

Suspected Mental Disorders Among Brazilian Healthcare Providers Who Worked Fighting Covid-19

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Received: February 13th, 2024.

Accepted: August 28th, 2024.

Section editor: Alexandre Luiz de Oliveira Serpa.

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Financial Support: We would like to thank the National Council for Scientific and Technological Development (CNPq) for funding the study in the form of Scientific Initiation.

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Conflict of Interest: None declared

Abstract

A higher prevalence of mental disorders was identified among healthcare providers working in the Covid-19 response. However, the factors associated with psychological distress in this public are not yet well established in the literature. This cross-sectional study analyzed sociodemographic and work factors associated with the psychological distress of 151 healthcare providers (114 women and 37 men), aged between 20 and 61 ($M=31.99$; $SD=7.91$), who were working on the front lines against Covid-19. Participants completed a sociodemographic questionnaire and the Self Report Questionnaire (SRQ-20). Data analysis included the Kolmogorov-Smirnov test, independent Student's t -test, Chi-square test and Binary Logistic Regression test ($p<.05$). Most participants were single (63.6%), held a postgraduate degree (55.6%), had no children (64.9%), worked in hospitals (79.5%), worked full time (75.5%), practiced physical activity (66.9%) and had a monthly income of up to five minimum wages (68.2%). Psychological distress was identified in 60.9% of the participants. Adjusted analysis showed significant associations between the presence of psychological distress and both monthly income ($OR=2.772$; $CI=1.070-7.184$) and physical activity ($OR=0.362$; $CI=0.152-0.863$). Professionals with a monthly income of up to three minimum wages were 2.772 times more likely to present psychological distress, while those who engaged in physical activity were 63.8% less likely to report this distress. In conclusion, the psychological distress of Covid-19 frontline healthcare providers is associated with monthly income and engagement in physical activity.

Keywords: health, Covid-19, health personnel, physical activity income

SUSPEITA DE TRANSTORNOS MENTAIS EM PROFISSIONAIS DE SAÚDE BRASILEIROS QUE TRABALHARAM CONTRA A COVID-19

Resumo

Uma maior ocorrência de transtornos mentais foi identificada nos profissionais da saúde atuantes no combate ao Covid-19, mas os fatores associados ao sofrimento psíquico neste público ainda não estão consolidados na literatura. Assim, este estudo transversal analisou os fatores sociodemográficos e laborais associados à suspeita de transtornos mentais em 151 profissionais de saúde, sendo 114 mulheres e 37 homens, com idades entre 20 e 61 anos ($M=31,99$; $DP=7,91$), que estavam atuando na linha de frente contra o Covid-19. Os participantes responderam um questionário sociodemográfico e o *Self Report Questionnaire* (SRQ-20). A análise dos dados foi conduzida por meio dos testes de Kolmogorov-Smirnov, t de *student* independente, Qui-quadrado e Regressão Logística Binária ($p<0,05$). A maioria dos participantes era solteiro (63,6%), com pós-graduação (55,6%), sem filhos (64,9%), trabalhava em hospitais (79,5%), com regime de trabalho integral (75,5%), praticava atividade física (66,9%) e tinha renda mensal de até cinco salários-mínimos (68,2%). A presença do sofrimento mental foi identificada em 60,9% dos profissionais. A análise ajustada mostrou associação significativa da presença de suspeita de transtornos mentais com a renda mensal ($OR=2,772$; $IC=1,070-7,184$) e com a prática de atividade física ($OR=0,362$; $IC=0,152-0,863$). Os profissionais com renda mensal de até três salários-mínimos apresentaram 2,772 vezes mais chances de apresentarem presença de suspeita de transtornos mentais e aqueles que praticavam atividade física tiveram 63,8% menos chances de apresentar presença de suspeita de transtornos mentais. Pode-se concluir que presença de suspeita de transtornos mentais dos profissionais de saúde que atuaram na linha de frente contra a Covid-19 está associado com a renda mensal e com a prática de atividade física.

Palavras-chave: saúde, Covid-19, pessoal da saúde, esforço físico, renda

SOSPECHA DE TRASTORNOS MENTALES ENTRE PROFESIONALES DE LA SALUD BRASILEÑOS QUE TRABAJARON CONTRA LA COVID-19

Resumen

Se identificó una mayor ocurrencia de trastornos mentales en los profesionales de la salud que actúan en la lucha contra la Covid-19, pero los factores asociados al malestar psicológico en este público aún no están consolidados en la literatura. Así, este estudio transversal analizó los factores sociodemográficos y laborales asociados al malestar psíquico de 151 profesionales de la salud, siendo 114 mujeres y 37 hombres, con edades entre 20 y 61 años ($M=31,99$; $DE=7,91$), que trabajaban en la primera línea contra la Covid-19. Los participantes respondieron un cuestionario sociodemográfico y el *Self Report Questionnaire* (SRQ-20).

