

COVID-19 pandemic: what factors compromised the mental capacity to work of nursing technicians?

Pandemia COVID-19: que fatores comprometeram a capacidade mental para o trabalho dos técnicos de enfermagem?

Pandemia de COVID-19: ¿qué factores comprometieron la capacidad mental para el trabajo de los técnicos de enfermería?

Katia Maria Rosa Vieira^I

ORCID: 0000-0003-2988-7437

Francisco Ubaldo Vieira Junior^{II}

ORCID: 0000-0003-0419-6971

Zélia Zilda Lourenço de Camargo Bittencourt^I

ORCID: 0000-0002-6796-5515

^IUniversidade Estadual de Campinas. Campinas, São Paulo, Brazil.

^{II}Instituto Federal de São Paulo. Campinas, São Paulo, Brazil.

How to cite this article:

Vieira KMR, Vieira Junior FU, Bittencourt ZZLC. COVID-19 pandemic: what factors compromised the mental capacity to work of nursing technicians?

Rev Bras Enferm. 2024;77(Suppl 1):e20220783.
<https://doi.org/10.1590/0034-7167-2022-0783>

Corresponding author:

Katia Maria Rosa Vieira

E-mail: katia_rosa@terra.com.br



EDITOR IN CHIEF: Álvaro Sousa
ASSOCIATE EDITOR: Carina Dessotte

Submission: 01-05-2023 **Approval:** 09-25-2023

ABSTRACT

Objectives: to identify the factors that influenced the mental capacity to work of nursing technicians during the COVID-19 pandemic. **Methods:** a cross-sectional study, carried out at two reference hospitals in assisting the population during the COVID-19 pandemic. A total of 237 professionals from Intensive Care Units participated and answered a questionnaire. Multiple linear regression models were used to assess the correlation between mental capacity to work and variables related to risks of contamination, institutional support and health. **Results:** lack of COVID-19 tests, lack of knowledge of routine, absences in 2021 and mental illness contributed to worse mental capacity to work. Management embracement and physical capacity were considered protective factors. **Conclusions:** reduced work capacity in relation to mental demands can affect professional performance and quality of care, with implications for patients and health institutions.

Descriptors: Pandemics; COVID-19; Working Conditions; Occupational Health; Nursing.

RESUMO

Objetivos: identificar os fatores que influenciaram a capacidade mental para o trabalho de técnicos de enfermagem no contexto da pandemia da COVID-19. **Métodos:** estudo transversal, realizado em dois hospitais de referência no atendimento à população na pandemia da COVID-19. Participaram 237 profissionais de Unidades de Terapia Intensiva que responderam um questionário. Utilizaram-se modelos de regressão linear múltipla para avaliar a correlação entre a capacidade mental para o trabalho e variáveis relacionadas ao risco de contaminação, apoio institucional e saúde. **Resultados:** os fatores ausência de testes de COVID-19, desconhecimento da rotina, afastamentos em 2021 e adoecimento mental contribuíram para a piora da capacidade mental para o trabalho. O acolhimento da chefia e a capacidade física foram considerados fatores de proteção. **Conclusões:** a redução da capacidade para o trabalho em relação às exigências mentais pode afetar o desempenho profissional e a qualidade da assistência, com implicações para pacientes e instituições de saúde.

Descritores: Pandemia; COVID-19; Condições de Trabalho; Saúde do Trabalhador; Enfermagem.

RESUMEN

Objetivos: identificar los factores que influyeron en la capacidad mental para el trabajo de técnicos de enfermería en el contexto de la pandemia de COVID-19. **Métodos:** estudio transversal, realizado en dos hospitales de referencia que atienden a la población durante la pandemia de COVID-19. Participaron 237 profesionales de Unidades de Cuidados Intensivos que respondieron un cuestionario. Se utilizaron modelos de regresión lineal múltiple para evaluar la correlación entre la capacidad mental para el trabajo y variables relacionadas con riesgo de contaminación, apoyo institucional y salud. **Resultados:** falta de pruebas de COVID-19, desconocimiento de la rutina, ausencias en 2021 y enfermedad mental contribuyeron al empeoramiento de la capacidad mental para el trabajo. Se consideraron factores protectores la recepción por parte de la dirección y la capacidad física. **Conclusiones:** una capacidad reducida para trabajar en relación con las demandas mentales puede afectar el desempeño profesional y la calidad de la atención, con implicaciones para pacientes y instituciones de salud.

Descriptorios: Pandemias; COVID-19; Condiciones de Trabajo; Salud Laboral; Enfermería.

INTRODUCTION

Global health was threatened by a disease called Coronavirus Disease-2019 (COVID-19), triggered by a new coronavirus (SARS-CoV-2). Due to its expansion to all continents in the world, except Antarctica, the World Health Organization (WHO) declared it a pandemic on March 11, 2020⁽¹⁾.

During the pandemic, international and national agencies expressed their concern about health professionals' working conditions, accident prevention and safety culture promotion in institutions⁽²⁻³⁾.

