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Implications Of The COVID-19 Pandemic On Maternal Mental Health And Coping Strategies Used By High-Risk Pregnant Women

Júlia Vieira Pazzim[1], Sérgio Hofmeister Martins-Costa[2], Cláudia Simone Silveira Santos[3], Maria Lucia Rocha Oppermann[4], José Geraldo Lopes Ramos[5]

(School Of Medicine, Federal University Of Rio Grande Do Sul, Brazil)
(Department Of Gynecology And Obstetrics, Hospital De Clínicas Of Porto Alegre, Brazil)
(Psychology Department. Hospital De Clínicas Of Porto Alegre, Brazil)
(School Of Medicine, Federal University Of Rio Grande Do Sul, Brazil)
(School Of Medicine, Federal University Of Rio Grande Do Sul, Brazil)

Abstract:
Context*: High-risk pregnant women are particularly vulnerable to psychological disorders due to pregnancy-related complications, and the COVID-19 pandemic has exacerbated these risks. This study aimed to identify the coping strategies used by high-risk pregnant women and assess the prevalence of depressive, anxiety, and stress symptoms during the pandemic.*
Methods*: A cross-sectional study was conducted from September 2020 to August 2021 with 104 high-risk pregnant women, divided into two groups: the DMG group (gestational diabetes) and the HAS group (gestational hypertension). Data collection was performed using questionnaires, including the DASS-21, the Coping Strategies Scale, and a demographic questionnaire. The participants filled out the questionnaires while waiting for routine consultations at the high-risk pregnancy outpatient clinic of a reference hospital in southern Brazil. Statistical analyses were conducted using SPSS version 21, with a significance level of 5%.*
Results*: The most commonly used coping strategies were religiosity-focused coping (48.1%) and problem-focused coping (22.1%). Symptoms of depression, anxiety, and stress ranged from normal to mild, but in the HAS group, a high prevalence of anxiety was observed (37.5%).*
Conclusion*: High-risk pregnant women adopt coping strategies primarily focused on religiosity and problem-solving. The pandemic exacerbated emotional challenges, especially for women with gestational hypertension. These findings highlight the importance of integrated psychosocial approaches to support maternal well-being during times of crisis.*
Key Word: *Coping strategies; High-risk pregnancy; Depression; Anxiety; Stress.*

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I. Introduction

Pregnancy is a period marked by profound psychological, physiological, and social transformations[1]. For many women, this time can represent the fulfillment of a dream as they begin to imagine their child and develop an emotional connection with the fetus. However, despite the positive expectations, pregnancy can also be emotionally challenging for both the expectant mothers and their partners, especially when associated with high-risk complications. These changes may predispose pregnant women to higher levels of psychological vulnerability, particularly in the face of additional stressors, such as health complications and unexpected events[2].

According to James and Steer (2018)[3], high-risk pregnancies refer to those in which the mother or fetus have a higher likelihood of complications compared to uncomplicated pregnancies. This situation can negatively impact the woman's emotional state, impairing her coping strategies, quality of life, and increasing the risk of developing psychopathologies[4]. The literature has also shown that women with high-risk pregnancies have a higher prevalence of emotional disorders, such as depression and anxiety, compared to low-risk pregnancies[5].

The COVID-19 pandemic, caused by the SARS-CoV-2 virus, exacerbated these difficulties. The global spread of the virus led governments to adopt protection measures at different levels, such as mask-wearing, social isolation, and later, vaccination[6]. The pandemic also interfered with access to prenatal care,

worsening anxiety and the perception of risk among high-risk pregnant women, who often found themselves isolated with limited access to healthcare services[7]. Despite these measures, thousands of deaths were recorded worldwide, putting high-risk pregnant women in an even more vulnerable position concerning the risk of infection and complications.

A study conducted in Canada, which included 1987 pregnant women during the pandemic, found a 37% increase in clinically relevant symptoms of depression and 57% reporting symptoms of anxiety, compared to pre-pandemic cohort studies, indicating a significant worsening in maternal mental health[8]. A systematic review conducted by Muñoz-Vela et al. (2023)[9] identified similar results.