El análisis de los datos se realizó mediante las pruebas de Kolmogorov-Smirnov, t de Student independiente, Chi-cuadrado y Regresión Logística Binaria ($p < 0,05$). La mayoría de los participantes eran solteros (63,6 %), con posgrado (55,6 %), sin hijos (64,9 %), que trabajaban en hospitales (79,5 %), que trabajaban a tiempo completo (75,5 %), practicaba actividad física (66,9%) y tenía ingresos mensuales de hasta cinco salarios mínimos (68,2%). La presencia de sufrimiento psíquico fue identificada en 60,9% de los profesionales. El análisis ajustado mostró asociación significativa entre la presencia de malestar mental y la renta mensual (OR=2,772; IC=1,070-7,184) y la actividad física (OR=0,362; IC=0,152-0,863). Los profesionales con renta mensual de hasta tres salarios mínimos tenían 2.772 veces más probabilidades de presentar sufrimiento psíquico y los que practicaban actividad física tenían 63,8% menos probabilidades de presentar sufrimiento psíquico. Él puede-se concluir que el sufrimiento psíquico de los profesionales de la salud que trabajaron en la primera línea frente al COVID-19 está asociado al ingreso mensual y a la práctica de actividad física.

Palabras-clave: salud, Covid-19, personal de salud, esfuerzo físico, renta

Healthcare providers often need to manage emotional challenges and peer pressure at work, as well as balance long working hours with family responsibilities on a daily basis (Danet, 2021). However, the emergence of viral outbreaks, such as Zika, AIDS, and more recently COVID-19, has shown that the negative impacts on mental health may persist for a long period and can become more prevalent during epidemics, with psychological consequences that can be immense (Nabuco et al., 2020).

The Covid-19 health crisis had a global impact across various fields of work. For healthcare providers directly involved in combating Covid-19, witnessing the suffering of patients and their families through hospitalization and death, alongside the inherent challenges of their profession, triggered numerous physical and mental health issues (Oliveira et al., 2020). The demanding and emotionally taxing nature of their roles led to a significant rise in mental health disorders among healthcare providers. Symptoms of secondary trauma were common throughout the pandemic, manifesting as loss of appetite, fatigue, physical decline, sleep disturbances, irritability, difficulty focusing, drowsiness, despair, and fear. These symptoms can progress into mental disorders, as observed in China, the first epicenter of Covid-19 (Paiano et al., 2020).

High prevalence of depression (50%), anxiety (45%), insomnia (34%), and distress (72%) were found in healthcare providers ($n = 1257$) in China during the pandemic, with women being more affected (Lai et al., 2020). In Brazil, healthcare providers who worked tirelessly on the front lines against Covid-19 reported experiencing symptoms of burnout, including emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment. The strain on social relationships due to extended work hours was also identified as a factor contributing to burnout and mental disorders among these professionals (Pinto, 2021). Additionally, healthcare providers with higher body mass were found to be more susceptible to mental disorders compared to their peers (Pimentel et al., 2021). Regular physical activity is well-known for supporting both physical and mental health and this applies to healthcare providers. Studies conducted before the pandemic indicated lower levels of anxiety and burnout levels among healthcare providers who engaged in regular physical activities (Brand et al., 2017).

A systematic review showed a higher incidence of mental disorders among professionals directly combating Covid-19 compared to other professionals who were not on the front lines but continued working during the pandemic (da Silva Neto et al., 2021). Data from the Brazilian Ministry of Health indicated that approximately 60% of these healthcare providers exhibited psychological and psychiatric symptoms above the Brazilian national average (Soares, 2020). Therefore, it is crucial to investigate the impact and factors associated with mental health in these professionals (Borges et al., 2021), to identify key areas for consideration when proposing future interventions for this population. As evidenced in the review by Scortegagna et al. (2021), most Asian studies reported symptoms of stress, anxiety, and depression, highlighting the importance of studies on Brazilian professionals, despite the limited related scientific evidence.

Another recent systematic review highlighted the lack of studies and information regarding the profile of healthcare providers who worked during the pandemic. The studies included in the review did not address key factors influencing the mental state of these professionals, such as working hours, physical activity levels, professional experience, or age, which hinders further discussion (Danet et al., 2021). Given that the effects of a pandemic can negatively impact health for many years, additional studies are needed to clarify the relationship between work factors and the mental health challenges faced by Brazilian healthcare providers who combated Covid-19.

Understanding the relationship between the Covid-19 pandemic and the physical and mental health of healthcare providers is crucial (Danet, 2021; Ribeiro et al., 2020). In Brazil, studies were limited to examining the effects by region (Pinto, 2021) or by profession: such as nurses (Santos et al., 2021), and psychologists (Campos et al., 2022). However, there is a noticeable lack of studies providing a national perspective on the sociodemographic and behavioral characteristics of professionals who worked on the front lines against Covid-19. Therefore, the present study aimed to analyze sociodemographic, work, and physical activity factors associated with suspected mental disorders among Brazilian healthcare providers who worked on the front lines against Covid-19.

Method

Study type

The present study was performed following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Malta et al., 2010). This research is characterized as quantitative, analytical, and observational, utilizing a cross-sectional design.

Participants

Brazilian healthcare providers, of both sexes, who worked on the Covid-19 response frontlines, were invited to participate in the study. These professionals worked in person and directly with Covid-19 patients in intensive care units, wards, and emergency rooms. Participant selection was non-probabilistic and based on convenience sampling. The inclusion criteria were: 1) being a healthcare provider; and 2) having worked on the Covid-19 front lines for at least three months. Participants who did not answer all items of the questionnaires were excluded. Only those who signed the consent form were included in the study.

Instruments

A sociodemographic questionnaire, developed by the authors, collected information on age, sex, marital status, children, monthly income (in minimum wage multiples), profession, weekly workload, length of time in the profession, length of time in the current job, workplace (hospital, clinic, public health center) and the practice of physical activity (yes or no).

