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Original Research Article

Biopsychosocial Risk and Uncertainty in Pregnant Women with Complications

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Abstract: Illness during pregnancy poses a significant challenge for expectant mothers, as it can lead to high levels of uncertainty, which, if not properly managed, can affect their physical, emotional, and social well-being. In this context, the ability to understand the condition, interpret symptoms, and access clear information becomes a key factor in making informed decisions and coping healthily with the pregnancy. The literature indicates that uncertainty, when not accompanied by cognitive strategies and structural support, increases biopsychosocial vulnerability and limits women's autonomy in their care process. To analyse these dynamics, a correlational study was conducted involving 91 pregnant women attending two health centres. The majority belonged to middle socioeconomic strata and had a university education. More than half were experiencing a high-risk pregnancy, and 45.1% presented a high biopsychosocial risk, mainly associated with high blood pressure and infectious conditions. The findings showed that uncertainty is related to a lack of clarity about the condition and to symptom variability. Furthermore, significant associations were identified between cognitive ability, biopsychosocial risk, sources of structural support, and overall uncertainty. These findings suggest that biopsychosocial risk is closely linked to higher levels of uncertainty during pregnancy. Consequently, there is a need to strengthen the processes of informational, cognitive, and structural support aimed at pregnant women, particularly those who are hospitalised or have high-risk conditions. Promoting educational interventions, effective communication strategies, and comprehensive support helps reduce perceived uncertainty and encourages healthier coping in clinical settings.

Keywords: Pregnancy, High-Risk, Uncertainty, Models, Biopsychosocial, Morbidity, Maternal Mortality.

INTRODUCTION

Maternal care policies in Latin America have evolved towards a holistic approach that takes into account women's life trajectories (MINSALUD, 2024). Early detection promotes physical, social, and mental health. Although pregnancy is a natural process, a range of social, economic, psychological, and biological factors can lead to health complications. The WHO has warned that many women are unable to enjoy motherhood due to adverse conditions in their environment (OMS, 2022).

Globally, maternal mortality rose from 282,000 to 322,000 deaths in 2021, representing a significant increase (WHO, 2023). During the COVID-19 pandemic, the maternal mortality ratio (MMR) in Colombia rose by 64.0%, increasing from 50.7 to 83.2 per 100,000 live births; this was mainly due to indirect causes linked to viral illnesses that made pregnancy more difficult (MINSALUD, 2022). To achieve the SDGs, maternal mortality must be reduced by 11.6% per year from 2021 to 2030, a target that is difficult to achieve at a global level (WHO, 2023). This situation highlights the need to address maternal morbidity and extreme

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maternal morbidity (EMM), defined as the condition in which a woman nearly dies from complications of pregnancy, childbirth, or the postpartum period, as well as maternal mortality (INS, 2024).

The biopsychosocial model developed by Herrera, Hurtado and Cáceres (Herrera *et al*., (2006; Herrera *et al*., 1992), is essential for identifying psychological, social and biological risks during pregnancy; it helps to detect complications at an early stage and to strengthen the preventive interventions that are fundamental to perinatal care (Herrera *et al*., 2006; Mishel, 2008; Davis *et al*., 2020). Another such theory is Merle Mishel's theory of uncertainty, which describes how women find it difficult to interpret their illness and how this affects their emotional well-being, decision-making, and self-care (Mishel, 2008; Johnson Castro *et al*., 2017); its components include self-assessment, background and coping, which may lead to anxiety and/or positive adaptation (Johnson Castro *et al*., 2017). The aim of this study was to establish the relationship between biopsychosocial risk and uncertainty regarding how pregnant women attending the gynaecology and obstetrics departments of two healthcare centres cope with their illness.

METHODOLOGY

A quantitative, descriptive and correlational study was conducted. The Medical Uncertainty Scale MUIS (Mishel, 2008), the Biopsychosocial Risk Scale (BRS) (Herrera *et al*., 2006), and a sociodemographic questionnaire were administered. The study population consisted of pregnant women attending the gynaecology and obstetrics department, aged over 18 years, and with a diagnosis of morbidity. Participants with cognitive, mental, hearing, or total visual impairments, or those in a critical state of health, were excluded.