In this context, it is important to highlight that in the face of internal or external stressors, it is common for individuals to resort to coping strategies, a term derived from English, to support and adapt to adverse circumstances[10]. Coping strategies refer to the actions, behaviors, or thoughts used to deal with the stressor[11]. The main strategies observed by Folkman and Lazarus (1980)[10] are related to emotion-focused coping and problem-focused coping.

Thus, the present study aimed to identify the coping strategies used by high-risk pregnant women and assess the prevalence of depressive, anxiety, and stress symptoms during the COVID-19 pandemic.

II. Material And Methods

The study included 104 pregnant women who were receiving prenatal care at the high-risk pregnancy outpatient clinic of a tertiary healthcare center in southern Brazil. The sample consisted of women diagnosed with gestational diabetes and gestational hypertension, starting from the 20th week of pregnancy. Pregnant women with a diagnosis of fetal malformation, a history of depressive or anxiety disorders, or those using antidepressants or anxiolytics were excluded from the sample.

Study Design: Cross-sectional study

Study Location: This was an outpatient-based study carried out at the Hospital de Clínicas de Porto Alegre, Brazil.

Study Duration: September 2020 to August 2021.

Sample size: 104 pregnant women

Sample size calculation: The sample size calculation was performed using the **samplingbook** package (version 1.2.2) in the R program. To estimate the mean of the Global Score with a margin of error of 1 point, a confidence level of 95%, and an expected standard deviation of 5.18 points, as reported in Pisoni (2015)[12], a sample size of 104 subjects was determined.

Subjects & selection method: The sample consisted of pregnant women followed up in the prenatal care at the high-risk pregnancy outpatient clinic for maternal disease at the Hospital de Clínicas de Porto Alegre from September 2020 to August 2021. The patients were divided into two groups: N=48 in the group of pregnant women diagnosed with gestational diabetes and N=56 in the group with gestational hypertension.

Inclusion criteria:

1. Pregnant women with a prenatal diagnosis of gestational diabetes and gestational hypertension.
2. Pregnant women from the 20th week of gestation onward.
3. Aged ≥ 18 years.

Exclusion criteria:

1. Participants with cognitive impairment that prevents the understanding of the content of the instruments used in the research.
2. Pregnant women with babies diagnosed with fetal congenital malformation during prenatal follow-up.
3. High-risk pregnant women who tested positive for COVID-19.
4. Pregnant women using antidepressants or anxiolytics were excluded from the sample.

Procedure methodology

Pregnant women were invited to participate in the study while waiting for a routine prenatal consultation at the high-risk pregnancy clinic. Upon agreement, all participants signed the Informed Consent Form (ICF) and were provided with all necessary instructions to complete the instruments used in the study. Given that data collection occurred during the COVID-19 pandemic, all protective measures, such as wearing

masks, gloves, gowns, and using hand sanitizer, were implemented to ensure the health and safety of the participants.

Instrument

A sociodemographic questionnaire and two self-reported psychometric instruments were used: the Depression Anxiety and Stress Scale (DASS-21) and the Problem-Solving Coping Scale. The sociodemographic questionnaire was developed by the researchers to collect information related to maternal age, prenatal diagnosis, family income, number of children, marital status, and other variables, which will be described in the results section.

The DASS-21 is a set of three 4-point Likert-type subscales for self-reporting, each consisting of 7 items designed to assess emotional states of depression, anxiety, and stress. The depression subscale evaluates symptoms of anhedonia, dysphoria, lack of interest/engagement, self-deprecation, devaluation of life, and discouragement. The anxiety subscale assesses autonomic nervous system excitement, skeletal muscle effects, situational anxiety, and subjective experiences of anxiety. The stress subscale evaluates difficulty relaxing, nervous excitement, irritability, agitation, overreaction, and impatience[13].