Nursing technicians are the category that represents the largest nursing workforce in Brazil, with 1,715,191 professionals (59.5%) with active registrations⁽⁴⁾, and had no assistance or financial resources to deal with the impact of their illness or that of their family members during this serious health crisis⁽⁴⁻⁵⁾.

The COVID-19 pandemic revealed weaknesses in the health system, which presented a shortage of qualified professionals, lung ventilators, personal protective equipment (PPE), essential supplies⁽⁶⁾, lack of diagnostic tests⁽⁷⁾ and failures in the organization of Intensive Care Units (ICU), functioning beyond their capacity⁽⁸⁾.

Studies carried out before the pandemic demonstrated that increased workload intensified physicians', nurses' and health assistants' stress and anxiety, with a decrease in their cognitive functions, reasoning and judgment capacity, with impaired attention and coordination⁽⁹⁻¹⁰⁾, with greater chances of failures and work accidents⁽¹¹⁾.

Research carried out in several countries showed that, during the pandemic, health professionals present symptoms of exhaustion, anxiety, stress, depression and illness⁽¹²⁻¹⁵⁾, with reduced functional capacity of nurses with mild symptoms and moderate infections due to COVID-19⁽¹⁶⁻¹⁷⁾ and compromised professional performance due to excessive workload⁽¹⁸⁾, enhanced by absenteeism⁽¹⁹⁾.

This overview took on a complex contour, as, in addition to predisposing nursing technicians to the risk of contamination by the coronavirus, it compromised their ability to work^(10,18,20). This concept refers to a dynamic balance between stress, working environment conditions, tools and professional exhaustion⁽²¹⁾.

The mental capacity to work of nursing technicians is related to their cognitive functions, which, to provide health care to patients, requires reasoning and judgment capacity to solve problems, memorize information, perform calculations and interpret data.

A study carried out in the United States of America⁽²²⁾ showed that nurses who worked with patients with COVID-19 felt helpless, unprepared and overwhelmed, with high levels of exhaustion, physical symptoms and negative emotions.

International literature reports some support strategies for prevention and intervention in nursing professionals' mental health. A study carried out in China⁽²³⁾ showed that cognitive strategies based on values and adequate social support facilitated work experiences with patients with COVID-19. Research carried out in the Philippines, in 20 hospitals, revealed that organizational and social support had consistent effects in improving nurses' anxiety⁽²⁴⁾.

In the current literature, there are few specific studies aimed at nursing technicians during the COVID-19 pandemic. It is imperative to identify factors associated with mental health and capacity to work in the largest professional category of health

care. Understanding this relationship allows to expand their understanding of working conditions, providing support to implement actions to promote these workers' health and quality of life.

OBJECTIVES

To identify the factors that influenced the mental capacity to work of nursing technicians during the COVID-19 pandemic.

METHODS

Ethical aspects

All ethical procedures were followed, in accordance with Resolution 466/2012 of the Brazilian National Research Council. The project was submitted and approved by the Research Ethics Committee. All participants signed the Informed Consent Form (ICF), respecting nursing professionals' and institutions' confidentiality and privacy.

Study design, place and period

This is a cross-sectional, exploratory, quantitative study, guided by STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines.

The study was carried out in two hospitals, selected for convenience, which are centers of excellence in medical and hospital care and a reference in serving the population during the COVID-19 pandemic, with the following characteristics: institution 1 - general, public, state, large hospital, teaching and research, tertiary and quaternary level, providing exclusive service to Brazilian Health System (SUS - *Sistema Único de Saúde*) users; institution 2 - general, private non-profit hospital, large, teaching and research, tertiary level, serving patients covered by health plans and private individuals.

The two health institutions are located in the city of Campinas, countryside of São Paulo. Data were collected in person by the researcher from March to June 2022.

Population or sample: inclusion and exclusion criteria

All nursing technicians from health institutions were invited to participate in the study. At the time of collection, the hospitals had 384 nursing technicians in the ICU, 56 of whom were on vacation, leave or on leave. Only eight subjects did not agree to participate: six from the public hospital and two from the private network.

All nursing technicians who worked for at least six months in the institutions' ICUs, of both sexes, who provided direct assistance to patients with COVID-19 in the morning, afternoon and night work shifts were included. Professionals who were on vacation, leave or leave were excluded.

Study protocol

To collect data, a checklist-type questionnaire was developed with objective questions. A pre-test was applied to six subjects from one of the participating institutions, with the instrument subsequently readjusted in semantic and syntax aspects.

The questionnaire consisted of four structured chunks of questions.

Chunk 1 - General and sociodemographic data: sex; age; time of institution; working time in ICU; and number of jobs.

Chunk 2 - Risk factors for contamination by COVID-19, with participants being able to list one or more items: prolonged working hours; accelerated work pace; lack of PPE; poor quality of PPE; excess jobs (two or more); absence and/or delay in vaccination of health professionals; lack of suitable resting place; non-use of PPE; work accidents with biological fluid/respiratory secretion from a patient with COVID-19; lack of secure information; deficit/absence of tests for workers suspected of having COVID-19; work overload; insufficient number of nursing technicians; stress; absences from shifts (absenteeism); lack and/or failure to wash hands; unfamiliarity with the ICU work routine; failure in circulation between contaminated and uncontaminated areas; accidental PPE removal/displacement (mask falling, others); lack of in-service training/education; failure to apron donning/doffing; discontinuous use of PPE due to appearance of skin injuries during the pandemic; failure to dispose of hospital waste; lack and/or failure to clean and disinfect surfaces; contamination during handling of PPE (N95/PFF2 masks).