The sample was selected on a convenience basis and calculated using Epidat with the formula for finite populations, assuming an expected correlation of 30% between biopsychosocial risk and uncertainty, with 80% power and a 95% confidence level. A total of 44 participants were recruited from the E.S. Western Kennedy Health Service Unit and 44 from Los Cobos Medical Centre, both obstetrics and gynaecology services, making a total of 88 pregnant women.

The dependent variables were the scores on the subscales used, relating to biopsychosocial risk and uncertainty. The independent variables included sociodemographic factors such as ethnic background, educational level, age, and health insurance status, as well as clinical factors (medical history, antenatal check-ups, current morbidity, and reason for consultation).

Data collection took place between 1 and 22 March 2020 at both institutions. The participants were using the services at the time of the assessment. Eligible pregnant women were invited to take part; the aims of the study were explained to them, and they were asked to read and sign the informed consent form. Upon admission to the study, the ERBP and the sociodemographic questionnaire were administered. The researchers completed the MUIS scale, which uses the technical language required to identify obstetric history and psychosocial conditions. Any missing information was retrieved from the electronic medical record. Completing the questionnaires took between 20 and 30 minutes.

Data Analysis

The data were organised in an Excel spreadsheet and subsequently analysed using SPSS version 25. A descriptive study was conducted, including measures of dispersion and central tendency for the individual and overall scales. The Kolmogorov-Smirnov test was used to assess normality, and the distribution was found to be non-normal. For this reason, Spearman's correlation coefficient and other non-parametric tests were used, as well as one-way ANOVA. Significance was set at $p \leq 0.05$. The research did not seek to compare institutions; the analysis was independent and integrative.

RESULTS OF THE STUDY

With regard to socio-economic status, the majority of participants were from socioeconomic strata 2 and 3. A completed university education was the most common level of education, at 40.7%. This was followed by technical training and secondary education. The majority were from the Andean region (58.2%), and 30.8% were foreign nationals. 9.9% were not covered by health insurance. 94.5% of hospital visits were due to illness, and 80.2% of these took place in the third trimester. 14.3% had not had any antenatal check-ups, whilst the remainder had had more than three (Table 1).

Table 1: Sociodemographic and admission characteristics

Variable	Category	n (%)
Socio-economic Status	1	8 (8.8)
	2	40 (44.0)
	3	30 (33.0)
	4	9 (9.9)
	5	3 (3.3)
	6	1 (1.1)

Variable	Category	n (%)
Level of Education	Incomplete Primary Education	2 (2.2)
	Full Primary School	3 (3.3)
	Incomplete Secondary Education	10 (11.0)
	Full Secondary Education	17 (18.7)
	Unqualified Technician	2 (2.2)
	Complete Technician	12 (13.2)
	Unfinished University	8 (8.8)
	Undergraduate Degree	37 (40.7)
Demographic Origin	Andean Region	53 (58.2)
	Atlantic Coast Region	6 (6.6)
	Pacific Region	2 (2.2)
	Orinoquía Region	1 (1.1)
	Amazon Region	1 (1.1)
	Foreign	28 (30.8)
National Insurance	Subsidised	33 (36.3)
	Contributory	46 (50.5)
	Private	3 (3.3)
	Not Affiliated	9 (9.9)
Reason for Visiting the Hospital	Medical Check-up	5 (5.5)
	Illness	86 (94.5)
Gestational Age (Weeks)	< 13	5 (5.5)
	14–27	13 (14.3)
	28–32	23 (25.3)
	33–40	50 (54.9)
Number of Antenatal Check-ups	None	13 (14.3)
	Between 1 and 3	12 (13.2)
	Between 4 and 7	44 (48.4)
	> 8	22 (24.2)

Source: Data from the study

Diabetes was the most common family history (79.1%), followed by high blood pressure (38.5%). In terms of maternal characteristics, 54.9% had a high-risk pregnancy. The predominant age group was 16 to 35 years, with a mean age of 28.5 years. Furthermore, 53.8% were in their first pregnancy. The most common complications were high blood pressure (24.2%), infections (20.9%), and the risk of preterm birth (19.8%). Table 2 showed that 45.1% of cases presented a high biopsychosocial risk. Subsequently, the role of elements of uncertainty was detailed (Table 3).

