SCIENTIA PLENA
www.scientiaplena.org.br
VOL. 21, NUM. 01 2025
doi: 10.14808/sci.plena.2025.017101

Depressive symptoms and fear of COVID-19 in Brazilian women during the COVID-19 pandemic: Data from May 2022

Síntomas depresivos y miedo al COVID-19 en mujeres brasileñas durante la pandemia de COVID-19: Datos de mayo de 2022

L. B. R. Faro[1]*; L. S. Silva[2]; A. Faro[2]

[1]*Medical School, Tiradentes University, 49032-490, Aracaju-Sergipe, Brazil*
[2]*Graduate Program in Psychology, Federal University of Sergipe, 49107-230, Aracaju-Sergipe, Brazil*

**faro.laura03@gmail.com*
(Recebido em 26 de outubro de 2023; aceito em 19 de janeiro de 2025)

The COVID-19 pandemic has had a profound impact on public life, with a notable strain on mental health. Throughout this global crisis, women have exhibited a heightened susceptibility to common mental health disorders, emphasizing the need for a focused discussion on their experiences with depression and related mental health issues. This study aimed to identify predictors of depressive symptoms in Brazilian women during the COVID-19 pandemic. In May 2022, 1225 responses were collected from various regions of the country, spanning over 420 cities. The online survey included a sociodemographic questionnaire, the Patient Health Questionnaire-9 (PHQ-9), and the COVID-19 Fear Scale (FCS-19). Inferential analysis relied on multinomial logistic regression, utilizing depression as the outcome variable stratified as mild, moderate, and severe. The model incorporated explanatory variables, including age, education level, geographic region, skin color, and fear of COVID-19. The findings revealed that most women exhibited severe depressive symptoms. Stronger fears of COVID-19 and a younger age were linked to increased vulnerability to depressive symptoms. Women from the North and Midwest regions displayed more prominent symptoms than those from the Northeast region. These results underscore the significant impact of certain factors on the manifestation of depressive symptoms in women during the pandemic. The significance of this study lies in its potential to identify at-risk groups not only during the COVID-19 crisis but also in analogous scenarios of public health emergencies.
Keywords: depression, COVID-19, women's health.

La pandemia de COVID-19 ha tenido un profundo impacto en la vida pública, con notable tensión en la salud mental. A lo largo de esta crisis global, las mujeres han mostrado una mayor susceptibilidad a trastornos comunes de salud mental, resaltando la necesidad de una discusión enfocada en sus experiencias con la depresión y problemas de salud mental relacionados. Este estudio tuvo como objetivo identificar los predictores de síntomas depresivos en mujeres brasileñas durante la pandemia de COVID-19. En mayo de 2022, se recopilaron 1225 respuestas de diversas regiones del país, abarcando más de 420 ciudades. La encuesta en línea incluyó un cuestionario sociodemográfico, el Cuestionario de Salud del Paciente-9 (PHQ-9) y la Escala de Miedo al COVID-19 (FCS-19). El análisis inferencial se basó en una regresión logística multinomial, utilizando la depresión como variable de resultado estratificada en leve, moderada y grave. El modelo incorporó variables explicativas, como la edad, el nivel de educación, la región geográfica, el color de piel y el miedo al COVID-19. Los hallazgos revelaron que la mayoría de las mujeres presentaban síntomas depresivos graves. Un mayor temor al COVID-19 y una edad más joven se asociaron con una mayor vulnerabilidad a los síntomas depresivos. Las mujeres de las regiones Norte y Centro-Oeste mostraron síntomas más prominentes que las de la región Noreste. La importancia de este estudio radica en su potencial para identificar grupos en riesgo no solo durante la crisis de COVID-19, sino también en escenarios análogos de emergencias de salud pública.
Palabras clave: depresión, COVID-19, salud de la mujer.

1. INTRODUCTION

The detrimental impact of a public health emergency is evident across various aspects of life, particularly mental health [1]. By 2022, COVID-19 had impacted approximately 700 million individuals worldwide. Among the aggregate cases recorded on July 31, 2023, Brazil accounted

for 5.44%, translating to approximately 38 million cases [2], constituting approximately 18% of the nation's total population [3]. The pronounced COVID-19 mortality rate in Brazil distinguishes it from the situation in other countries, with a rate of approximately 2% among resolved cases (recovery or fatality), in contrast to the global average of 1% until February 2023 [2]. Some of the factors attributed to elevated mortality in Brazil include socioeconomic disparities, heterogeneous healthcare systems within the country, and variations in the adoption of optimal practices for the clinical management of critically ill patients [4].

The nexus between pandemic-induced stress and the preexisting susceptibility of certain individuals to depression's onset, further compounded by the distinctive challenges posed by the COVID-19 crisis, has precipitated a surge in the diagnosis of this ailment [5]. The World Health Organisation (WHO) estimated a 25% increase in the global prevalence of anxiety and depression during the inaugural year of the COVID-19 pandemic [6]. Moreover, a meta-analysis has reported that the prevalence of depression may increase to as much as 45% among survivors [7]. Literature posits that the pandemic has magnified public health concerns regarding depression in Brazil [8]. Although this is a widespread scenario, specific individuals and groups exhibit heightened vulnerability, which is underscored by the pandemic. Vulnerability factors encompass sociodemographic and health-related elements, particularly sex [9, 10]. Throughout the pandemic, women consistently showed greater vulnerability than men. Therefore, there is a strong argument for investing in research exploring the intricacies of exposure to a decline in mental health during the pandemic.

