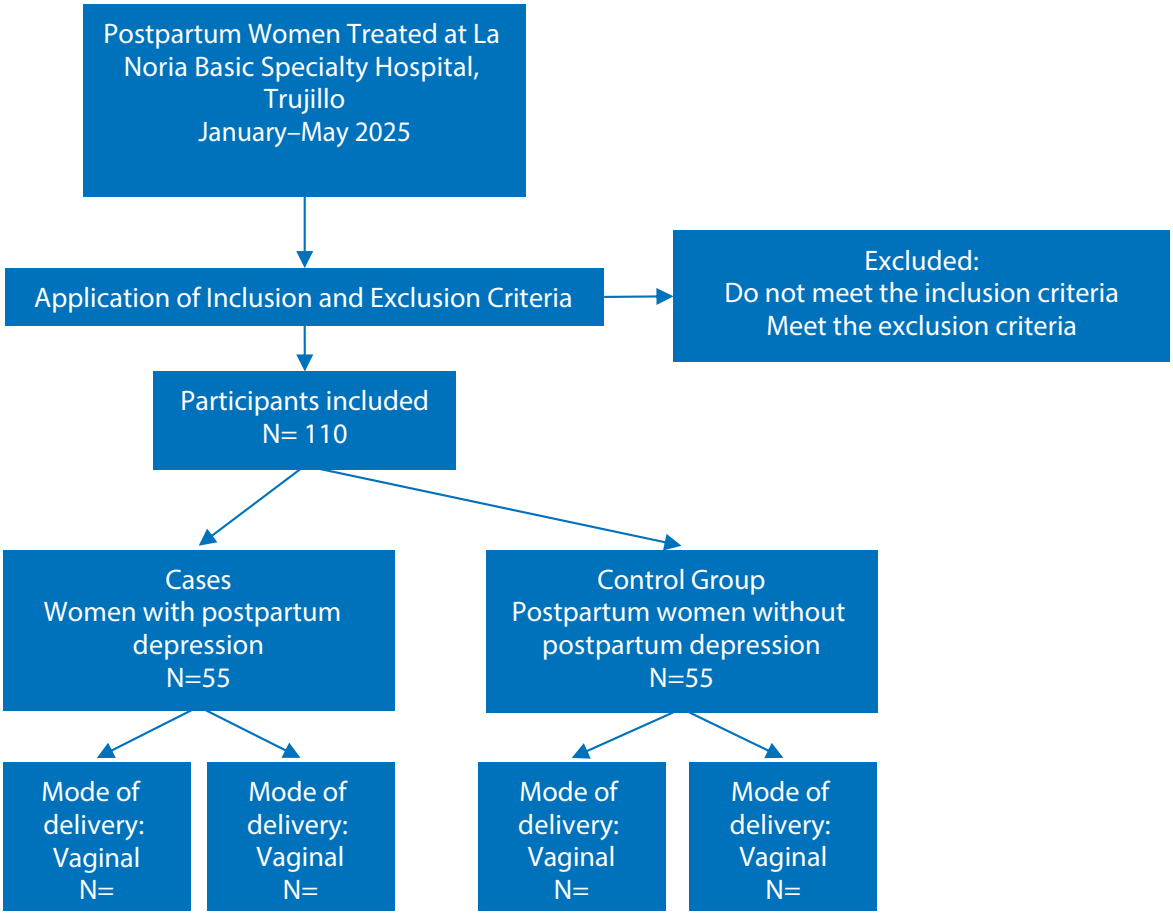


Figure 1: Flowchart of the research design (Source: created by the author).

Each item is scored from 0 to 3, with a total score ranging from 0 to 30, where higher scores reflect greater intensity of depressive symptoms. To interpret the results, a cutoff point established based on clinical criteria (considered to be greater than or equal to 10) is used, which identifies patients at clinically relevant risk for postpartum depression[10]. Several recent psychometric studies support its methodological importance in maternal populations, demonstrating adequate internal consistency (with Cronbach's alpha coefficients greater than 0.80) and strong construct and criterion validity[11].