Chunk 3 - Institutional measures to support health professionals, with participants being able to list one or more items: psychologist support; psychiatrist support; management embracement; multidisciplinary team support; labor gymnastics; and integrative practices.

Chunk 4 - Workers' health: diseases acquired during the pandemic with a medical diagnosis (response pattern: Yes-No, with a description of diagnosis); absences from work during 2020 and 2021 (response pattern: Yes-No); self-perception of mental and physical capacity for current job in relation to mental (solving problems, performing calculations, memorizing information, analyzing data) and physical demands (perform physical effort, handle patients, carry out transport) compared to before the COVID-19 pandemic (response pattern: Much worse = 1, Worse = 2, Same capacity = 3, Improved = 4 and Much improved = 5).

Analysis of results, and statistics

After collection, data were typed into a Microsoft Excel® spreadsheet (v.2308), and statistical analysis was performed with the aid of the Minitab 19 program. Multiple linear regression was used, with a gradual procedure and automatic stepwise selection to examine the correlation between the dependent variable mental capacity to work and the set of independent variables, included in the following models:

Model 1 – (Risk of contamination): due to the large number of independent variables (25) related to contamination risk factors (chunk 2), Mallows' Cp coefficient was used to help balance the number of predictors (variables) that best fit mental capacity to work. A Mallows' Cp value that is close to the number of predictors plus the constant indicates that the model is relatively unbiased in estimating true and unbiased regression coefficients. For this, $C_p \approx K+1$ was used, where k – was the number of variables in the model.

Model 2 – (Institutional support): psychiatric support, psychological support, management embracement, multidisciplinary team

support, workplace gymnastics and integrative practices to measure the influence of institutional support on mental capacity to work.

Model 3 – (Health): physical capacity to work, absences in 2020, absences in 2021 and mental illness were included.

Collinearity was assessed by variance inflation factor (VIF), with $VIF < 5$ being interpreted as absence of collinearity. The Shapiro-Wilk test, to verify the normality of residuals, the lack of fit test, to assess data adequacy to the model, the Durbin-Watson test, to verify the autocorrelation of residuals, and the adjusted coefficient of determination ($_{adj}R^2$), to assess model goodness of fit, were used. For all results, $p < 0.05$ was considered statistically significant.

RESULTS

A total of 237 nursing technicians (179 women, 58 men) participated in the research, 143 from a public institution and 94 from a private institution, with a mean age of 38.4 ± 9.8 years (mean \pm standard deviation), time at the institution of 7.8 ± 6.6 years, working time in the ICU of 6.0 ± 5.4 years and a mean of jobs of 1.5 ± 0.55 . Of the participants, 64.3% self-perceived a worsening of their current mental capacity to work, and 67.2%, a worsening of their current physical capacity to work, compared to before the COVID-19 pandemic.

The analysis of the best subsets for the variables incorporated in Model 1, related to the risk of contamination, included stress, lack of resting place, absence of COVID-19 tests, unfamiliarity with the routine, PPE contamination and handling and non-use of PPE due to skin injuries. This was the best subset with six variables, and resulted in Mallows' Cp = 6.98.

Table 1 shows the results of the multiple linear regression of the variables that made up the three models.

The results of the multiple linear regression of the variables that made up the risk of contamination (Model 1) showed low explanatory power ($_{adj}R^2 = 10.2\%$), revealing that stress, lack of testing for COVID-19 and non-use of PPE due to skin injuries were statistically significant and showed a negative correlation with mental capacity to work.

With the inclusion of the variables that made up institutional support (Model 2), the explanatory power of mental capacity to work improved ($_{adj}R^2 = 13.49\%$), revealing that management embracement and multidisciplinary team support were statistically significant. Risk of contamination, stress, absence of COVID-19 tests and non-use of PPE due to skin injuries maintained significance, and lack of resting place became part of the model. It is noteworthy that variables related to institutional support showed a positive correlation with mental capacity to work.

When adding health-related variables (Model 3), there was a substantial improvement in the explanatory capacity of mental capacity to work ($_{adj}R^2 = 46.58\%$), revealing that physical capacity to work, absences in 2021 and mental illness were statistically significant. It is noteworthy that, with the inclusion of health-related variables, stress, lack of resting place and PPE contamination and handling are no longer part of the model, and non-use of PPE due to skin injuries and multidisciplinary team support no longer showed statistical significance. With the inclusion of health-related variables, unfamiliarity with the routine became part of the final model.