Research conducted in Brazil further corroborated this sex-related risk. For instance, a study juxtaposing pandemic and pre-pandemic data revealed a stronger tendency toward common mental disorders among females [8]. Additional studies established an increased risk of depressive disorders among women during the pandemic [11, 12]. Consequently, it becomes apparent that the elevated prevalence of depression among women, an observation consistent even before the pandemic, appears to have persisted throughout the pandemic. This serves as a cautionary signal, underscoring the need for depression-focused mental health interventions tailored to women.

Among the various factors that could explain heightened susceptibility to depression in females, fear of COVID-19 emerges as a significant aspect [13]. Fear, denoting a negative emotion triggered by stimuli bearing potential harm to the individual, loses its protective role when intensified and maintains a linkage with depression [14]. Within the specific context of COVID-19-related fear, understanding the specific role of fear in mental health may help identify cases or groups that demand symptom management at some level [15]. Existing data highlight the widespread prevalence of COVID-19-related fear, especially among women [13]. These findings emphasize the importance of scrutinizing the impact of COVID-19 fear on the prevalence of depression in females, given the potential for their co-occurrence.

As the repercussions of the COVID-19 crisis persist in Brazil, it is imperative to understand the dynamics underlying the fluctuations in depression rates among women, including the role of fear in the context of the pandemic. Conducting studies with this focus has the potential to identify subgroups that are more prone to depression, thereby facilitating early identification and enabling tailored interventions. A viable approach to such an investigation involves scrutinizing depressive symptoms through a dedicated survey targeting women. This approach enables a comprehensive understanding of the diversity in exposure levels within women’s demographics, extending beyond mere comparison with men, which might otherwise create a misleading impression of uniform vulnerability across females.

All of the aforementioned studies concur that depression is more prevalent in women than in men. Thus, it seems plausible to explore potential variations within women's profiles concerning depression, considering factors such as socio-demographic attributes and the extent of COVID-19 fear. The main objective of this study is to identify the predictors of depressive symptoms among Brazilian women throughout the COVID-19 pandemic and to assess the impact of fear of COVID-19 on depressive symptomatology in May 2022.

2. MATERIALS AND METHODS

2.1 Design of the study

This was a cross-sectional study, based on a convenience sampling.

2.2 Description of the sample

This study obtained an initial sample comprised of 1325 adult women from all states in Brazil. Due to the low representation within certain groups, subsequent exclusions were implemented in the analysis: individuals of the yellow race (sample size [n] = 26), indigenous (n = 7), other skin colors (n = 9), and those with completed primary education (n = 31). Consequently, the final sample consisted of 1225 women with a mean [M] age of 38.2 years (standard deviation [SD] = 13.37; minimum [Min] = 18 and maximum [Max] = 72). In the final sample, a substantial proportion of participants was concentrated in the Southeast region (37.7%; n = 473), followed by the Northeast (36.1%; n = 453), South (16.1%; n = 202), and Midwest (6.9%; n = 86), while the North accounted for 3.3% (n = 41). Owing to the limited number of participants, the last two categories were grouped into the North and Midwest category (10.1%; n = 127).

2.3 Measurements

2.3.1 Patient Health Questionnaire-9 (PHQ-9 [16])

Comprising nine questions structured on a Likert-type scale ranging from 0 (never) to 3 (almost every day), the PHQ-9 analyzes the manifestation of depressive signs and symptoms within the preceding two weeks. A score of 10 points or higher indicates the presence of depressive symptoms at the screening level. On the severity levels, we adopted a cutoff from 10 to 14 as mild (yellow flag), from 15 to 19 as moderate (red flag), and more than 20 as severe (emergence) [16, 17]. It is noteworthy highlight that the reason for grouping categories was because there were few cases in the most extreme strata (minimum and extremely severe).

2.3.2 COVID-19 Fear Scale (EMC-19 [15])

This scale evaluates the extent of fear associated with COVID-19 and comprises seven items to which participants respond using a Likert-type scale ranging from 1 (totally disagree) to 5 (totally agree). The cumulative score (7–35 points) was obtained by summing the item responses.

2.3.3 Sociodemographic questionnaire.

Questions concerning gender, age, educational attainment (basic school completion, high school, undergraduate, or graduate), city of residence, and skin color/race (white, black, brown, yellow, indigenous, or other).

2.4 Procedure and ethical considerations

Data were collected through online forms (SurveyMonkeytm) during the first half of May 2022. Participants were invited via social media platforms and required to confirm their agreement through an electronically generated Free and Informed Consent Form. The study protocol was approved by the National Research Council (CONEP; n. 3.955.180). All ethical considerations outlined in the Guidelines for Research Involving Human Subjects were followed.