Procedure and Data Analysis: Once the data were obtained, they were exported to a Microsoft Excel spreadsheet, where they were cleaned. Next, descriptive analysis was performed using frequencies and percentages, followed by inferential analysis using the statistical software SPSS version 28. The association between variables was evaluated using the bivariate chi-square test. Odds ratios (ORs) were calculated using 95% confidence intervals. A p-value < 0.05 was used to define a statistically significant result.

Ethical aspects: The study was conducted in accordance with the ethical principles of the Declaration of Helsinki[12] for research involving human subjects.

Voluntary participation was ensured through informed consent, confidentiality of information, and anonymization of participants' identities. The study protocol was approved by the Institutional Ethics Committee of César Vallejo University and by the Trujillo Health Network prior to the start of the research[13].

Results

The proportion of postpartum women with a history of cesarean delivery was higher in the group with postpartum depression (74.5%) than in the group without postpartum depression (43.6%). In contrast, vaginal delivery

was more common in the group without postpartum depression (56.4%). An association was identified between mode of delivery and postpartum depression. Table 1.

The odds ratio analysis showed a crude OR of 3.78 (95% CI: 1.68–8.48), indicating that cesarean delivery was more strongly associated with postpartum depression than vaginal delivery. Table 2.

It was observed that postpartum women with postpartum depression were more frequently young (76.4%), from urban areas (78.2%), and primiparous (58.2%) compared to postpartum women without postpartum depression. Likewise, a statistically significant association was found between postpartum depression and age (p=0.001), place of residence (p=0.039), and parity (p=0.001) (Table 3).

Table 1. Relationship between mode of delivery and postpartum depression in postpartum women. Trujillo, 2025

Postpartum depression				
Delivery route	Cases		Controls	
	N	%	N	%
Caesarean section	41	74.5	24	43.6
Vaginal	14	25.5	31	56.4
Total	55	100	55	100

X^2 = 10.868; p = 0.001. N: Absolute frequency

Table 2. Unadjusted odds ratio (OR) for the association between mode of delivery and postpartum depression. Trujillo, 2025.

	95% CI		
	OR	Lower	Superior
Via of Childbirth (Cesarean section / Vaginal delivery)	3.783	1.687	8.482
Total postpartum women	110		

OR: odds ratio. 95% CI: 95% confidence interval

Discussion

The main finding of this study was to demonstrate a statistically significant association between the mode of delivery and postpartum depression (p=0.001). Women whose pregnancies ended in cesarean section had an increased likelihood of developing this condition compared to those who had a vaginal delivery (unadjusted OR = 3.78; 95% CI: 1.69–8.48). These findings are consistent with those reported by Ning et al. in 2024[14] and highlight the importance of the mode of delivery within a comprehensive approach to maternal mental health; they also reinforce the need to strengthen strategies for timely detection during the postpartum period.

The results obtained are consistent with the available evidence and support the findings of Moameri[15], who has described a higher prevalence of postpartum depression among women whose pregnancies ended with a cesarean section. Several studies have also reported that this type of delivery is associated with an increased risk of developing depressive symptoms during the postpartum period, particularly when it occurs in an emergency setting or is accompanied by more severe perinatal pain. Pilch presents this same idea in his research, positing that the greater the exposure to acute pain during childbirth, the higher the probability of developing postpartum depression[16]. Taken together, these findings support the relationship observed in the present study and reinforce the importance of recognizing these women as a population that could benefit from closer monitoring for the timely detection of mental health disorders during the postpartum period.

Table 3. Potential confounding variables based on the presence of postpartum depression in postpartum women. Trujillo, 2025.