Table 2: Personal and family history

Variable	Category	n (%)
Diabetes	Yes	72 (79.1)
	No	19 (20.9)
High Blood Pressure	Yes	35 (38.5)
	No	56 (61.5)
Other Comorbidities	Yes	6 (6.6)
	No	82 (90.1)
Tuberculosis	Yes	0 (0.0)
	No	91 (100.0)
Twin Pregnancy	Yes	3 (3.3)
	No	88 (96.7)
Age	Under 16 years	0 (0.0)
	16–35 years	74 (81.3)
	>35 years	17 (18.7)
Parity	No children	49 (53.8)
	1–4 children	38 (41.8)
	>5 children	4 (4.4)
Current Morbidity	Hypertensive disorders of pregnancy	22 (24.2)
	Maternal infectious conditions	19 (20.9)

Variable	Category	n (%)
	Threat of preterm birth	18 (19.8)
	Haematological disorders	4 (4.4)
	Polyhydramnios/Oligohydramnios	4 (4.4)
	Fetal engagement	3 (3.3)
	Vaginal bleeding	3 (3.3)
	Mood disorders	2 (2.2)
	Gestational diabetes	2 (2.2)
	Hepatorenal involvement	1 (1.1)
	Others	13 (14.3)
Biopsychosocial Risk	Low risk	50 (54.9)
	High risk	41 (45.1)

Source: Data from the study

Table 3: Interpretation of the uncertainty subscales

	MUIS	Classification of the measurement						
Item	**Subscale**	**Strongly Agree n (%)**	**Agree n (%)**	**Undecided n (%)**	**Disagree n (%)**	**Strongly Disagree n (%)**	**Mean**	**SD**
1	Incentive Framework	27 (29.7)	22 (24.2)	9 (9.9)	23 (25.3)	10 (11.0)	3.36	1.418
2	Incentive Framework	2 (2.2)	6 (6.6)	6 (6.6)	40 (44.0)	37 (40.7)	1.86	0.961
3	Incentive Framework	2 (2.2)	10 (11.0)	21 (23.1)	36 (39.6)	22 (24.2)	2.27	1.023
4	Incentive Framework	18 (19.8)	35 (38.5)	11 (12.1)	16 (17.6)	11 (12.1)	3.36	1.312
5	Incentive Framework	17 (18.7)	17 (18.7)	7 (7.7)	31 (34.1)	19 (20.9)	2.80	1.447
6	Incentive Framework	14 (15.4)	39 (42.9)	6 (6.6)	19 (20.9)	13 (14.3)	3.24	1.336
7	Incentive Framework	13 (14.3)	23 (25.3)	11 (12.1)	22 (24.2)	22 (24.2)	2.81	1.421
8	Incentive Framework	4 (4.4)	3 (3.3)	16 (17.6)	43 (47.3)	25 (27.5)	2.10	0.989
9	Incentive Framework	9 (9.9)	16 (17.6)	8 (8.8)	34 (37.4)	24 (26.4)	2.47	1.319
10	Cognitive Ability	6 (6.6)	16 (17.6)	7 (7.7)	35 (38.5)	27 (29.7)	2.33	1.257
11	Cognitive Ability	12 (13.2)	16 (17.6)	14 (15.4)	29 (31.9)	20 (22.0)	2.68	1.349
12	Cognitive Ability	7 (7.7)	13 (14.3)	21 (23.1)	29 (31.9)	21 (23.1)	2.52	1.214
13	Cognitive Ability	8 (8.8)	21 (23.1)	6 (6.6)	32 (35.2)	24 (26.4)	2.53	1.336
14	Cognitive Ability	13 (14.3)	18 (19.8)	15 (16.5)	27 (29.7)	18 (19.8)	2.79	1.354
15	Cognitive Ability	2 (2.2)	3 (3.3)	6 (6.6)	47 (51.6)	33 (36.3)	1.84	0.860
16	Cognitive Ability	19 (20.9)	22 (24.2)	28 (30.8)	16 (17.6)	6 (6.6)	3.35	1.187
17	Cognitive Ability	6 (6.6)	21 (23.1)	16 (17.6)	35 (38.5)	13 (14.3)	2.69	1.171
18	Cognitive Ability	3 (3.3)	21 (23.1)	16 (17.6)	21 (23.1)	30 (33.0)	2.41	1.256
19	Cognitive Ability	36 (39.6)	34 (37.4)	5 (5.5)	12 (13.2)	4 (4.4)	3.95	1.177
20	Cognitive Ability	26 (28.6)	40 (44.0)	4 (4.4)	16 (17.6)	5 (5.5)	3.73	1.212
21	Cognitive Ability	8 (8.8)	29 (31.9)	28 (30.8)	20 (22.0)	6 (6.6)	3.14	1.071
22	Cognitive Ability	7 (7.7)	18 (19.8)	18 (19.8)	32 (35.2)	16 (17.6)	2.65	1.205
23	Cognitive Ability	10 (11.0)	25 (27.5)	26 (28.6)	23 (25.3)	7 (7.7)	3.09	1.132
24	Cognitive Ability	9 (9.9)	31 (34.1)	19 (20.9)	21 (23.1)	11 (12.1)	3.07	1.209
25	Cognitive Ability	2 (2.2)	13 (14.3)	24 (26.4)	35 (38.5)	17 (18.7)	2.43	1.024
26	Cognitive Ability	12 (13.2)	22 (24.2)	25 (27.5)	24 (26.4)	8 (8.8)	3.07	1.181
27	Structure Suppliers/Sources	9 (9.9)	25 (27.5)	14 (15.4)	32 (35.2)	11 (12.1)	2.88	1.228
28	Structure Suppliers/Sources	5 (5.5)	13 (14.3)	14 (15.4)	38 (41.8)	21 (23.1)	2.37	1.151
29	Structure Suppliers/Sources	8 (8.8)	21 (23.1)	6 (6.6)	33 (36.3)	23 (25.3)	2.54	1.328
30	Structure Suppliers/Sources	2 (2.2)	21 (23.1)	11 (12.1)	38 (41.8)	19 (20.9)	2.44	1.128
31	Structure Suppliers/Sources	4 (4.4)	7 (7.7)	10 (11.0)	34 (37.4)	36 (39.6)	2.00	1.106
32	Structure Suppliers/Sources	3 (3.3)	13 (14.3)	19 (20.9)	40 (44.0)	16 (17.6)	2.42	1.044
33	Structure Suppliers/Sources	2 (2.2)	6 (6.6)	8 (8.8)	36 (39.6)	39 (42.9)	1.86	0.984