Table 1 – Multiple linear regression of the mental capacity to work of nursing technicians in relation to the variables contained in the models, Campinas, São Paulo, Brazil, 2023

Variable	Mental capacity to work					
	Model 1 Risk of contamination		Model 2 Institutional support		Model 3 Health	
	Coef	VIF	Coef	VIF	Coef	VIF
Stress	-0.245*	1.10	-0.234*	1.10	--	--
Lack of resting place	-0.206	1.10	-0.205*	1.13	--	--
Absence of COVID-19 tests	-0.294*	1.10	-0.243*	1.14	-0.277†	1.11
Unfamiliarity with the routine	-0.251	1.10	-0.245	1.10	-0.212*	1.06
PPE contamination and handling	-0.211	1.10	-0.213	1.13	--	--
Non-use of PPE due to skin injuries	-0.371*	1.10	-0.393*	1.13	-0.258	1.10
Management embracement			0.277*	1.10	0.192*	1.07
Multidisciplinary team support			0.310*	1.03	0.206	1.07
Physical capacity to work					0.439†	1.12
Absences in 2020					-0.170	1.23
Absences in 2021					-0.263†	1.17
Mental illness					-0.366†	1.07
R ²	12.48%		16.42%		47.33%	
R ² _{aj}	10.20%		13.49%		46.58%	
Normality (Shapiro-Wilk)	<0.01		<0.01		>0.100	
Lack of adjustment	0.930		0.378		0.686	
Durbin-Watson	> 0.05		> 0.05		> 0.05	

*p<0.05; †p<0.01; Coef - slope coefficient; VIF - variance inflation factor; PPE - personal protective equipment.

In the final model, there was no indication that multicollinearity biased the results, as none of VIF scores exceeded 1.3. The residual normality test showed normal distribution (p>0.10), and there was no indication of residual autocorrelation (p>0.05) or lack of data adjustment (p>0.686).

The final model was represented by the following variables: absence of COVID-19 tests; unfamiliarity with the routine; management embracement; physical capacity to work; absences in 2021; and mental illness.

It was observed, in the final model, that the variables incorporated into the risk of contamination had negative correlation coefficients, i.e., they negatively compromised the mental capacity to work. The variable that made up institutional support (management embracement) showed a positive correlation with mental capacity. Finally, the variables that made up the health model showed a positive correlation between physical capacity and mental capacity. Absence in 2021 and mental illness were negatively correlated with mental capacity to work.

DISCUSSION

The pandemic crisis has had a profound impact on the world, due to the rapid spread of the disease and the challenges posed to health institutions. There was a mismatch in the speed of building scientific evidence and implementing effective actions over time, which often resulted in an increase in the chances of nursing team contamination, with impacts on workers' physical and mental health as well as quality of care⁽²⁵⁾.

In Brazil, one of the countries most affected by the pandemic, the situation was worsened due to divergences, misalignment of government actions and different views on how to confront the health crisis. In public management, a protocol was adopted for using chloroquine and hydroxychloroquine to treat patients with COVID-19, led by the Brazilian Federal Government. Due to the lack of scientific support to justify the adoption of this treatment,

clashes and contradictions occurred between health professionals, scientific societies and public health authority institutions⁽²⁶⁾.

Despite divergences, COVID-19 spread throughout the country, with high morbidity and mortality rates⁽²⁷⁾. Health professionals who were on the front line were committed to assisting patients, with few resources and knowledge⁽⁶⁾, high risk of occupational exposure⁽²⁾, in addition to reduced attention capacity⁽⁹⁾ and problem-solving capacity at work⁽¹⁰⁾.

The present study analyzed 25 variables related to the risk of contamination. Only the absence of COVID-19 tests and unfamiliarity with the routine were correlated with mental capacity to work.

To face a health crisis of this magnitude, nursing professionals with physical and mental skills were needed to carry out activities in an environment permeated by inadequate working conditions⁽¹⁵⁾. Research has shown that long working hours⁽¹⁸⁾ and accelerated work pace⁽²⁰⁾ were associated with reduced work capacity. However, in the present study, these results were not observed.

Health professionals experienced strong emotional stress⁽¹²⁾, psychological pressures and uncertainties regarding the proportions of the pandemic⁽²⁸⁾, mainly due to the lack of diagnostic tests for COVID-19⁽²⁹⁾, fear of risk of contamination and spread of disease to family members, lack of information and the possibility of mental disorders⁽³⁰⁻³¹⁾.

In the present research, the absence of COVID-19 tests was negatively related to mental capacity to work, causing insecurity and fear of spread of coronavirus, and, when associated with stress, contributed to a reduction in their cognitive functions for work.

This result is consistent with the literature. A study developed in Poland⁽³²⁾ showed that the possibility of testing for COVID-19 had a protective influence on nurses' mental health. Research in Indonesia⁽⁷⁾ with nurses showed an association between stress and the lack of diagnostic testing services for COVID.

The initial uncertainty and dearth of knowledge about COVID-19 has caused severe stress and feelings of panic among the general population⁽³³⁾. Lack of knowledge about the virus' incubation

period, its form of transmission, treatment and safety measures caused feelings of fear and anxiety, with negative impacts on mental health due to uncertainty regarding the future⁽³⁴⁾.