2.5 Statistical analyses

Descriptive analyses (mean, median, standard deviation, percentages, and absolute frequencies) and Multinomial Logistic Regression (main effects approach) were performed. Categorization on the PHQ-9 depression scale was used as the dependent variable. The subgroup without depression served as a reference for comparison. Explanatory variables introduced into the model encompassed age (in years), educational attainment (high school, higher education), geographic region (northeast, southeast, south, north/central-west), skin color (white, black, brown), and COVID-19 fear score.

The model's fit was assessed using the initial and final -2 log likelihood values, Odds Ratio (OR) with statistical significance ($p < 0.05$), the model's predictive capacity (with desired values exceeding 50% of correctly predicted cases), Pseudo-Nagelkerke's index (Pseudo R-Square, reflecting explained variance; higher values are preferable), and Pearson's Goodness of Fit X^2 (nonsignificant chi-square value). In cases of OR values < 1, a transformation was applied using the formula 1/OR to yield standardized outcomes.

3. RESULTS

3.1 Sample Profile

Age, measured in years, exhibited a mean of 38.2 (n = 1255, SD = 13.37), ranging from 18 to 72. Among the participants, the prevailing skin colors were white (51.6%, n = 647), trialed brown (40.0%, n = 502), and black (8.4%, n = 106). Regarding educational attainment, the distribution showed that 62.5% had attained higher education (n = 784), whereas 37.5% had completed high school (n = 471).

The mean total PHQ-9 was 14.3 (SD = 7.57). Notably, a positive depression-screening outcome was evident in 88.3% of the participants (n = 1108). Among those who screened positive for depression, the majority experienced severe symptoms (50%; n = 627, M = 20.8, SD = 3.63), followed by moderate (19.4%, n = 244, M = 11.9, SD = 1.48) and mild (18.9%; n = 237, M = 7.1, SD = 1.41) symptoms. The mean EMC-19 score for the entire sample amounted to 20.7 points (SD = 6.12).

3.2 Multinomial logistic regression

The analysis revealed that an escalation in the COVID-19 fear score correspondingly amplified the probability of falling into the mild depression group by 11.0% (OR = 1.11), by 16.0% for the moderate depression group (OR = 1.16), and by 25.0% for the severe depression group (OR = 1.25), all when contrasted with the group exhibiting no signs of depression. Regarding age, the findings indicated that in comparison to individuals devoid of depressive symptoms, younger participants bore a 3.0% higher likelihood of belonging to the mild depression group (OR = 0.97, 1/OR = 1.03), a 6.0% likelihood for the moderate depression group (OR = 0.94, 1/OR = 1.06), and an 8.0% likelihood for the severe depression group (OR = 0.93, 1/OR = 1.08). Furthermore, in contrast to non-depressed participants from the Northeast region, those hailing from the North and Central-West regions were approximately three times more likely to belong to the severe depression group (OR = 0.34 or 1/OR = 2.90). The remaining variables were not significant (Table 1).

Table 1: Multinomial Logistic Regression Results for Depression in Brazilian Women with the PHQ-9 in Brazil (May 2022).

Severity level	Variables	M (DP)	F% (*n*)	*OR* (IC 95%)	*1/OR*	*p*-value
Mild	*Fear of COVID-19*	0.6 (0.61)	18.8 (237)	1.11 (1.07 - 1.16)		< 0.001
	Age (in years)	40.2	18.8 (237)	0.97 (0.95 - 0.98)	1.03	< 0.001
	Region	(13.72)				
	Northeast		77.7 (97)	0.98 (0.43 - 2.22)	1.02	0.959
	Southeast		6.6 (84)	1.64 (0.70 - 3.83)		0.250
	South		3.1 (40)	2.60 (0.95 - 7.07)		0.061
	North and Midwest		1.2 (16)	1		-
	Scholarity					
	Complete high school		7.4 (94)	1.52 (0.95 - 2.40)		0.075
	Higher education		11.3 (143)	1		-
	Skin color					
	White		9.6 (121)	0.95 (0.58 - 1.54)	1.05	0.849
	Black		1.9 (24)	1.21 (0.53 - 2.74)		0.638
	Brown		7.3 (92)	-		-
Moderate	*Fear of COVID-19*	0.7 (0.66)	19.4 (244)	1.16 (1.12 - 1.21)		< 0.001
	Age (in years)	37.1	19.4 (244)	0.94 (0.92 - 0.96)	1.06	< 0.001
	Region	(12.80)				
	Northeast		6.7 (85)	0.64 (0.28 - 1.44)	1.56	0.281
	Southeast		8.2 (103)	1.98 (0.85 - 4.55)		0.110
	South		2.9 (37)	2.10 (0.77 - 5.73)		0.146
	North and Midwest		1.5 (19)	1		-
	Scholarity					
	Complete high school		7.2 (91)	1.22 (0.76 - 1.96)		0.405
	Higher education		12.1 (153)	1		-
	Skin color					
	White		9.8 (124)	0.92 (0.56 - 1.50)	1.08	0.743
	Black		1.8 (23)	0.91 (0.39 - 2.10)	1.09	0.825
	Brown		7.7 (97)	1		-
Severe	*Fear of COVID-19*	0.9 (0.76)	49.9 (627)	1.25 (1.20 - 1.30)		< 0.001
	Age (in years)	36.5	49.9 (627)	0.93 (0.91 - 0.94)	1.08	< 0.001
	Region	(13.08)				
	Northeast		15.0 (200)	0.34 (0.16 - 0.70)	2.90	0.004
	Southeast		18.8 (237)	1.12 (0.53 - 2.35)		0.760
	South		8.8 (111)	1.46 (0.59 - 3.60)		0.411
	North and Midwest		6.2 (79)	1		-
	Scholarity					
	Complete high school		19.3 (243)	1.21 (0.78 - 1.88)		0.389
	Higher education		30.5 (384)	1		-
	Skin color					
	White		25.9 (326)	0.95 (0.60 - 1.49)	1.05	0.823
	Black		3.8 (48)	0.67 (0.30 - 1.48)	1.49	0.327
	Brown		20.1 (253)	1		-