The presence of suspected mental disorders among the professionals was evaluated using the Self Report Questionnaire (SRQ-20) (Harding et al., 1980). The SRQ-20 is designed to detect symptoms suggesting the likelihood (absence/presence) of a mental disorder, although it does not provide a specific diagnosis or specify the type of disorder. The instrument consists of 24 questions, of which 20 assess non-psychotic disorders and four address psychotic disorders. Each affirmative response scores one point, with a cut-off score of seven for men and eight for women. The SRQ-20 used in this study was initially adapted and validated for the Brazilian population by Mari & Williams (1985), showing a sensitivity of 83%, specificity of 80%, and a classification error rate of 19%. A more recent study by Santos et al. (2010) further confirmed its reliability for use in the Brazilian context. In the present study, the SRQ-20 presented a Cronbach's Alpha of .91, indicating strong internal consistency.

Data Collection

The present study was approved by the Ethics Committee of the Federal University of Vale do São Francisco under protocol number 4.823.034, in accordance with Resolution 466/12 of the Brazilian National Health Council on research with human subjects. The divulgation of the study and recruitment of participants was conducted through social media platforms (Facebook, Instagram, and WhatsApp). Data was collected through a free online form from Google Forms. Individuals interested in participating provided consent through a consent form on the platform. Contact information (telephone numbers and e-mails) for the researchers was provided to address any participant questions regarding research procedures during the consent process. Access to the questionnaire was granted only after participants accepted the consent terms.

The questionnaire was open for responses for 90 days (September to November 2021). Participants were instructed to allocate 30 minutes and to be in a calm environment while completing the questionnaire. Throughout the data collection process, all ethical standards for participant privacy were followed, ensuring the anonymity of the information.

Statistical Analysis

Data analysis was performed using SPSS version 25.0 with both descriptive and inferential statistics. Absolute and relative frequencies were used for descriptive analysis. For numerical variables, data normality was tested using the Kolmogorov-Smirnov Test, while homogeneity of variances was assessed using Levene's Test. Bootstrapping procedures (1000 re-samples; 95% CI BCa) were applied to improve the reliability of results, address deviations from normality in the sample distribution, and adjust for differences in group sizes, while also providing a 95% confidence interval for differences between means, correlations and predictions (Haukoos & Lewis, 2005).

An Independent Student's *t*-test was conducted to compare the length of time in the profession and weekly workload of the healthcare providers as a function of the presence of psychological distress. The Chi-Square Test was used to investigate differences in the proportion

of suspected mental disorders across sociodemographic and work-related variables. Binary Logistic Regression (both raw and adjusted analyses) examined associations between sociodemographic and work-related variables (independent variables) and the likelihood of suspected mental disorders (dependent variable) among healthcare providers. Only variables that presented a significance level below .20 in the Chi-Square and Independent Student’s *t*-test analyses were included in the regression model. Model fit was assessed using the Hosmer-Lemeshow Test. A significance level of $p < .05$ was adopted.

Results

A total of 151 healthcare providers participated in the study, including 114 women and 37 men, aged between 20 and 61 ($M = 31.99$; $SD = 7.91$). The majority of participants were single (63.6%), held a postgraduate degree (55.6%), had no children (64.9%), worked in hospitals (79.5%), held full-time positions (75.5%), practiced physical activity (66.9%), and had a monthly income of up to five minimum wages (75.5%). Regarding profession, 43.0% were nurses, 26.5% doctors, 21.9% physical therapists, 5.3% psychologists, and 3.3% social workers. Based on responses to the questionnaire, 60.9% of the participants were identified as experiencing psychological distress according to the SRQ-20.

Table 1
Sociodemographic and work-related profile of Brazilian healthcare providers who worked on the front lines against Covid-19. Brazil, 2021.

VARIABLES	<i>n</i>	%
Sex		
Female	114	75.5
Male	37	24.5
Marital status		
Single	96	63.6
Married	41	27.2
Divorced	14	9.3
Education		
Graduate degree	67	44.4
Postgraduate degree	84	55.6
Children		
Yes	53	35.1
No	98	64.9
Profession		
Nurse	65	43.0
Doctor	40	26.5
Physical Therapist	33	21.9
Psychologist	8	5.3
Social Worker	5	3.3

Table 1
Sociodemographic and work-related profile of Brazilian healthcare providers who worked on the front lines against Covid-19. Brazil, 2021.

VARIABLES	n	%
Workplace		
Hospital	120	79.5
Public health center	20	13.2
Private clinic	11	7.3
Workload		
Part-time	37	24.5
Full-time	114	75.5
Physical activity		
Yes	101	66.9
No	50	33.1
Psychological distress		
No	59	39.1
Yes	92	60.9
Monthly income		
Up to 3 minimum wages	64	42.4
3.1 to 5 minimum wages	39	25.8
More than 5 minimum wages	48	31.8

Table 2 shows the mean score of workloads, length of time in the profession, length of time in the current job, and number of jobs of Brazilian healthcare providers who worked on the front lines against Covid-19.

Table 2
Mean score of workloads, time in profession, time in the current job, and number of jobs of Brazilian healthcare providers who worked on the front lines against Covid-19. Brazil, 2021.