Variable	Categories	Cases (with postpartum depression) N=55		Controls (without postpartum depression) N=55		Total, N=110		p-value [1]
		n	%	n	%	n	%	
Age	Young	42	76.4	23	41.8	65	59.1	0.001 [2]
	Adult	13	23.6	32	58.2	45	40.9	
Origin	Urban	43	78.2	33	60	76	69.1	0.039 [2]
	Marginal urban	12	21.8	22	40	34	30.9	
Parity	Primipara	32	58.2	13	23.6	45	40.9	0.001 [2]
	Multiparous	23	41.8	42	76.4	65	59.1	

1 Chi-square test
2 Statistically significant association (p < 0.05)
N: Absolute frequency. %: Percentage

Although the available evidence supports the association observed in this study, not all studies have yielded similar results. Some authors, such as Lantigua[17], found no statistically significant association between the mode of pregnancy outcome and postpartum depression, suggesting that this condition has a multifactorial origin and that its onset may also be influenced by biological, psychological, social, and obstetric factors. In this context, differences in the findings could be related to the characteristics of the study population and to the involvement of other factors specific to the postpartum period[18]; therefore, the results must be interpreted comprehensively, taking into account the specific characteristics of each population.

The observed findings could be explained by the interaction of various obstetric, physiological, and emotional factors present during the postpartum period. It has been reported that pain experienced during the perinatal period is a key determinant in the onset of depressive symptoms, with the risk increasing as the intensity of the pain rises[19]. Similarly, emergency cesarean sections, adverse obstetric experiences, and conditions such as unwanted pregnancy or premenstrual syndrome have also been linked to this condition. Added to this are the hormonal changes characteristic of the postpartum period, including a decrease in estrogen and progesterone, alterations in the hypothalamic-pituitary-cortisol axis, and variations in prolactin and thyroid hormone levels, all of which may influence the development of depressive symptoms during this stage[20].

In addition to mode of delivery, age, place of origin, and parity were significantly associated with the development of postpartum depression in the study population, suggesting that these maternal characteristics also play an important role in the development of this disorder during the postpartum period. The higher prevalence observed among young women is consistent with previous studies that identify them as a particularly vulnerable group; therefore, closer monitoring during the first few weeks after childbirth is recommended. With regard to place of residence[21], although living in urban areas is often associated with greater access to health services[22], this does not guarantee protection against postpartum depression, as factors related to the environment, socioeconomic conditions, and the demands of urban life can negatively influence mothers' emotional well-being. Similarly, primiparity has been described as an obstetric factor associated with a higher incidence of this condition[23], likely due to the challenges of facing the physical and emotional changes and the responsibilities inherent in motherhood for the first time[24].

This study has some limitations. As it is a case-control study conducted at a single health facility, the results must be interpreted in light of the characteristics of the study population, which may limit their generalizability to other contexts. Furthermore, it was not possible to perform a multivariate analysis using logistic regression to control for the effect of potential confounding variables. However, the findings provide local evidence on the relationship between mode of delivery and postpartum depression, laying the groundwork for future research involving multivariate analyses and larger sample sizes. Finally, it should also be acknowledged as a limitation that the presence of emotional support networks among the participating mothers was not investigated.

In conclusion, delivery by cesarean section was significantly associated with the presence of postpartum depression and showed a higher incidence compared to vaginal delivery. In addition, young age, urban residence, and primiparity were identified as variables associated with the presence of this condition. These findings underscore the imperative to strengthen mental health screening during the postpartum period, especially among women with higher vulnerability factors, in order to facilitate timely detection and intervention.

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Ethical Responsibilities: The study was approved by the relevant Ethics Committee and was conducted in accordance with ethical principles for research involving human subjects.

Data Confidentiality: The confidentiality and anonymous processing of participants' data were ensured.

Right to privacy and informed consent: All participants provided their informed consent prior to inclusion in the study.

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Original contribution and significance: This study provides evidence on the association between cesarean section and postpartum depression in postpartum women treated at a hospital in Trujillo, contributing to national knowledge regarding the factors associated with postpartum depression.

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