The Problem-Solving Coping Scale was designed based on the interactive model of stress and conceptualizes coping as a set of specific responses to a stressful situation. It aims to measure and identify psychosocial factors that cause stress using 45 items with a 5-point scale: 1= Never do this; 2= Do this a little; 3= Do this sometimes; 4= Do this a lot; 5= Do this always. The scale is divided into four factors, each with a maximum score of 20 points[14].

Statistical analysis

Categorical data were presented as absolute (n) and relative (%) frequencies. Quantitative data were presented as mean and standard deviation. Comparisons between prenatal diagnoses and coping strategies were made using the Chi-square test for categorical data, and the t-test or one-way ANOVA with Tukey post-hoc test for quantitative data. Statistical analyses were performed using SPSS version 21, with a significance level of 5% ($p<0.05$).

Ethical Aspects

The project adheres to Resolution No. 466/12 of the National Health Council, both ethically and methodologically, and was submitted and approved by the Ethics Committee of the Research and Graduate Program at the Hospital de Clínicas de Porto Alegre, Brazil, under opinion number: 24153819.9.0000.5327.

III. Result

A total of 104 pregnant women were included in the study. Of the sample, 53.8% (n=56) were receiving prenatal care at the Hypertension Clinic (HAS), and 46.2% (n=48) at the Gestational Diabetes Clinic (DMG) (Table 1). The average age of participants in the HAS group was 30.2 ± 6.5, and in the DMG group, it was 30.7 ± 7.5. The only significant difference between the groups was marital status (p=0.001). Other sociodemographic characteristics of the sample are presented in Table 1.

Table 1. Sample Grouping of High-Risk Pregnant Women During the COVID-19 Pandemic.

		SAH (n=56)	GDM (n=48)	Total (n=104)	p-value
Age (mean ± SD)		30.2 (± 6.5)	30.7 (±7.5)	30.4 (±6.9)	0.697
Gestational age (mean ± SD)		29.0 (±6.6)	30.0 (±6.0)	29.5 (±6.3)	0.299
Number of pregnancies (mean ± SD)		2.9 (±1.5)	3.3 (±1.8)	3.1 (±1.6)	0.238
Previous births (n, %)					
	Vaginal	24 (42.9)	21 (43.8)	45 (43.3)	0.927
	Cesarean	23 (41.1)	16 (33.3)	39 (37.5)	0.416
Miscarriage (n, %)		20 (35.7)	17 (35.4)	37 (35.6)	0.975
Number of children (n, %)					
	0	18 (32.1)	13 (27.1)	31 (29.8)	
	1	20 (35.7)	13 (27.1)	33 (31.7)	
	2	9 (16.1)	6 (12.5)	15 (14.4)	
	3	5 (8.9)	12 (25.0)	17 (16.3)	
	4	3 (5.4)	4 (8.3)	7 (6.7)	
	6	1 (1.8)	0	1 (1.0)	
Marital status (n, %)					0.001
	Married	10 (17.9)*	28 (58.3)*	38 (36.5)	
	Common-law marriage	24 (42.9)*	10 (20.8)*	34 (32.7)	
	Single	21 (37.5)	10 (20.8)	31 (29.8)	
	Divorced	1 (1.8)	0	1 (1.0)	
Education (n, %)					0.789
	Elementary school	19 (33.9)	17 (35.4)	36 (34.6)	

	High school	30 (53.6)	27 (56.3)	57 (54.8)	
	Higher education	7 (12.5)	4 (8.3)	11 (10.6)	
Family income (n, %)					0.353
	Up to 1 minimal wage	24 (42.9)	18 (37.5)	42 (40.2)	
	Between 1 e 2 minimal wages	19 (33.9)	22 (45.8)	41 (39.4)	
	Between 2 e 3 minimal wages	6 (10.7)	6 (12.5)	12 (11.5)	
	Over 3 minimal wages	7 (12.5)	2 (4.2)	9 (8.7)	

Coping Strategy and Maternal Emotional State

The most frequently employed coping strategy in both groups was reliance on religiosity (48.1%, n=50), followed by problem-focused coping (22.1%, n=23) (Table 2). Levels of depression, anxiety, and stress in both groups ranged from normal to mild. However, elevated anxiety levels were observed in the hypertension group (HAS), with a prevalence of 37.5% (n=21). Although comparisons were conducted between the groups, no significant associations were identified (Table 2).