VARIABLES	Mean	Standard Deviation
Daily workload (hours)	10.55	4.05
Weekly workload (hours)	48.93	25.20
Time in profession (years)	7.18	7.42
Time in the current job (years)	3.80	4.47
Total number of jobs	1.76	0.75

Table 3 shows a higher proportion of suspected mental disorders among participants who were women ($p = .011$), single ($p = .011$), without children ($p = .028$), and with lower monthly incomes ($p = .017$). Additionally, there was a significantly higher proportion of professionals without suspected mental disorders among those who reported practicing physical activity ($p = .008$).

Table 3
Comparison of proportions of sociodemographic and work-related variables between healthcare providers with and without suspected mental disorders (N = 151). Brazil, 2021.

VARIABLE	Suspected mental disorders		χ²	p-value
	No (n = 59)	Yes (n = 92)		
	n (%)	n (%)		
Sex				
Female	38 (64.4)	76 (82.6)	6.438	.011*
Male	21 (35.6)	16 (17.4)		
Marital status				
Single	31 (52.5)	65 (70.7)	6.424	.011*
Married	19 (32.2)	22 (23.9)		
Divorced	09 (15.3)	05 (5.4)		
Education				
Graduate degree	21 (35.6)	46 (50.0)	3.023	.082
Postgraduate degree	38 (64.4)	46 (50.0)		
Children				
Yes	27 (45.8)	26 (28.3)	4.834	.028*
No	32 (54.2)	66 (71.7)		
Profession				
Nurse	22 (37.3)	43 (46.7)	0.460	.498
Doctor	19 (32.2)	21 (22.8)		
Physical Therapist	13 (22.0)	20 (21.7)		
Psychologist	02 (3.4)	06 (6.5)		
Social Worker	03 (5.1)	02 (2.2)		
Workplace				
Hospital	42 (71.2)	78 (84.8)	2.492	.114
Public health center	12 (20.3)	08 (8.7)		
Private clinic	05 (8.5)	06 (6.5)		
Workload				
Part-time	13 (22.0)	24 (26.1)	0.319	.572
Full-time	46 (78.0)	68 (73.9)		
Monthly income				
Up to 3 MW	20 (33.9)	44 (47.8)	5.678	.017*
3.1 to 5 MW	13 (22.0)	26 (28.3)		
More than 5 MW	26 (44.1)	22 (23.9)		
Physical activity				
Yes	47 (79.7)	54 (58.7)	7.134	.008*
No	12 (20.3)	38 (41.3)		

*Significant association – p < .05: Fisher's Exact Test. MW = Minimum Wage.

Table 4 presents the comparison of workload and length of time in the current job of healthcare providers according to the presence of suspected mental disorders. A significant difference was observed between groups for the length of time in the current job (p = .041), indicating that professionals with suspected mental disorders had, on average, a shorter time

in their current job ($M = 3.20$ years) compared to those without suspected mental disorders ($M = 4.73$ years).

Table 4
Comparison of mean score for workload, time in profession, time in the current job, and number of jobs according to the presence of suspected mental disorders. Brazil, 2021.

VARIABLES	Suspected mental disorders		p-value	Cohen's-d
	No (n = 59)	Yes (n = 92)		
	M (SD)	M (SD)		
Daily workload	10.29 (4.53)	10.71 (3.73)	.532	.101
Weekly workload	48.22 (24.47)	49.39 (25.80)	.783	.048
Time in profession	8.42 (7.80)	7.39 (11.51)	.557	.104
Time in the current job	4.73 (4.26)	3.20 (2.80)	.041*	.424
Total number of jobs	1.90 (0.74)	1.67 (0.76)	.075	.307

* Significant difference ($p < 0.05$) – Independent Student's T-test.

For the regression analysis model, only variables with a significance level below .20 in the Chi-Square test and Independent Student's t -test were considered. Table 5 presents the sociodemographic and work-related factors associated with suspected mental disorders among Brazilian healthcare providers. In the raw analysis, significant associations ($p < .05$) were found between suspected mental disorders and factors including length of time in the current job, monthly income, sex, marital status, children, and physical activity.

After adjusting for all variables (Table 5), a statistically significant association ($p < .05$) remained only for monthly income and physical activity. Notably, healthcare providers with a monthly income of up to three minimum wages had 2.772 times higher odds [95% CI = 1.070–7.184] of suspected mental disorders compared to those with a monthly income higher than five minimum wages. Additionally, practicing physical activity emerged as a protective factor, with professionals who exercised showing a 63.8% lower likelihood of suspected mental disorders.

Table 5

Factors associated with suspected mental disorders in Brazilian healthcare providers who worked on the front lines against Covid-19. Brazil, 2021.