Notes: 1. F% = percentage frequency; n = number of participants 2. OR, Odds Ratio; 95% CI, 95% confidence interval; 3. p-value = statistically significant. 4. Initial -2LL = 3029,306; Final -2LL = 2748,690; $X^2 = 280.616$ ($p < 0.001$); Nagelkerke R = 0.209 (20.9% explained variance); the final model had a total accuracy predictive capacity of 51.8%. * Inversion of the Odds Ratio to assess the effect of exposure on the symptomatology of depressive disorder.

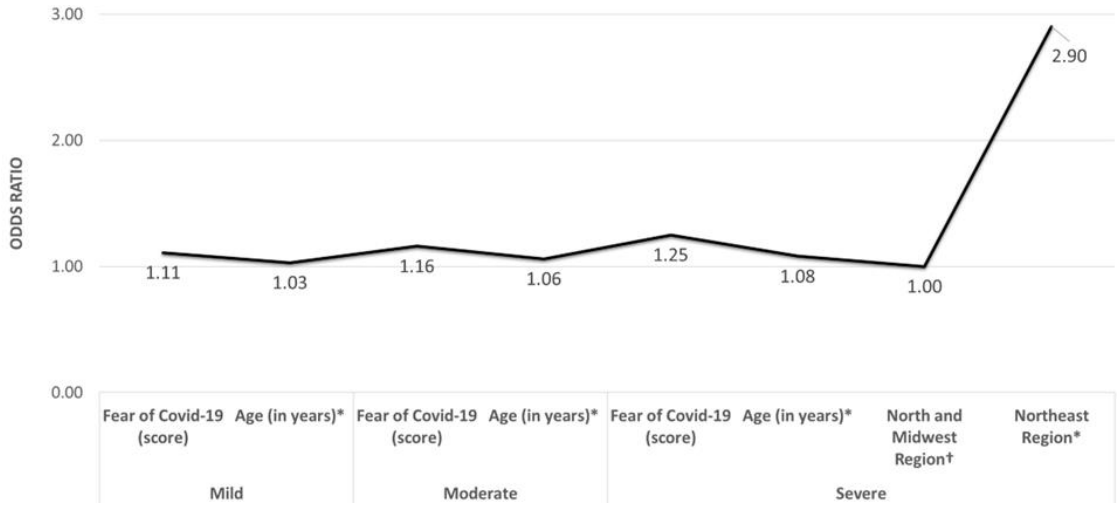

*Figure 1: Odds-Ratio Values for Significant Variables related to Depressive Symptomatology in a Brazilian Sample of Women (Brazil, May 2022). Notes: Confidence intervals for OR values are listed in Table 1. *Age and Northeast Region are represented by 1/OR values. † Reference group for the geographical region variable.*

4. DISCUSSION

The main objective of this study was to identify predictors of depressive symptoms in Brazilian women during the COVID-19 pandemic. Additionally, we evaluated the influence of COVID-19-related fear on the development of depressive symptoms in May 2022. The findings showed a widespread occurrence of depressive symptoms among most women, with a pronounced concentration at a severe level. Additionally, the study revealed that younger age, heightened fear of COVID-19, and geographical region of origin contributed to an increase in the severity of depressive symptoms. This underscores the presence of influential factors that significantly shaped the emergence of depressive symptoms in women throughout the pandemic. Moreover, these factors warrant thorough screening not only during the peak of the crisis but also during and after its exacerbation. Despite having few variables, the model exhibits an explained variance of 20.9 %.

Prior to the pandemic, the existing literature underscored significant gender disparities in mental health [18]. Notably, the heightened prevalence of depression within the female population across various contexts has been recognized [19]. This trend appears to have persisted during the pandemic [20], a trajectory further substantiated by the findings of this study. Particularly noteworthy is the revelation that Brazilian women exhibited elevated rates of moderate (19.4%) and severe depressive symptoms (49.9%). This aligns with the prevailing narrative that pre-existing vulnerabilities, compounded by escalated stress stemming from health-related and financial concerns, among other factors, collectively contribute to an increased burden of mental health issues, particularly among women [21]. Similar outcomes were observed in other Brazilian studies conducted during the pandemic. These investigations revealed an elevated risk of depressive symptoms among women [11, 12], as well as a heightened likelihood of scores being classified as moderate to severe [9].