Table 2. Coping Strategies and Levels of Depression, Anxiety, and Stress.

	SAH (n=56)	**GDM (n=48)**	**Total (n=104)**	**p-value**
Coping (n, %)				0.278
Problem	16 (28.6)	7 (14.6)	23 (22.1)	
Emotion	5 (8.9)	4 (8.3)	9 (8.7)	
Social	9 (16.1)	13 (27.1)	22 (21.2)	
Religious	26 (46.4)	24 (50.0)	50 (48.1)	
Depression (n, %)				0.249
Normal/Mild	28 (50.0)	24 (14.6)	52 (50.0)	
Minimal	5 (8.9)	7 (14.6)	12 (11.5)	
Moderate	10 (17.9)	6 (12.5)	16 (15.4)	
Severe	4 (7.1)	8 (16.7)	12 (11.5)	
Very Severe	9 (16.1)	3 (6.3)	12 (11.5)	
Anxiety (n, %)				0.385
Normal/Mild	21 (37.5)	23 (47.9)	44 (42.3)	
Minimal	6 (10.7)	6 (12.5)	12 (11.5)	
Moderate	4 (7.1)	6 (12.5)	10 (9.6)	
Severe	4 (7.1)	1 (2.1)	5 (4.8)	
Very Severe	21 (37.5)	12 (25.0)	33 (31.7)	
Stress (n, %)				0.673
Normal/Mild	23 (41.1)	23 (47.9)	46 (44.2)	
Minimal	6 (10.7)	8 (16.7)	14 (13.5)	
Moderate	10 (17.9)	7 (14.6)	17 (16.3)	
Severe	10 (17.9)	7 (14.6)	17 (16.3)	
Very Severe	7 (12.5)	3 (6.3)	10 (9.6)	

Comparative Analysis of Coping Strategy Types

We combined the analysis of GDM and SAH because no significant differences were observed between the variables, as shown in the previous tables. This approach enabled us to increase the number of participants in each category. Differences in some variables were observed, as reported in Table 3, and denoted by letters for significant comparisons

Table 3. Comparison between the Types of Coping Strategies

	Problem (n=23)	**Emotion (n=9)**	**Social (n=22)**	**Religion (n=50)**	**p-value**
Age (mean ± SD)	32.7 (±8.2)	29.4 (±7.1)	28.7 (±5.1)	30.3 (±6.8)	0.257
Gestational age (mean ± SD)	29.0 (±6.3)	24.0 (±5.2)d	29.9 (±6.4)	30.4 (±6.0)b	0.044
Number of pregnancies (mean ± SD)	3.5 (±1.2)	3.2 (±1.2)	2.7 (±1.4)	2.9 (±1.8)	0.422
Previous births (n, %)					
Vaginal	12 (52.2)b	0a	8 (36.4)	25 (50.0)b	0.030
Cesarean	8 (34.8)b	8 (88.9)acd	7 (31.8)b	16 (32.0)b	0.011
Miscarriage (n, %)	10 (43.5)	5 (55.6)	7 (31.8)	15 (30.0)	0.390
Number of children (n, %)					0.042
0	6 (21.1)	1 (11.1)	10 (45.5)	14 (28.0)	
1	4 (17.4)b	6 (66.7)a	4 (18.2)	19 (38.0)	
2	6 (26.1)	1 (11.1)	2 (9.1)	6 (12.0)	
3 or more	7 (41.2)	1 (11.1)	6 (27.3)	11 (22.0)	
Marital status (n, %)					0.371
Married	7 (30.4)	4 (44.4)	9 (40.9)	18 (36.0)	
Common-law marriage	9 (39.1)	5 (55.6)	5 (22.7)	15 (30.0)	
Single	7 (30.4)	0	7 (31.8)	17 (34.0)	
Divorced	0	0	1 (4.5)	0	