Nursing work is characterized by well-established routines and protocols in health services. During the pandemic, there was a substantial change in these routines, with an extension of working hours⁽³⁵⁾, lack of information about the new disease⁽²⁹⁾, health system's inability to meet demand⁽⁸⁾, frequent training⁽¹³⁾, new biosafety protocols⁽¹²⁾ and lack of knowledge to care for patients⁽³⁶⁾.

In the present study, unfamiliarity with the work routine was a variable negatively related to mental capacity to work. During the pandemic, the country was experiencing an infodemic⁽³⁷⁾ related to prevention and control protocols to combat the virus, which may have increased nursing technicians' mental illness.

This finding was consistent with a study carried out in China⁽³⁸⁾, in which nurses who were on the front line of the fight against coronavirus presented fear, anxiety, anger and sadness due to close contact with patients, lack of familiarity with procedures and unusual workplaces. These conditions triggered psychological distress, causing depressive, anxiety and stress symptoms⁽¹⁴⁾ that affected performance and mental capacity to work.

In the present work, among the variables that made up the model related to institutional support, only management embracement showed a positive correlation with mental capacity to work.

The well-being of members of multidisciplinary teams is a shared responsibility between the health institution and the professionals who make up it. In the present study, members of multidisciplinary teams were exposed to numerous stressors in the work environment^(12,15), with differences in conduct and difficulties in communication. This made it impossible for multidisciplinary team support to become a protective factor for mental capacity to work.

This result is consistent with a study carried out in Australia⁽³⁹⁾ during the COVID-19 pandemic with a multidisciplinary team made up of physicians, nurses and support professionals. The findings highlighted that nursing professionals had lower satisfaction with the work environment, and the lack of team support contributed to higher levels of stress, anxiety and exhaustion.

Organizational support has been identified in the literature as a protective factor against adversity and stress among nurses, allowing them to maintain their well-being and mental health⁽²⁴⁾.

In this research, management support was a fundamental element in preserving mental capacity to work. The relevance of institutional support, promoted by nursing management, is highlighted in the construction of welcoming environments and attentive listening to difficulties, providing support to alleviate workers' suffering and fears. The results of this work are consistent with a study carried out in Southeast Asia⁽²⁴⁾ during the pandemic. The authors concluded that nurses with greater organizational and social support had fewer anxiety symptoms related to COVID-19.

These findings suggest that working directly with patients with COVID-19 represents significant psychological strain for nurses and adequate institutional support can prevent and alleviate psychological distress⁽²²⁾ and be a protective factor for mental capacity to work.

Among the four variables in the health model, three were correlated with mental capacity to work. There was a direct

relationship between physical and mental capacity to work. This finding is in line with a study carried out in Iran⁽⁴⁰⁾, which showed a direct relationship between nurses' physical effort and occupational cognitive failures. Factors external to the work environment, such as reduced physical activity before and during the pandemic, alter physical/emotional balance, with repercussions on the capacity to work⁽¹⁶⁾.

Through strong pressure, acute psychological stress activates the sympathetic system of the adrenal medulla and the hypothalamic-pituitary-adrenal axis, with consequences for physical and mental health⁽⁴¹⁾. National and international literature is vast regarding the mental and emotional disorders experienced by health professionals during the COVID-19 pandemic, with a negative emotional state associated with anxiety and anguish⁽⁴²⁾, feelings of fear⁽²⁹⁾, worsening of previous mental illness⁽¹⁵⁾, Burnout syndrome⁽⁴³⁾, depressive symptoms and psychological distress⁽¹³⁻¹⁴⁾.

In the present study, the medically diagnosed illnesses self-reported by nursing technicians were anxiety, panic syndrome, mixed anxiety and depression disorder, anxiety disorder, depression and post-traumatic stress.

Pressure associated with prolonged stress culminated in the participating professionals' mental illness, reducing their mental capacity to work. Similar results were identified in a study carried out in Turkey⁽¹⁰⁾, showing that health professionals' problem-solving skills decreased with increasing anxiety levels. Other studies showed that nursing professionals experienced anxiety, depression and exhaustion during the pandemic, with impaired concentration, work capacity and professional performance^(24,43-44).

Research has shown that the nursing team caring for patients with COVID-19 had high levels of acute fatigue⁽⁴⁵⁾, and inadequacy of resting places was associated with professional burnout⁽⁴⁶⁾.

A review study⁽⁴⁷⁾ showed that most professionals who worked in direct assistance to patients infected by coronavirus presented some type of skin impairment due to prolonged use of N95 mask or similar, protective glasses and face shield.

In the present study, model analysis chronology showed that including health-related variables (Model 3) increased explanatory power by 30.91%. It is likely that discontinued use of PPE due to skin injuries may have increased the fear of contamination and spread to family members^(12,35). Non-use of PPE due to skin injuries and lack of resting place may have contributed to the occurrence of emotional stress, which transformed, in the final model, into mental illness.

During the pandemic, mental and behavioral disorders may have been heightened. A study in Germany⁽¹⁹⁾ investigated the factors associated with sick leave of nurses in 2021, showing that the fear of becoming infected was associated with sick leave, being indicative of high mental vulnerability.