Fear of COVID-19 emerged as a notable risk factor for depressive symptoms [22, 23], whereby the heightened intensity of COVID-19-related fear corresponded to an increased severity of depressive symptoms. Fear, while capable of triggering an adaptive response to a potential threat, can devolve into maladaptive territory when it inflates the perception of real or even non-existent danger. In this regard, fear intensification can be detrimental by fostering the development of psychiatric disorders [24]. The literature substantiates a positive correlation between stress levels and fear of COVID-19 [25], and the existence of this unique strain of fear appears to have contributed to the escalation or instigation of depressive symptoms [5].

It is pertinent to highlight that the data collection period for this study coincided with the propagation of the Ômicron variant in Brazil during the year 2022. This variant is highly

transmissible and has halted the decline in COVID-19 cases and deaths [26]. Before this, the nation had already confronted the emergence of other variants and had experienced escalating case numbers. In the early months of 2022, fear may have been exacerbated by the resurgence of infections and uncertainty surrounding the duration and consequences of this wave. In the second week of May, the Epidemiological Bulletin (EB) No. 112 reported 90 deaths and 15,756 registered cases [27]. During the last week of April, EB No. 111 revealed 14,655 cases, a 7% increase from the previous week (EB No. 110) [28, 29]. Additionally, there was a 32% increase in the number of deaths (127 deaths). Unfortunately, data for the month prior to data collection are unavailable. Consequently, apprehension and fear surrounding the possibility of a new wave of infections have become persistent concerns.

Fear of contracting illnesses other than COVID-19 has previously been linked to depression and stress [30, 31]. While no existing studies were found that specifically evaluated the interplay between the female gender, fear of COVID-19, and depression, there have been instances where bivariate relationships among these variables were detected [11, 23]. Conversely, there are documented instances of a heightened fear of COVID-19 and an increased perception of the infection threat among females [13], a pattern that has also been identified in relation to other health concerns, such as alcohol and cannabis consumption [32]. Distortion in risk perception resulting from fear engenders consequences such as compromised psychological adjustment and inadequate adaptation to confronting threats, underscoring the importance of closely monitoring this emotion [13].

Specific contexts related to women could provide justification for the observed data, including their hormonal dynamics and potential cultural factors leading to less expression of emotions toward men [13]. Factors include work-related burdens in the healthcare sector, the choice to leave employment to care for others, confinement to home, domestic violence, and implications for employability [21]. These aspects may explain why women expressed fear more prominently during the pandemic. Thus, the amplification of their responsibilities and worries may have yielded greater repercussions on their mental well-being [33]. In light of these considerations, we believe that the pandemic could have acted as a catalyst for stress and, consequently, heightened fear among women.

This study revealed a relation between younger age and a heightened likelihood of experiencing depressive symptoms, with this association becoming progressively more pronounced as symptom severity increased. Brazilian studies have previously reported that factors such as youth and female sex, even among healthcare professionals, increased the risk of heightened depressive symptoms during the pandemic [10, 11]. Younger individuals may be more exposed to uncertainties concerning the post-COVID-19 future, stemming from factors such as instability, financial constraints impeding social distancing, educational interruptions, and a sense of diminished personal freedom [34]. It seems plausible that these aspects collectively heightened concerns among younger women.

By the time of data collection, Brazil was emerging from the third wave of COVID-19 infections in April [35]. Considering the diverse spread of COVID-19 throughout Brazil coupled with variations in approaches to combating the virus and public trust in healthcare services, it is conceivable that these disparities could exert lasting effects on mental health in the coming years [4, 36]. Within the scope of this study, it was discerned that women from the North and Midwest regions exhibited a tendency toward more severe depressive symptoms than their counterparts from the Northeast. By April 2021, the state of Ceará was on high alert, according to the Oswaldo Cruz Foundation, because of the pronounced risks stemming from elevated incidence rates, mortality figures, and the strain imposed on the healthcare infrastructure [37]. Similarly, in July of the same year, Mato Grosso and Goiás emerged as two of the ten Brazilian states with the lowest vaccination rates [38], potentially contributing to the heightened impact of COVID-19.

In the North region, an unexpected surge in COVID-19-related deaths and hospitalizations struck Manaus in January 2021 [39], accompanied by a shortage of vital resources [40]. Notably, within the State of Amazonas, the mortality profile underwent a notable shift during the second wave of COVID-19, witnessing a 1.64-fold increase in the mortality rate among women, thereby underscoring a pronounced impact on the female sex [41]. This backdrop might have contributed to feelings of hopelessness, heightened psychological stress, and increased fear, all of which are

recognized as significant risk factors for depression during the pandemic [23]. Consequently, the elevated susceptibility of women in these regions to developing depressive symptoms can likely be attributed to their greater vulnerability to stress throughout the pandemic, compounded by the critical and unique circumstances that characterize these locales.

Another pertinent regional comparison involves the North, Midwest, and Northeast regions, based on healthcare indices. At the conclusion of 2021, the incidence and mortality rates per 100,000 inhabitants for the Midwest were 9,364.44 and 38.01%, respectively, while for the Northeast, they stood at 5,341.07 and 24.18, respectively. Regarding the overall number of beds from 2020 to 2023, regions Midwest and North maintained the lowest bed counts and exhibited the slowest annual growth rates, whereas Northeast maintained its position as the second region with the highest bed capacity, surpassing the combined totals of North and Midwest by more than 1.5 times [42, 43]. It is important to recognize that the Northeast region has faced significant pandemic effects. However, in the North and Midwest regions, disparities in healthcare compared to other areas could have influenced feelings of helplessness, affecting the level of fear of COVID-19 and its consequences [44, 45]. While only a few studies have examined the link between regional disparities and depression in Brazil, this study's pertinent findings indicate that the heterogeneous distribution of COVID-19 transmission and healthcare resources may have contributed to variations in the impact on women's mental health, especially within the exclusively female sample.