Education (n, %)					0.022
Elementary school	7 (30.4)	7 (77.8)	6 (27.3)	16 (32.0)	
High school	14 (60.9)	2 (22.2)	16 (72.7)	25 (50.0)	
Higher education	2 (8.7)bc	0ad	0ad	9 (18.0)bc	
Family income (n, %)					0.136
Up to 1 minimal wage	7 (30.4)	7 (77.8)	10 (45.5)	18 (36.0)	
Between 1 e 2 minimal wages	10 (43.5)	1 (11.1)	10 (45.5)	20 (40.0)	
Between 2 e 3 minimal wages	5 (21.7)	0	2 (9.1)	5 (10.0)	
Over 3 minimal wages	1 (4.3)	1 (11.1)	0	7 (14.0)	
Prenatal diagnosis (n, %)					0.278
SAH	16 (69.6)	5 (55.6)	9 (40.9)	26 (52.0)	
GDM	7 (30.4)	4 (44.4)	13 (59.1)	24 (48.0)	
Depression (n, %)					0.035
Normal/Mild	6 (26.1)d	5 (55.6)	10 (45.5)	31 (62.0)a	
Minimal	3 (13.0)	2 (22.2)	1 (4.5)	6 (12.0)	
Moderate	5 (21.7)	0	2 (9.1)	9 (18.0)	
Severe	5 (21.7)	1 (11.1)	4 (18.2)	2 (4.0)	
Very Severe	4 (17.4)	1 (11.1)	5 (22.7)	2 (4.0)	
Anxiety (n, %)					<0.001
Normal/Mild	5 (21.7)d	1 (11.1)d	7 (31.8)	31 (62.0)ab	
Minimal	1 (4.3)b	4 (44.4)ac	0	7 (14.0)	
Moderate	4 (17.4)	1 (11.1)	4 (18.2)	1 (2.0)	
Severe	0	0	3 (13.6)	2 (4.0)	
Very Severe	13 (56.5)d	3 (33.3)	8 (36.4)	9 (18.0)a	
Stress (n, %)					0.445
Normal/Mild	7 (30.4)	3 (33.3)	9 (40.9)	27 (54.0)	
Minimal	3 (13.0)	3 (33.3)	3 (13.6)	5 (10.0)	
Moderate	5 (21.7)	0	3 (13.6)	9 (18.0)	
Severe	5 (21.7)	2 (22.2)	3 (13.6)	7 (14.0)	
Very Severe	3 (13.0)	1 (11.1)	4 (18.2)	2 (4.0)	

a =difference with Problem; b = difference with Emotion; c = difference with Social; d = difference with Religious;

Women who employed emotion-focused strategies had a shorter gestational age compared to those who utilized religion-focused strategies (p=0.044). Regarding the delivery method, women who predominantly used emotion-focused strategies had no history of vaginal delivery, whereas those who relied more on problem- and religion-focused strategies had a higher frequency of vaginal births (p=0.030). Cesarean sections were more frequently associated with emotion-focused coping strategies compared to other coping styles (p=0.011) (Table 3).

IV. Discussion

This study aimed to identify the coping strategies used by high-risk pregnant women and assess the prevalence of depressive, anxious, and stress symptoms during the COVID-19 pandemic. It was observed that the most common coping strategies for dealing with the pandemic were focusing on religiosity, problem-solving, and social support. These findings align with studies of pregnant women during the pandemic. In one study, 77% of participants mentioned talking to friends and family, 24% sought faith-based community support, and 52% increased screen time due to COVID-19-related news[15].