Variables	OR _{raw}	OR _{adjusted} [95% CI]
Time in the current job	0.927 [0.859-0.999]*	1.021 [0.930-1.120]
Monthly income		
Up to 3 MW	2.600 [1.197-5.648]*	2.772 [1.070-7.184]*
3.1 to 5 MW	2.364 [0.985-5.670]	1.762 [0.666-4.662]
More than 5 MW	1.00	1.00
Sex		
Female	2.625 [1.230-5.602]*	2.169 [0.924-5.093]
Male	1.00	1.00
Marital status		
Single	3.774 [1.167-12.208]*	2.953 [0.710-12.283]
Married	2.084 [0.595-7.302]	2.277 [0.536-9.681]
Divorced	1.00	1.00
Education		
Graduate degree	1.810 [0.924-3.542]	1.413 [0.637-3.134]
Postgraduate degree	1.00	1.00
Children		
Yes	0.467 [0.236-0.926]*	0.573 [0.235-1.397]
No	1.00	1.00
Workplace		
Hospital	1.548 [0.446-5.373]	1.509 [0.360-6.325]
Public health center	0.556 [0.126-2.456]	0.349 [0.064-1.915]
Private clinic	1.00	1.00
Physical activity		
Yes	0.363 [0.170-0.774]*	0.362 [0.152-0.863]*
No	1.00	1.00

*Significant association – p < .05; Binary Logistic Regression. OR adjusted for all variables. OR = Odds Ratio; CI = confidence interval. MW = minimum wage.

Discussion

The present study aimed to analyze the sociodemographic, work-related, and physical activity factors associated with suspected mental disorders among healthcare providers. The main findings indicated that participants with a monthly income of up to three minimum wages had a higher likelihood of suspected mental disorders compared to those with higher salaries. Additionally engaging in physical activity emerged as a protective factor against suspected mental disorders in these professionals.

The comparison of sociodemographic variables between healthcare providers with and without suspected mental disorders (table 3) revealed a higher proportion of suspected mental disorders among women. This finding can be explained by the longstanding social expectations

related to the role of women, which influence both their personal identities and professional activities. Professionally, these results suggest that pressure at work and acceptance in the workplace impact women's health. Another important factor is the high proportion of women employed in hospital settings. Pimentel et al. (2021) found that over 80% of their study sample consisted of women. Similarly, Santos et al. (2021), reported that female nurses working during the Covid-19 pandemic presented a 62% higher prevalence of depressive symptoms compared to male nurses. Concerns about the predominance of stress, anxiety, and depression symptoms in women have been widely documented in the literature since the beginning of the Covid-19 response (Souza et al., 2020). The results of the present study also indicated that healthcare providers who were single and without children were more likely to exhibit suspected mental disorders (Table 3). This finding suggests that during the Covid-19 response, frontline healthcare providers who were married or had children may have experienced lower levels of suspected mental disorders due to the presence of family support during this stressful period. However, Cruz et al. (2019) found that marital status did not significantly affect anxiety, psychological exhaustion, or burnout symptoms among healthcare providers in Spain. Similarly, Santos et al. (2021) reported no association between having children and lower levels of psychological distress among healthcare providers. A systematic review by Dugani et al. (2018) also found no differences in the prevalence of mental disorders between developed and developing countries. When comparing weekly workload and length of time in the current job as a function of the presence of suspected mental disorders, a statistically significant difference was found only for the time in the current job, in which less time in the job was associated with a higher likelihood of suspected mental disorders. Studies conducted before the Covid-19 pandemic, however, have presented contrasting findings. Moura et al. (2018) identified more years in the job as a potential risk factor for developing work-related psychological disorders. Similarly, Wisetborisut et al. (2014) found that healthcare providers working night shifts for over 10 years had a higher risk of developing burnout syndrome compared to peers with different work schedules. The results highlight the need for support systems for healthcare providers and better characterization of risk factors, such as excessive workload, high job pressure, and limited professional experience. Additionally, mental disorders continue to rise globally, with an even faster increase low – and medium – income countries (Razzouk et., 2013).

The results in Table 5 indicate that having a monthly income of five or more minimum wages was associated with a lower likelihood of suspected mental disorders during the Covid-19 response. In this context, lower incomes may contribute to various challenges, including impacts on family dynamics, social life, and the mental health of these professionals. Other studies, such as the one by Santos et al. (2021), with Covid-19 frontline nurses in Brazil, found that professionals with monthly incomes between 3 and 4 minimum wages had a 41% higher prevalence of moderate severe or severe depression compared to those who had a monthly income of 5 or more minimum wages. Conversely, Santos et al. (2019) found no significant association between demographic factors, including monthly income, and mental health outcomes

in a sample of 168 professionals working in various Intensive Care Units in the city of São Paulo. In Brazil, symptoms of psychological distress align with the present findings, showing associations between psychological distress and the female gender, management positions, and a monthly income exceeding 7 minimum wages (Poletto et al., 2016). Consequently, the literature continues to seek a deeper understanding of predictive factors for psychological distress among healthcare providers. The findings of the present study contribute to this ongoing discussion, as concrete evidence on the direction of these associations remains limited. However, the potential for selection bias is uncertain, as it is unclear whether those who participated in the study experienced greater psychological distress than the general population or other healthcare providers. This could lead to an overestimation of mental health issues among the participants relative to the actual prevalence in the broader population.

In the present study, professionals who engaged in physical activity had lower odds of presenting suspected mental disorders. Similarly, Carvalho et al. (2016) found a higher prevalence of common mental disorders among healthcare providers who did not practice physical activity. The benefits of physical activity for physical health and chronic pain management have been demonstrated across various populations (Geneen et al., 2017). Additionally, regular physical activity has been associated with reductions in depression and anxiety symptoms (Lourenço et al. 2017). In this context, a study of 235 healthcare providers in Spain also identified that exercise was associated with a lower prevalence of anxiety, emotional exhaustion, and depersonalization (Cruz et al., 2019). Therefore, promoting physical activity among healthcare providers, even after the Covid-19 pandemic, may contribute to improved mental health of this population, as suggested by Pollock et al. (2020) in a systematic review of mental health intervention methods for healthcare providers.