5. CONCLUSION

In summary, the findings of this study have the potential to contribute to the monitoring of depressive symptoms in women, taking into account specific risk factors in 2022. Moreover, these results provide guidance for directing interventions toward at-risk groups to mitigate the impact of adverse outcomes. However, some limitations of this study should be noted. First, it is important to highlight the potential for participant bias, given that online data collection restricted the sample to individuals with Internet access. Second, the sample size included a limited number of women from the North and Midwest regions as well as individuals with incomplete secondary or higher education, which could provide a more representative portrayal of the broader Brazilian population. Third, it is worth noting that the existing literature does not offer studies demonstrating an interaction between sex and the geographic distribution of depression in the Brazilian context. Therefore, further comparisons with different studies require caution.

In conclusion, for future research, it is recommended to examine additional variables that could serve as explanatory factors, such as income, occupation, maternity status, and marital status, which were not possible due to time and funding restrictions. Furthermore, studies encompass participants from racial and skin-color minorities, as well as those with complete elementary education. These efforts may help properly represent the diversity of the Brazilian female population.

6. ACKNOWLEDGEMENTS

Thanks for the Coordination of Superior Level Staff Improvement (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* – Brasil [CAPES]) – Finance Code 001 that supported the third author as Productivity Researcher Scholarship.

7. REFERENCES

1. World Health Organisation. Situation report – 78. Coronavirus disease 2019 (COVID-19) [Internet]. 2020 [cited 2023 Oct 25]. Available from: http://www.who.int/docs/default-source/coronaviruse/situation-reports/20200407-sitrep-78-covid-19.pdf?sfvrsn=bc43e1b_2.
2. Worldometers. COVID-19 Coronavirus Pandemic [Internet]; [2020?] [cited 2023 Oct 25]. Available from: https://www.worldometers.info/coronavirus/.

3. Brazilian Institute of Geography and Statistics (IBGE). Prévia da população calculada com base nos resultados do Censo Demográfico 2022 até 25 de dezembro de 2022 [Preview of the population calculated based on the results of the 2022 Demographic Census until December 25, 2022] [Internet]; 2023 [cited 2023 Oct 25]. Available from: https://ftp.ibge.gov.br/Censos/Censo_Demografico_2022/Previa_da_Populacao/POP2022_Brasil_e_UFs.pdf.
4. Ranzani OT, Bastos LSL, Gelli JGM, Marchesi JF, Baião F, Hamacher S, et al. Characterisation of the first 250,000 hospital admissions for COVID-19 in Brazil: A retrospective analysis of nationwide data. Lancet Respir Med. 2021;9(4):407-18. doi: 10.1016/S2213-2600(20)30560-9
5. Taylor S. The psychology of pandemics. Annu Rev Clin Psychol. 2022;18:581-609. doi: 10.1146/annurev-clinpsy-072720-020131
6. World Health Organisation. Mental Health and COVID-19: Early evidence of the pandemic's impact: Scientific brief, 2 March 2022. COVID-19: Scientific briefs [Internet]; 2022 [cited 2023 Oct 25]. Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-Sci_Brief-Mental_health-2022.1.
7. Deng J, Zhou F, Hou W, Silver Z, Wong CY, Chang O, et al. The prevalence of depression, anxiety, and sleep disturbances in COVID-19 patients: A meta-analysis. Ann N Y Acad Sci. 2021;1486(1):90-111. doi: 10.1111/nyas.14506
8. Fatori D, Suen P, Bacchi P, Afonso L, Klein I, Cavendish BA, et al. Trajectories of common mental disorders symptoms before and during the COVID-19 pandemic: Findings from the ELSA-Brasil COVID-19 Mental Health Cohort. Soc Psychiatry Psychiatr Epidemiol. 2022;57(9):2445-55. doi: 10.1007/s00127-022-02365-0
9. Musse FCC, Castro LS, Mestre TF, Pelloso SM, Poyares D, Musse JLL, et al. Violência mental: Ansiedade e depressão durante a pandemia de COVID-19 no Brasil. Saúde e Pesq. 2022;15(1):e-9684. doi: 10.17765/2176-9206.2022v15n1.e9684
10. Turan O, Demirci NY, AK G, Akçay Ş, Aktürk ÜA, Bilaçeroğlu S, et al. Anxiety and depression levels of healthcare workers during COVID-19 pandemic. Afr Health Sci. 2022;22(1):532-40. doi: 10.4314/ahs.v22i1.62
11. Silva-Santos LC, Silva MC, Faro A. Meta-worry, anxiety, and depression in the coronavirus 2019 (COVID-19) pandemic: Brazil, June 2020. Salud Ment. 2022;45(4):151-8. doi: 10.17711/sm.0185-3325.2022.021
12. Vazquez DA, Caetano SC, Schlegel R, Lourenço E, Nemi A, Slemian A, et al. Vida sem escola e saúde mental dos estudantes de escolas públicas na pandemia de COVID-19 [Schoolless life and mental health of public school students in the COVID-19 pandemic]. Saúde Debate. 2022;46(133):304-17. doi: 10.1590/0103-1104202213304
13. Metin A, Erbiçer ES, Sen S, Çetinkaya A. Gender and COVID-19 related fear and anxiety: A meta-analysis. J Affect Disord. 2022;310:384-95. doi: 10.1016/j.jad.2022.05.036
14. Harper CA, Satchell LP, Fido D, Latzman RD. Functional fear predicts public health compliance in the COVID-19 pandemic. Int J Ment Health Addict. 2021;19(5):1875-88. doi: 10.1007/s11469-020-00281-5
15. Ahorsu DK, Lin C, Imani V, Saffari MD, Griffiths M, Pakpour, AH. The fear of COVID-19 scale: Development and initial validation. Int J Ment Health Addict. 2022;20(3):1537-45. doi: 10.1007/s11469-020-00270-8
16. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606-13. doi: 10.1046/j.1525-1497.2001.016009606.x
17. Blackwell TL, McDermott AN. Test Review: Patient Health Questionnaire–9 (PHQ-9). Rehabil Couns Bull. 2014;57(4):246-8. doi: 10.1177/0034355213515305
18. Seedat S, Scott KM, Angermeyer MC, Berglund P, Bromet EJ, Brugha TS, et al. Cross-national associations between gender and mental disorders in the World Health Organization World Mental Health Surveys. Arch Gen Psychiatry. 2009;66(7):785-95. doi: 10.1001/archgenpsychiatry.2009.36
19. Kuehner C. Why is depression more common among women than among men?. Lancet Psychiatry. 2016;4(2):146-58. doi: 10.1016/S2215-0366(16)30263-2
20. COVID-19 Mental Disorders Collaborators. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet. 2021;398(10312):1700-12. doi: 10.1016/S0140-6736(21)02143-7
21. Flor LS, Friedman J, Spencer CN, Cagney J, Arrieta A, Herbert ME, et al. Quantifying the effects of the COVID-19 pandemic on gender equality on health, social, and economic indicators: A comprehensive review of data from March, 2020, to September, 2021. Lancet. 2022;399(10344):2381-97. doi: 10.1016/s0140-6736(22)00008-3
22. Çıkrıkçı Ö, Çıkrıkçı N, Griffiths M. Fear of COVID-19, stress and depression: A meta-analytic test of the mediating role of anxiety. Psychol Psychother. 2022;95(4):853-74. doi: 10.1111/papt.12406