Source: Data from the study

Incentive Framework

For item 1, 29.7% of participants strongly agreed, and 24.2% agreed that they were unclear about the intensity of their pain. For item 2, 40.7% said they did not understand the purpose of the treatment. In item 3, 39.6% and 24.2% stated that they disagreed and strongly disagreed with interpreting pain according to their situation. In item 4, 38.5% and 19.8% agreed and strongly agreed that their symptoms changed unexpectedly. In item 5, 58.3% agreed that there were different professional roles involved in their care. In item 6, 42.9% stated that the illness fluctuated, with good days

and bad days. In item 7, 48.4% considered the tests carried out to be consistent. In item 8, 74.8% indicated that the treatment had no known probability of success. In item 9, 63.8% had a clear diagnosis.

Cognitive Ability

For item 10, 68.2% of mothers knew what problems they had. For item 11, more than half said their questions had been answered. For item 12, 55.0% were unsure whether their condition might improve or worsen. For item 13, 61.6% received clear explanations. In item 14, 49.5% knew when to expect the procedures to take place. In item 15, 87.9% did not fully understand what had been explained. Item 16 showed that 45.1% knew how long they had had their illness. In item 17, 52.8% said it was easy to tell whether the treatments were working. In item 18, 56.1% were able to plan for the future.

In item 19, 77.0% did not know how to look after themselves after being discharged from the hospital. In item 20, 72.6% did not understand what was happening to them. In item 21, 40.7% usually knew whether they would have a good or a bad day. In item 22, 52.8% could predict when they would be able to look after themselves. In item 23, responses were divided between agreement (27.5%), indecision (28.6%), and disagreement (25.3%) regarding predicting the progression of their illness. In item 24, 44.4% confirmed that what they could do did not vary. In item 25, 57.2% stated that they saw nothing wrong with them; whereas in item 26, 37.4% believed that physical discomfort could not be predicted, 35.2% believed that it could be predicted, and 27.5% remained undecided.