Other studies support our findings and emphasize the need to address the mental health of healthcare providers working in hospital environments (Pascoal, Santos, Silva, Fernandes & Sousa, 2019). In a study conducted in China (Lai et al., 2020), healthcare providers working during the pandemic were 70% more likely to experience psychological distress compared to those not working on the Covid-19 front lines. The authors highlighted the need for further investigations that consider the participants' local and social contexts. Similarly, Pinto (2021) reported increased stress episodes among healthcare providers in the city of Florianópolis, Brazil, attributed to excessive workloads and social pressure during the Covid-19 pandemic.

Although this study presents significant findings, some limitations should be mentioned. While the study aimed to include healthcare providers from various regions of Brazil, the sample size is insufficient to generalize the results nationwide, partly due to the loss of data on the regional distribution of professionals during the data extraction process. Additionally, examining the relationship between physical activity and mental health, this study did not account for the type, frequency, or intensity of activities performed by the participants. Furthermore, selection bias may have been present, as healthcare providers experiencing higher levels of psychological distress might have been more motivated to participate. Despite these limitations, this study has

notable strengths, including its examination of mental health according to sociodemographic factors and physical activity, providing valuable insights into the impacts of the Covid-19 response on healthcare providers.

Final Considerations

In conclusion, suspected mental disorders among Brazilian healthcare providers who worked on the Covid-19 front lines are associated with monthly income and physical activity. It should be emphasized that lower income was linked to a higher likelihood of suspected mental disorders, while physical activity served as a protective factor for these disorders during the Covid-19 response. Continued attention to the mental health of these professionals after the pandemic is essential, as certain healthcare roles remain undervalued, with comparatively low salaries, and healthcare environments often imposing significant physical and emotional burdens on these individuals.

References

- Borges, F. E. de S., Aragão, D. F. B., Borges, F. E. de S., Borges, F. E. S., Sousa, A. S. de J., & Machado, A. L. G. (2021). Fatores de risco para a Síndrome de Burnout em profissionais da saúde durante a pandemia de Covid-19. *Revista Enfermagem Atual In Derme*, 95(33), Art. 33. <https://doi.org/10.31011/reaid-2020-v.94-n.32-art.835>
- Brand, S. L., Thompson Coon, J., Fleming, L. E., Carroll, L., Bethel, A., & Wyatt, K. (2017). Whole-system approaches to improving the health and wellbeing of healthcare workers: A systematic review. *PLoS ONE*, 12(12), e0188418. <https://doi.org/10.1371/journal.pone.0188418>
- Campos, J. A. D. B., Campos, L. A., Martins, B. G., de Oliveira, A. P., & Navarro, F. M. ([s.d.]). *Covid-19 pandemic: Prevalence of depression, anxiety, and stress symptoms among Brazilian psychologists*. <https://doi.org/10.3389/fpsyg.2022.1012543>
- Carvalho, D. B. de, Araújo, T. M. de, & Bernardes, K. O. (2016). Transtornos mentais comuns em trabalhadores da Atenção Básica à Saúde. *Revista Brasileira de Saúde Ocupacional*, 41. <https://doi.org/10.1590/2317-6369000115915>
- Cruz, S. P. de la, Cruz, J. C., Cabrera, J. H., & Abellán, M. V. (2019). Factors related to the probability of suffering mental health problems in emergency care professionals. *Revista Latino-Americana de Enfermagem*, 27. <https://doi.org/10.1590/1518-8345.3079-3144>
- da Silva Neto, R. M., Benjamim, C. J. R., de Medeiros Carvalho, P. M., & Neto, M. L. R. (2021). Psychological effects caused by the Covid-19 pandemic in health professionals: a systematic review with meta-analysis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 104, 110062.
- Danet, A. D (2021). Impacto psicológico de la Covid-19 en profesionales sanitarios de primera línea en el ámbito occidental. Una revisión sistemática. *Medicina Clínica*, 156(9), 449–458. <https://doi.org/10.1016/j.medcli.2020.11.009>
- Dugani, S., Afari, H., Hirschhorn, L. R., Ratcliffe, H., Veillard, J., Martin, G., Lagomarsino, G., Basu, L., & Bitton, A. (2018). Prevalence and factors associated with burnout among frontline primary health care providers in low- and middle-income countries: A systematic review. *Gates Open Research*, 2, 4. <https://doi.org/10.12688/gatesopenres.12779.3>
- Esteves, G. G. L., Leão, A. A. M., & Alves, E. de O. (2019). Fadiga e Estresse como preditores do Burnout em Profissionais da Saúde. *Revista Psicologia Organizações e Trabalho*, 19(3), 695–702. <https://doi.org/10.17652/rpot/2019.3.16943>
- Geneen, L. J., Moore, R. A., Clarke, C., Martin, D., Colvin, L. A., & Smith, B. H. (2017). Physical activity and exercise for chronic pain in adults: An overview of Cochrane Reviews. *Cochrane Database of Systematic Reviews*, 2020(2). <https://doi.org/10.1002/14651858.CD011279.pub3>
- Harding, T. W., de Arango, M. V., Baltazar, J., Climent, C. E., Ibrahim, H. H., Ladrado-Ignacio, L., Murthy, R. S., & Wig, N. N. (1980). Mental disorders in primary health care: A study of their frequency and diagnosis in four developing countries. *Psychological Medicine*, 10(2), 231–241. <https://doi.org/10.1017/S0033291700043993>
- Haukoos, J. S., & Lewis, R. J. (2005). Advanced Statistics: Bootstrapping Confidence Intervals for Statistics with “Difficult” Distributions. *Academic Emergency Medicine*, 12(4), 360–365. <https://doi.org/10.1197/j.aem.2004.11.018>
- Hussain, A., Mahawar, K., Xia, Z., Yang, W., & EL-Hasani, S. (2020). Obesity and mortality of Covid-19. Meta-analysis. *Obesity Research & Clinical Practice*, 14(4), 295–300. <https://doi.org/10.1016/j.orcp.2020.07.002>
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., & Hu, S. (2020). Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*, 3(3), e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- Lourenço, B. da S., Peres, M. A. de A., Porto, I. S., Oliveira, R. M. P. de, & Dutra, V. F. D. (2017). Atividade física como uma estratégia terapêutica em saúde mental: Revisão integrativa com implicação para o cuidado de enfermagem. *Escola Anna Nery*, 21. <https://doi.org/10.1590/2177-9465-EAN-2016-0390>