23. Şimşir Z, Koç H, Seki T, Griffiths MD. The relationship between fear of COVID-19 and mental health problems: A meta-analysis. Death Stud. 2022;46(3):515-23. doi: 10.1080/07481187.2021.1889097
24. Ornell F, Schuch JB, Sordi AO, Kessler FHP. "Pandemic fear" and COVID-19: Mental health burden and strategies. Braz J Psychiatry. 2020;42(3):232-5. doi: 10.1590/1516-4446-2020-0008
25. Alimoradi Z, Ohayon MM, Griffiths MD, Lin CY, Pakpour AH. Fear of COVID-19 and its association with mental health-related factors: Systematic review and meta-analysis. BJPsych Open. 2022;8(2):e73. doi: 10.1192/bjo.2022.26
26. Butantan Institute [Instituto Butantan]. Seis fatos sobre a ômicron, a variante mais transmissível da COVID-19 [Six facts about omicron, the most transmissible variant of COVID-19] [Internet]. 2022 [cited 2023 Oct 25]. Available from: https://butantan.gov.br/noticias/seis-fatos-sobre-a-omicron-a-variante-mais-transmissivel-da-covid-19.
27. Ministry of Health (BR). Doença pelo Novo Coronavírus - COVID-19 [New Coronavirus Disease - COVID-19]. In Boletim Epidemiológico Especial 112 [Internet]. 2023 [cited 2023 Oct 25]. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/epidemiologicos/covid-19/2022/boletim-epidemiologico-no-112-boletim-coe-coronavirus.pdf/@@download/file.
28. Ministry of Health (BR). Doença pelo Novo Coronavírus - COVID-19 [New Coronavirus Disease - COVID-19]. In Boletim Epidemiológico Especial 111 [Internet]. 2023 [cited 2023 Oct 25]. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/epidemiologicos/covid-19/2022/boletim-epidemiologico-no-111-boletim-coe-coronavirus/@@download/file.
29. Ministry of Health (BR). Doença pelo Novo Coronavírus - COVID-19 [New Coronavirus Disease - COVID-19]. In Boletim Epidemiológico Especial 110 [Internet]. 2023 [cited 2023 Oct 25]. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/boletins/epidemiologicos/covid-19/2022/boletim-epidemiologico-no-110-boletim-coe-coronavirus/@@download/file.
30. Hall RCW, Hall RCW, Chapman MJ. The 1995 Kikwit Ebola outbreak: Lessons hospitals and physicians can apply to future viral epidemics. Gen Hosp Psychiatry. 2008;30(5):446-52. doi: 10.1016/j.genhosppsych.2008.05.003
31. Tsaras K, Papathanasiou IV, Mitsi D, Veneti A, Kelesi M, Zyga S, et al. Assessment of depression and anxiety in breast cancer patients: Prevalence and associated factors. Asian Pac J Cancer Prev. 2018;19(6):1661-9. doi: 10.22034/APJCP.2018.19.6.1661
32. Waddell JT. Age-varying time trends in cannabis- and alcohol-related risk perceptions 2002-2019. Addict Behav. 2022;124:107091. doi: 10.1016/j.addbeh.2021.107091
33. Broche-Pérez Y, Fernández-Fleites Z, Fernández-Castillo E, Jiménez-Puig E, Vizcaíno-Escobar AE, Ferrer-Lozano DM, et al. Anxiety, health self-perception, and worry about the resurgence of COVID-19 predict fear reactions among genders in the Cuban population. Front Glob Womens Health. 2021;2:634088. doi: 10.3389/fgwh.2021.634088
34. Pelucio L, Simões P, Dourado MCN, Quagliato LA, Nardi AE. Depression and anxiety among online learning students during the COVID-19 pandemic: A cross-sectional survey in Rio de Janeiro, Brazil. BMC Psychol. 2022;10(192):1-8. doi: 10.1186/s40359-022-00897-3
35. Oswaldo Cruz Foundation (Fiocruz). Observatório COVID-19 aponta fase de extinção da "terceira onda" no Brasil [COVID-19 Observatory points to extinction phase of the "third wave" in Brazil] [Internet]; 2022 [cited 2023 Oct 25]. Available from: https://portal.fiocruz.br/noticia/observatorio-covid-19-aponta-fase-de-extincao-da-terceira-onda-no-brasil.
36. Hossain MM, Tasnim S, Sultana A, Faizah F, Mazumder H, Zou LE, et al. Epidemiology of mental health problems in COVID-19: A review. F1000Res. 2020;9:636. doi: 10.12688/f1000research.24457.1
37. Oswaldo Cruz Foundation (Fiocruz). Boletim do Observatório COVID-19 das semanas 12 e 13/2021: Sul e Centro-Oeste tendem a cenário crítico [COVID-19 Observatory Bulletin for weeks 12 and 13/2021: South and Central-West tend towards critical scenario] [Internet]; 2021 [cited 2023 Oct 25]. Available from: https://portal.fiocruz.br/documento/boletim-do-observatorio-covid-19-das-semanas-12-e-13/2021-sul-e-centro-oeste-tendem.
38. PODER360. Covid: Centro-Oeste ultrapassa 3.000 mortes por milhão de habitantes [Covid: Central-West exceeds 3,000 deaths per million inhabitants] [Internet]; 2021 [cited 2023 Oct 25]. Available from: https://www.poder360.com.br/brasil/covid-centro-oeste-ultrapassa-3-000-mortes-por-milhao-de-habitantes/.
39. Sabino EC, Buss LF, Carvalho MPS, Prete Jr, CA, Crispim MAE, Fraiji NA, et al. Resurgence of COVID-19 in Manaus, Brazil, despite high seroprevalence. Lancet. 2021;397(10273):452-5. doi: 10.1016/S0140-6736(21)00183-5
40. Whittaker C, Ratmann O, Dye C, Sabino EC, Faria NR. Altered demographic profile of hospitalizations during the second COVID-19 wave in Amazonas, Brazil. Lancet Reg Health Am. 2021; 2:100064. doi: 10.1016/j.lana.2021.100064