Additionally, a previous study conducted in Brazil identified that, among high-risk and low-risk pregnant women, religiosity as a coping strategy—when used positively and grounded in reality—was associated with lower levels of depressive symptoms[16]. These findings suggest that religiosity may have a protective effect in situations of intense stress, providing pregnant women with a coping mechanism that alleviates feelings of helplessness.

Spirituality and spiritual values are important coping strategies for dealing with challenges during pregnancy. According to some studies, spirituality contributes to the reduction of negative emotions and promotes health during this period[17].

A study conducted in the Eastern Anatolia region of Turkey between March 1 and March 30, 2021, included 336 pregnant women with the objective of assessing depressive symptoms and spiritual well-being. The results indicated that the participants demonstrated above-average levels of spiritual well-being, with a scale score of 117.15 ±.19[17]. Moreover, the same study identified that approximately one-third of the sample exhibited mild to moderate depression. These findings align with the data observed in the present study.

Regarding emotional symptoms, our sample predominantly exhibited depression and stress levels classified as normal/mild (Table 2). However, we observed that 37.5% (n=21) of pregnant women with hypertension presented with very severe anxiety levels. This finding may be explained by concerns about COVID-19 infection and fears that this stressor could increase blood pressure or lead to other health

complications. The literature supports this correlation, as studies conducted during the pandemic have identified that pregnant women frequently exhibited elevated levels of anxiety[19,20].

Davis-Floyd et al. (2020)[20] reported in their study conducted in the United States that pregnant women exhibited heightened fears and concerns due to the possibility of vertical transmission of COVID-19 to their fetuses. Similar findings were observed in the study by Naghizadeh et al. (2021)[21], which found that the fear experienced by pregnant women during the pandemic significantly reduced their perceived quality of life.

It was also observed that women in the early stages of pregnancy relied more on emotion-focused coping strategies compared to those in the third trimester. This may be explained by the fact that pregnant women fear the loss of the baby or fetal complications, as during the second trimester, fetal growth involves extremely complex processes, such as organ maturation and the formation of the central nervous system[22].

In a systematic review with meta-analysis, which included 22 studies assessing 2,689 (38.23%) pregnant women positive for SARS-CoV-2, 174 (6.47%) cases of miscarriage were reported, of which 168 (96.55%) were spontaneous abortions due to placental infection caused by the coronavirus[23].

Another interesting finding concerns the mode of delivery. Women with a history of vaginal births indicated a greater focus on the problem. This result may be associated with the fact that vaginal birth is painful and requires significant effort from the woman to overcome potential fears and anxieties. Although labor pain is a multifactorial and subjective phenomenon, for most women, it may be the most extreme pain they will experience, leading to negative psychological outcomes[24,25].

Aksoy, Ozdemir, and Aksoy (2023)[26] observed, in a study conducted in Turkey, that high-risk pregnant women hospitalized during the pandemic showed a significant correlation between anxiety symptoms and fear of childbirth ($p < 0.001$).

The study highlighted that those who planned a vaginal birth were 1.80 times more likely to experience anxiety and fear related to childbirth compared to those who opted for a cesarean section[25]. These data are consistent with our findings, showing that women with a history of vaginal birth tend to adopt more active coping strategies, focused on the concrete challenges imposed by the pandemic.

V. Conclusion

This study highlighted that high-risk pregnant women predominantly utilized religiosity, social support, and problem-focused coping strategies during the COVID-19 pandemic, with religiosity serving as a significant protective factor for mental health. While most participants exhibited mild levels of depression and stress, a high prevalence of very severe anxiety was observed among pregnant women with systemic hypertension, underscoring the vulnerability of this group. Variations in coping strategies across pregnancy trimesters and the impact of previous obstetric experiences, such as a history of vaginal birth, highlight the complexity of emotional factors associated with pregnancy. The findings underscore the need for integrated interventions addressing emotional, spiritual, and social dimensions to enhance maternal well-being, particularly in high-risk settings and during public health crises. A limitation of this study was the absence of postnatal follow-up, which precluded the analysis of potential changes in outcomes over time.

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