- Malta, M., Cardoso, L. O., Bastos, F. I., Magnanini, M. M. F., & Silva, C. M. F. P. da. (2010). Iniciativa STROBE: Subsídios para a comunicação de estudos observacionais. *Revista de Saúde Pública*, 44, 559–565. <https://doi.org/10.1590/S0034-89102010000300021>
- Mari, J. J., & Williams, P. (1986). A validity study of a psychiatric screening questionnaire (SRQ-20) in primary care in the city of Sao Paulo. *The British Journal of Psychiatry: The Journal of Mental Science*, 148, 23–26. <https://doi.org/10.1192/bjpp.148.1.23>
- Morgantini, L. A., Naha, U., Wang, H., Francavilla, S., Acar, Ö., Flores, J. M., Crivellaro, S., Moreira, D., Abern, M., Eklund, M., Vigneswaran, H. T., & Weine, S. M. (2020). Factors contributing to healthcare professional burnout during the Covid-19 pandemic: A rapid turnaround global survey. *PLoS ONE*, 15(9), e0238217. <https://doi.org/10.1371/journal.pone.0238217>
- Moura, A., Lunardi, R., Volpato, R., Ferreira do Nascimento, V., Bassos, T., & Guimaraes Lemes, A. (2018). Factors associated with anxiety between basic attention professionals/ Fatores associados à ansiedade entre profissionais da atenção básica/ Los factores asociados con la ansiedad entre los profesionales de atención primaria. *Revista Portuguesa de Enfermagem de Saúde Mental*, s/n. <https://doi.org/10.19131/rpesm.0198>
- Nabuco, G., Oliveira, M. H. P. P. de, & Afonso, M. P. D. (2020). O impacto da pandemia pela Covid-19 na saúde mental: Qual é o papel da Atenção Primária à Saúde? *Revista Brasileira de Medicina de Família e Comunidade*, 15(42), Art. 42. [https://doi.org/10.5712/rbmfc15\(42\)2532](https://doi.org/10.5712/rbmfc15(42)2532)
- Oliveira, E. N., Costa, M. S. A., Nascimento, P. I. da F. V. do, Rodrigues, C. S., Andrade, C. S. G. de, Mendonça, J. M. F., Pinto, M. R., França, S. da S., & Lima, G. F. (2020). Com a palavra os profissionais de saúde na linha de frente do combate à Covid-19. *Research, Society and Development*, 9(8), Art. 8. <https://doi.org/10.33448/rsd-v9i8.5145>
- Paiano, M., Jaques, A. E., Nacamura, P. A. B., Salci, M. A., Radovanovic, C. A. T., & Carreira, L. (2020). Saúde mental dos profissionais de saúde na China durante pandemia do novo coronavírus: Revisão integrativa. *Revista Brasileira de Enfermagem*, 73. <https://doi.org/10.1590/0034-7167-2020-0338>
- Pascoal, K. P. M. F., Santos, A. C. B. da C., da Silva, J. A. S. S., Fernandes, V. M. de S., & de Sousa, M. N. (2019). AVALIAÇÃO DA QUALIDADE DE VIDA, ESTRESSE E SAÚDE MENTAL DOS PROFISSIONAIS DE SAÚDE DAS UNIDADES DE TERAPIA INTENSIVA. *Revista interdisciplinar em saúde*, 6(5), 19–30. <https://doi.org/10.35621/23587490.v6.n5.p19-30>
- Pimentel, R. F. W., Rodrigues, L. M., Rocha, R. L., Santana, A. I. C., Figueiredo, P. C. M. de, Carvalho, M. L. do V., Silva, D. A. R. da, Suen, V. M. M., & Mercedes, M. C. das. (2021). Relação entre a pandemia da Covid-19, compulsão alimentar e sofrimento mental em profissionais de saúde no Brasil: Um estudo transversal. *Revista Brasileira de Medicina do Trabalho*, 19(3), 283–289. <https://doi.org/D0I: 10.35621/23587490.v6.n5.p19-30>
- Pinto, G. L. K. (2021). SÍNDROME DE BURNOUT: UM ESTUDO SOBRE O ESGOTAMENTO FÍSICO E MENTAL DOS PROFISSIONAIS DA SAÚDE NA GRANDE FLORIANÓPOLIS FRENTE À PANDEMIA DO Covid-19. *REVISTA HUMANITARIS - B3*, 3(3), Art. 3. <http://www.icepsc.com.br/ojs/index.php/revistahumanitaris/article/view/469>
- Poletto, N. A., Probst, L. F., Oliveira, T. L. de, Guerra, L. M., Ambrosano, G. M. B., Cortellazzi, K. L., Gil-Monte, P. R., & Possobon, R. de F. (2016). Síndrome de Burnout em gestores municipais da saúde. *Cadernos Saúde Coletiva*, 24, 209–215. <https://doi.org/10.1590/1414-462X201600020005>
- Pollock, A., Campbell, P., Cheyne, J., Cowie, J., Davis, B., McCallum, J., McGill, K., Elders, A., Hagen, S., McClurg, D., Torrens, C., & Maxwell, M. (2020). Interventions to support the resilience and mental health of frontline health and social care professionals during and after a disease outbreak, epidemic or pandemic: A mixed methods systematic review. *Cochrane Database of Systematic Reviews*, 11. <https://doi.org/10.1002/14651858.CD013779>
- Razzouk, D., Sousa, A., Oliveira, G. G., Cardoso, A., & Mari, J. J. (2013). The Impact of Antipsychotics Polypharmacy on Health Care Costs of Patients with Mental Disorders in São Paulo City, Brazil. *Value in Health*, 16(7), A694–A695. <https://doi.org/10.1016/j.jval.2013.08.2086>