41. Freitas ARR, Beckedorff OA, Cavalcanti LPG, Siqueira AM, Castro DB, Costa CF, et al. The emergence of novel SARS-CoV-2 variant P.1 in Amazonas (Brazil) was temporally associated with a change in the age and sex profile of COVID-19 mortality: A population based ecological study. Lancet Reg Health Am. 2021;1:100021. doi: 10.1016/j.lana.2021.100021
42. Ministry of Health (BR). COVID-19 no Brasil [COVID-19 in Brazil] [Internet]; 2020 [cited 2023 Oct 25]. Available from: https://infoms.saude.gov.br/extensions/covid-19_html/covid-19_html.html.
43. Tabnet Datasus. Cadastro Nacional de Estabelecimentos de Saúde [National Registry of Health Establishments] [Internet]; [cited 2023 Oct 25]. Available from: http://tabnet.datasus.gov.br/cgi/deftohtm.exe?cnes/cnv/leiintbr.def.
44. Bilge Y, Keles E, Baydili KN. The impact of COVID-19 vaccination on mental health. J Loss Trauma. 2022;27(3):285-8. doi: 10.1080/15325024.2021.1963558
45. De Lavor A. Amazônia sem respirar – Falta de oxigênio causa mortes e revela colapso em Manaus [Amazon without breathing – Lack of oxygen causes deaths and reveals collapse in Manaus]. Radis Comunicação e Saúde [Internet]; 2021 [cited 2023 Oct 25]. Available from: https://radis.ensp.fiocruz.br/reportagem/amazonia-sem-respirar/.