The present study revealed a negative correlation between mental capacity to work and the number of absences in 2021. A study carried out with nursing professionals before the pandemic already demonstrated that mental and behavioral disorders were the prevalent reasons for absences⁽⁴⁸⁾.

The results of this study showed that hospital institutions, regardless of the pandemic, play a fundamental role in preserving nursing technicians' health and mental capacity to work. Substantial improvements can be achieved with the qualification

of nursing management to listen attentively and support workers, adaptation of places for rest and social interaction, implementation of workplace gymnastics to preserve physical capacity and adequate sizing of staff to minimize work overload.

Study limitations

The hospitals were chosen for convenience and are of reference and excellence in health care, but they may not represent the work context of most Brazilian institutions. It is unknown whether the results of this study can be generalized to other health institutions.

Data collection was carried out in 2022, outside the height of the pandemic, and relied on participants' memories. Due to the great impact of the health crisis on the lives of frontline workers, the authors understand that possible memory bias was not relevant.

The literature review revealed few studies during the pandemic involving factors associated with nursing technicians' illness and work capacity. The comparison with the literature was carried out based on studies, mainly with nurses and physicians. The authors understand that this limitation may not provide generalized conclusions, but broaden the understanding of the topic.

Contributions to nursing

The results contribute to understanding the work context during the pandemic, in particular to preserve the physical and mental capacity to work of nursing technicians.

As far as we know, this study was the first investigation, during the COVID-19 pandemic, into illness and the mental capacity to work of nursing technicians in Brazil. Thus, these findings are

useful in providing initial information with the potential to support prevention and health protection actions.

CONCLUSIONS

The study identified that physical capacity and management support were protective factors and contributed to preserving mental capacity to work.

Lack of tests for COVID-19, lack of knowledge of the routine and mental illness were factors that contributed to the worsening of mental capacity to work and increased absences in 2021.

Nursing professionals' work directly compromises human life. Reducing their mental capacity to work in relation to mental demands can affect quality of care, with implications for patients and health institutions.

The authors understand that almost all factors identified in this study are under the governance of hospital management. The implementation of actions, often simple, can substantially improve the mental capacity to work of nursing technicians, reflected in quality of patient care.

Considering the above, it is suggested that new studies be carried out on the mental capacity to work of nursing technicians to complement and expand the understanding of the subject.

CONTRIBUTIONS

Vieira KMR and Bittencourt ZZLC to the conception or design of the study/research. Vieira KMR, Vieira Junior FU and Bittencourt ZZLC contributed to the analysis and/or interpretation of data. Vieira KMR, Vieira Junior FU and Bittencourt ZZLC contributed to the final review with critical and intellectual participation in the manuscript.

REFERENCES

1. World Health Organization (WHO). Novel Coronavirus (2019-nCoV): situation report - 1 [Internet]. Geneva: WHO; 2020 [cited 2022 Apr 3]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200121-sitrep-1-2019-ncov.pdf?sfvrsn=20a99c10_4
2. World Health Organization (WHO). Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health [Internet]. Geneva: WHO; 2020 [cited 2022 May 10]. Available from: [https://www.who.int/publications-detail/coronavirus-disease-\(covid-19\)-outbreak-rights-roles-and-responsibilities-of-health-workers-including-key-considerations-for-occupational-safety-and-health](https://www.who.int/publications-detail/coronavirus-disease-(covid-19)-outbreak-rights-roles-and-responsibilities-of-health-workers-including-key-considerations-for-occupational-safety-and-health)
3. Fundação Oswaldo Cruz (Fiocruz). Covid-19: a saúde dos que estão na linha de frente [Internet]. Rio de Janeiro: FIOCRUZ; 2020 [cited 2021 Apr 13]. Available from: <https://portal.fiocruz.br/noticia/covid-19-saude-dos-que-estao-na-linha-de-frente>
4. Conselho Federal de Enfermagem (Cofen). Nursing in numbers [Internet]. Brasília: 2022 [cited 2022 Nov 10]. Available from: <http://www.cofen.gov.br/enfermagem-em-numeros.enfermagem-em-numeros>
5. Minayo MCS, Freire NP. Pandemia exacerba desigualdades na Saúde. *Ciênc Saúde Coletiva*. 2020;25(9):3555-6. <https://doi.org/10.1590/1413-81232020259.13742020>
6. Teixeira CFS, Soares CM, Souza EA, Lisboa ES, Pinto ICM, Andrade LR, et al. The health of healthcare professionals coping with the Covid-19 pandemic. *Ciênc Saúde Coletiva*. 2020;25(9):3465-74. <https://doi.org/10.1590/1413-81232020259.19562020>
7. Asa GA, Fauk NK, Ratu M, Ward PR. The impact of working in COVID-19 hospital on Indonesian nurses' mental health and wellbeing: a qualitative study. *BMC Nurs*. 2022;21(345):1-11. <https://doi.org/10.1186/s12912-022-01131-6>
8. Moreira AS, Lucca SR. Apoio psicossocial e saúde mental dos profissionais de enfermagem no combate à COVID-19. *Enferm Foco*. 2020;11(esp):155-61. <https://doi.org/10.21675/2357-707X.2020.v11.n1.ESP.3590>
9. Yavaşcaoğlu B, Aydın B, Karataş EG, Kaya FN, Özcan B, Kırılı S. The effect of night duty on the cognitive function and psychological status of anesthesia residents. *Uludağ Üniversitesi Tıp Fakültesi Dergisi*. 2007;33(2):75-9. Available from: <https://dergipark.org.tr/en/download/article-file/420630>