Structure Suppliers or Sources

In item 27, 37.4% reported that doctors did not provide precise information, whilst 15.4% were undecided. In item 28, 64.9% stated that the treatment prescribed was not so complex that they could not explain it themselves; in item 29, only 8.8% of mothers were given differing opinions about what was wrong with them. In item 30, 62.7% emphasised that the effectiveness of their treatment had been determined; in item 31, 77.0% stated that they could not be sure that nurses would be available when they needed them. In item 32, 3.3% felt that the severity of their illness had not yet been determined. Finally, in item 33, 82.5% of patients felt that doctors and nurses did not communicate clearly.

Global Analysis

The analysis revealed correlations between the components of uncertainty and other maternal factors (Table 4). Biopsychosocial risk was the most significant variable and correlated significantly with cognitive capacity ($r = 0.289$; $p = 0.008$), providers/sources of structure ($r = 0.276$; $p = 0.011$), and uncertainty ($r = 0.291$; $p = 0.007$). Although the correlations were low or moderate, it was found that higher biopsychosocial risk is associated with a greater perception of cognitive resources, an increased tendency to seek structural support, and the coexistence of uncertainty during pregnancy. In contrast, no correlations were found with clinical information (associated conditions, reproductive history, characteristics of the current pregnancy, and obstetric risk) ($p > 0.05$). Obstetric risk had a mean of 3.46 (SD = 2.857), and biopsychosocial risk reached a maximum of 17 points, with a mean of 3.38 (SD = 2.711).

Table 4: Relationship between uncertainty and maternal condition

Variable	Reproductive History r (p-value)	Associated Conditions r (p-value)	Current Pregnancy r (p-value)	Obstetric Risk r (p-value)	Biopsychosocial Risk r (p-value)
Incentive Framework	-0.175 (0.096)	-0.046 (0.664)	0.003 (0.975)	-0.091 (0.389)	0.246* (0.024)
Cognitive Ability	-0.012 (0.911)	-0.035 (0.745)	0.046 (0.663)	0.008 (0.942)	0.289** (0.008)
Structure Suppliers or Sources	-0.071 (0.503)	0.000 (0.999)	-0.091 (0.391)	-0.083 (0.432)	0.276* (0.011)
Uncertainty (Overall)	-0.092 (0.384)	-0.033 (0.756)	-0.006 (0.955)	-0.056 (0.596)	0.291** (0.007)

**. The correlation is significant at the 0.01 level (bilateral)

Source: Data from the study

DISCUSSION

Uncertainty during pregnancy was not associated with place of origin, obstetric factors (maternal age, parity, clinical risk), educational level or socioeconomic status. This differs from Latin American studies that link low educational attainment and multiparity with high levels of anxiety and lower rates of antenatal care (WHO, 2023; Rivera-Romero *et al*., 2019). In this case, the discrepancy may be the result of a sample with a high educational level and good adherence to check-ups, which yielded reliable information and the early detection of complications, as supported by the literature (Raru *et al*., 2022).

The biopsychosocial risk showed significant associations with the stimulus framework, cognitive ability and the search for reliable healthcare providers. These findings are consistent with previous studies that found greater uncertainty when symptoms are inconsistent or unfamiliar and medical information is insufficient or imprecise (Guarnizo-Tole, 2021; Pascal, *et al*., 2023; Palomo-Gómez, *et al.,* 2024). The stimulus framework (form, proximity and consistency of the

clinical message) is vital for interpreting one's state of health, whilst diagnostic clarity and effective communication reduce ambiguity and enhance adherence (Pascal, *et al*., 2023; Palomo-Gómez, et al., 2024; Mercado-Peña, 2017).

In this study, women's cognitive capacity in the face of illness served as an adaptive resource in dealing with uncertainty, facilitating the construction of meaning, anticipation of events, and informed decision-making. However, it is essential to strengthen clinical communication (nurse–doctor–patient) as a mechanism for regulating stress. The current findings also differ from studies on perinatal resilience, which have highlighted the role of the professional relationship in maternal emotional regulation (Grigoriadis *et al*., 2018; Lobel *et al*., 2019), opening up opportunities for future interventions.