- Ribeiro, L. M., Vieira, T. de A., & Naka, K. S. (2020). Síndrome de burnout em profissionais de saúde antes e durante a pandemia da Covid-19. *Revista Eletrônica Acervo Saúde*, 12(11), e5021. <https://doi.org/10.25248/reas.e5021.2020>
- Saidel, M. G. B., Lima, M. H. de M., Campos, C. J. G., Loyola, C. M. D., Espiridião, E., & Rodrigues, J. (2020). Intervenções em saúde mental para profissionais de saúde frente a pandemia de Coronavírus [Mental health interventions for health professionals in the context of the Coronavirus pandemic] [Intervenciones de salud mental para profesionales de la salud ante la pandemia de Coronavirus]. *Revista Enfermagem UERJ*, 28(0), Art. o. <https://doi.org/10.12957/reuerj.2020.49923>
- Santos, K. O. B., Araújo, T. M., Pinho, P. S., & Silva, A. C. C. (2010). Avaliação de um instrumento de mensuração de morbidade psíquica: estudo de validação do Self- 93 Reporting Questionnaire (SRQ-20). *Revista Baiana de Saúde Pública*, 31(3), 244-560. <https://doi.org/10.22278/2318-2660.2010.v34.n3.a54>
- Santos, K. M. R. dos, Galvão, M. H. R., Gomes, S. M., Souza, T. A. de, Medeiros, A. de A., & Barbosa, I. R. (2021). Depressão e ansiedade em profissionais de enfermagem durante a pandemia da covid-19. *Escola Anna Nery*, 25. <https://doi.org/10.1590/2177-9465-EAN-2020-0370>
- Scortegagna, Silvana Alba, Limal, Eduardo dos S. de, Pasian, Sonia Regina, & AmparolIII, Deise M. do. (2021). Mental health in health professionals facing Covid-19: a systematic review. *Psicologia: teoria e prática*, 23(1), 1-23. <https://doi.org/10.5935/1980-6906/ePTPC1913976>
- Soares, F. (2020, setembro 11). Saúde Divulga Dados Sobre a Influência da Covid-19 na Saúde Mental de Profissionais. *Biblioteca Virtual de Enfermagem - Cofen*. <http://biblioteca.cofen.gov.br/influencia-covid-19-saude-mental-profissionais/>
- Souza, A. S. R., Souza, G. F. de A., & Praciano, G. de A. F. (2020). A saúde mental das mulheres em tempos da Covid-19. *Revista Brasileira de Saúde Materno Infantil*, 20, 659-661. <https://doi.org/10.1590/1806-93042020000300001>
- Souza, C. G. V. M. de, Benute, G. R. G., Moretto, M. L. T., Levin, A. S. S., Assis, G. R. de, Padoveze, M. C., & Lobo, R. D. (2019). Qualidade de vida profissional na saúde: Um estudo em Unidades de Terapia Intensiva. *Estudos de Psicologia (Natal)*, 24(3), 269-280. <https://doi.org/10.22491/1678-4669.20190028>
- Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2009). *Métodos de pesquisa em atividade física*. Artmed Editora.
- Wisetborisut, A., Angkurawaranon, C., Jiraporncharoen, W., Uaphanthasath, R., & Wiwatanadate, P. (2014). Shift work and burnout among health care workers. *Occupational Medicine*, 64(4), 279-286. <https://doi.org/10.1093/occmed/kqu009>

Contribution of each author to the work:

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Kauany Maria Araújo Veras: Contributed to the development of the project, data collection, data analysis, writing, and final revision. Contributed to the development of the project, data collection, data analysis, writing, and final revision.

Nathan Leonardo Gomes Costa: Contributed to data analysis, writing, and final revision.

Gabriel Lucas Moraes Freire: Contributed to the development of the project, data collection, data analysis, and writing.

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