10. Korkmaz S, Kazgan A, Çekiç S, Tartar AS, Balci HN, Atmaca M. The anxiety levels, quality of sleep and life and problem-solving skills in healthcare workers employed in COVID-19 services. *J Clin Neurosci*. 2020;80:131-36. <https://doi.org/1016/j.jocn.2020.07.073>
11. Vieira KMR, Vieira Junior FU, Bittencourt ZZLC. Occupational accidents with biological material in a school. *Rev Bras Enferm*. 2019;72(3):737-43. <https://doi.org/10.1590/0034-7167-2018-0630>
12. Petzold BM, Plag J, Strohle A. Dealing with psychological distress by healthcare professionals during the COVID-19 pandemia. *Nervenarzt*. 2020;91(5): 417-21. <https://doi.org/10.1007/s00115-020-00905-0>
13. Ho CSH, Chee CY, Ho RC. Mental health strategies to combat the psychological impact of COVID-19: beyond paranoia and panic. *Ann Acad Med Singap*. 2020;49 (3):155-60. <https://doi.org/10.47102/annals-acadmedsg.202043>
14. Dias EG, Bardaquim VA, Robazzi MLCC. Occurrences in the world of work arising from the 2019 Coronavirus pandemic. *Rev Saúde Col UEFS*. 2023;13(1): e7887 <https://doi.org/10.13102/rscdauufs.v13i1.7887>
15. Galon T, Navarro VL, Gonçalves AMS. Nurse perception regarding their health and working conditions during the COVID-19 pandemic. *Rev Bras Saúde Ocup* 2022;47. <https://doi.org/10.1590/2317-6369/15821PT2022v47ecov2>
16. Soemarko DS, Jahja FE, Adi NP, Anestherita F, Fitriani DY. Association between COVID-19 Post-infection and Work Capacity among Healthcare Workers in the National Referral Hospital in Indonesia. *Acta Med Philipp [Internet]*. 2023 [cited 2023 Sep 11]. Available from: <https://actamedicaphilippina.upm.edu.ph/index.php/acta/article/view/6739>
17. Gómez-Ochoa SA, Franco OH, Rojas LZ, Raguindin PF, Roa-Díaz ZM, Wyssmann BM, et al. COVID-19 in healthcare workers: a living systematic review and meta-analysis of prevalence, risk factors, clinical characteristics, and outcomes. *AM J Epidemiol*. 2021;190(1)161-75. <https://doi.org/10.1093/aje/kwaa191>
18. Wulandari R, Prasandi A, Nugroho T, Gusmeta N. The correlation between workload and nurse performance during the covid-19 pandemic at hospital. *J Aisyah*. 2023;8(S1):327-32. <https://doi.org/10.30604/jika.v8iS1.1724>
19. Schug C, Geiser F, Hiebel N, Beschoner P, Jerg-Bretzke L, Albus C, et al. Sick Leave and Intention to Quit the Job among Nursing Staff in German Hospitals during the COVID-19 Pandemic. *Int J Environ Res Public Health*. 2022;19(4):1-15. <https://doi.org/10.3390/ijerph19041947>
20. Lu Y, Liu Q, Yan H, Gao S, Liu T. Job burnout and its impact on work ability in biosafety laboratory staff during the COVID-19 epidemic in Xinjiang. *BMC Psychiatry*. 2021;21(1):543. <https://doi.org/10.1186/s12888-021-03555-x>
21. Silva TPD, Araújo WN, Stival MM, Toledo AM, Burke TN, Carregaro RL. Musculoskeletal discomfort, work ability and fatigue in nursing professionals working in a hospital environment. *Rev Esc Enferm USP*. 2018;52:e03332. <https://doi.org/10.1590/S1980 220X2017022903332>
22. Kellogg MB, Schierberl Scherr AE, Ayotte BJ. "All of this was awful:" exploring the experience of nurses caring for patients with COVID-19 in the United States. *Nurs Forum*. 2021;56:869-77. <https://doi.org/10.1111/nuf.12633>
23. Sun N, Wei L, Shi S, You Y, Liu S, Wang H. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control*. 2020;48(6):592-98. <https://doi.org/10.1016/j.ajic.2020.03.018>
24. Labrague LJ, Santos JAA. COVID-19 anxiety among front-line nurses: predictive role of organizational support, personal resilience and social support. *J Nurs Manag*. 2020;28(7):1653-61. <https://doi.org/10.1111/jonm.13121>
25. Alves CLM, Saraiva AR. Damage to the health of nursing workers due to the Covid-19 pandemic: an integrative review. *Enferm Glob*. 2022;21(66):517-66. <https://doi.org/10.6018/eglobal.501511>
26. Souza DO. Chloroquine and hydroxychloroquine in Brazil: a case of inefficacy in public health. *Rev Salud Pública*. 2021;23(2):e203. <https://doi.org/10.15446/rsap.v23n2.89741>
27. World Health Organization (WHO). Coronavirus disease (Covid-19). Numbers at a glance [Internet]. 2022[cited 2022 Nov 10]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019?adgroupsurvey={adgroupsurvey}&gclid=Cj0KCQiA4OybBhCzARiAlcf n9m LfY0ye1omOU_QQNPhWY 7ku_YvGm1jEDwe3djGqwLpVYenKwPkMMaAuTKEALw_wcb
28. Portugal JKA, Reis MHS, Barão EJS, Souza TTG, Guimarães RS, Almeida LS, et al. Perception of the emotional impact of the nursing staff in the face of the COVID-19 pandemic: experience report. *REAS*. 2020;46:e3794. <https://doi.org/10.25248/reas.e3794.2020>
29. Góes FGB, Silva ACSS, Santos AST, Ávila- Pereira FMV, Silva LJ, Silva LF, et al. Challenges faced by pediatric nursing workers in the face of the COVID-19 pandemic. *Rev Latino-Am Enfermagem*. 2020;28:e3367. <https://doi.org/10.1590/1518-8345.4550.3367>
30. Cai H, Tu B, Ma J, Chen L, Fu L, Jiang Y, et al. Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID) in Hubei, China. *Med Sci Monit*. 2020;26:e924171-16. <https://doi.org/10.12659/MSM.924171>
31. Li Z, Ge J, Yang M, Feng J, Qia M, Jiang R, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain Behav Immun*. 2020;88:916-9. <https://doi.org/10.1101/2020.02.29.20029322>
32. Malinowska-Lipień I, Wadas T, Gabryś T, Kózka M, Gniadek A, Brzostek T, et al. Evaluating Polish nurses' working conditions and patient safety during the COVID-19 pandemic. *Int Nurs Rev*. 2022;69:239-48. <https://doi.org/10.1111/inr.12724>
33. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID19) in some regions of China. *Psychol Health Med*. 2020:1-10. <https://doi.org/10.1080/13548506.2020.1746817>
34. Li W, Yang Y, Liu ZH, Zhao YJ, Zhang Q, Zhang L, et al. Progression of mental health services during the COVID-19 outbreak in China. *Intl J Biol Sci*. 2020;16 (10):1732-8. <https://doi.org/10.7150/ijbs.45120>