The adaptive coping strategies employed by pregnant women in the face of clinical uncertainty involve the combined use of cognitive and structural resources. According to Mishel (2008), incomplete information requires greater cognitive effort and the need to seek out reliable sources. This is where support networks and healthcare professionals play a crucial role in reducing anxiety and improving maternal health (Guarnizo-Tole, 2021; Grigoriadis *et al*., 2018; Lobel *et al*., 2019).

The lack of association between clinical variables and uncertainty is consistent with Latin American studies that find that socio-economic, educational and social security factors have a greater impact on the experience of pregnancy than obstetric conditions (Rivera-Romero *et al*., 2019; Guarnizo-Tole, 2021). This challenges health systems to move beyond the biomedical model and to integrate psychosocial screening, emotional support and clear clinical communication on a regular basis.

Current scientific evidence suggests that social support is beneficial for women at clinical risk, but uncertainty persists even in well-managed high-risk pregnancies. This demonstrates the interaction between biological and psychosocial stressors; the combined mobilisation of cognitive and support resources is an adaptive process in conditions of uncertainty (Johnson Castro *et al*., 2017; Raru *et al*., 2022; Guarnizo-Tole, 2021).

The COVID-19 pandemic exacerbated uncertainty and maternal morbidity, affecting decisions regarding vaccination and access to healthcare services. Indirect maternal deaths and obstetric care disruptions showed a reversal of progress, particularly in situations where there was insufficient information to assess the overall impact (González-Q *et al*., 2021). According to Ocampo-Rivero *et al*., (2025), social support during pregnancy is associated with better postnatal outcomes, fewer symptoms of depression, and more positive mother-child interaction (Ocampo-Rivero *et al*., 2025; Guarnizo-Tole *et al*., 2018). Furthermore, continuing nursing care after discharge reduces uncertainty and promotes maternal and neonatal health (Guarnizo-Tole, 2021; Ocampo-Rivero *et al*., 2025; Guarnizo-Tole *et al*., 2018; Guarnizo-Tole, 2018).

Pregnancy is a multidimensional experience in which psychosocial factors, rather than clinical ones, shape how uncertainty is perceived and guide coping strategies. The pregnant woman not only experiences symptoms but also analyses them, seeks logic in the information, and activates support networks to reduce ambiguity. This pattern is consistent with studies that emphasise the importance of active processes of emotional regulation and meaning-making for women and their care environment during uncertain and complex pregnancies (Guarnizo-Tole, 2021; Ocampo-Rivero *et al*., 2025; Guarnizo-Tole *et al*., 2018).

CONCLUSION

The study confirms that biopsychosocial factors have a significant impact on the experience of pregnancy, as they influence uncertainty, rational coping and the search for social support. A holistic approach is needed that goes beyond the clinical aspect and recognises the interaction at the emotional, social and cognitive levels in coping with the condition/pregnancy. Although no significant association was found between obstetric and sociodemographic variables, their influence appears to be determined by access to information and support during pregnancy. Biopsychosocial risk emerges as the main predictor of uncertainty, which calls for strengthening antenatal care through information strategies, psychosocial screening, emotional support and follow-up care. This promotes equitable and responsive health systems.

Limitations of the Study: These are linked to the lack of comparative metrics showing performance across institutions.

Strengths: The study addresses a critical gap in the literature regarding the link between biopsychosocial uncertainty and risk in pregnant women and maternal morbidity, providing new evidence to strengthen the nursing theoretical framework and guide comprehensive interventions in antenatal care.

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Conflict of Interest: The authors declare that they have no conflict of interest.

Ethical Considerations: In accordance with Resolution 008430/1993 of the Colombian Ministry of Health, the research was classified as 'low risk'. The research was approved by the ethics committees of El Bosque University (Minutes No. 018-2019), Los Cobos Medical

Centre, and Subred Sur Occidente E.S.E. Informed consent was signed by the participants. The developers of the MUIS and the ERBP authorised the use of their validated instruments.

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