35. Reis LM, Lago PN, Carvalho AHS, Nobre VN, Guimarães N, Rodrigues AP. Nursing performance in the pandemic COVID-19 scenery. *Rev Nurs.* 2020;23(269): 4765-8. <https://doi.org/10.36489/nursing.20220v23i269p4765-4772000>
36. González-Gil MT, Blázquez CG, Moreno AIP, Marcos AP, Santos AP, Garcia LO, et al. Nurses' perceptions and demands regarding COVID-19 care delivery in critical care units and hospital emergency services. *Intens Crit Care Nurs.* 2021;62:102966. <https://doi.org/10.1016/j.iccn.2020.102966>
37. World Health Organization (WHO). The potential of frequently used information technologies during the pandemic[Internet]. Geneva: 2020 [cited 2022 Dec 10]. Available from: <https://iris.paho.org/handle/10665.2/522023>
38. Xu M, Zhang Y. Psychological status survey of first-line support nurses fighting against pneumonia caused by a 2019 novel coronavirus infection. *Chinese Nurs Res.* 2020;34(3):368-70. <https://doi.org/10.12102/j.issn.1009-6493.2020.03.001>
39. Dixon E, Murphy M, Wynne R. A multidisciplinary, cross-sectional survey of burnout and wellbeing in emergency department staff during COVID-19. *Austral Emerg Care.* 2022;25(3):247-52. <https://doi.org/10.1016/j.auec.2021.12.001>
40. Mehri F, Babaei-pouya A, Karimollahi M. Intensive Care Unit Nurses in Iran: occupational cognitive failures and job content. *Front Public Health.* 2022;10:e786470. <https://doi.org/10.3389/fpubh.2022.786470>
41. Turner AI, Smyth N, Hall SJ, Torres SJ, Hussein M, Jayasinghe SU, et al. Psychological stress reactivity and future health and disease outcomes: a systematic review of prospective evidence. *Psychoneuroendocrinol.* 2020;114:104599. <https://doi.org/10.1016/j.psychneu.2020.104599>
42. Borges EMN, Queirós CML, Vieira MFSP, Teixeira AAR. Perceptions and experiences of nurses about their performance in the COVID-19 pandemic. *Rev Rene* 2021; 2021;22:e60790. <https://doi.org/10.15253/2175-6783>
43. Zhou T, Xu C, Wang C, Sha S, Wang Z, Zhou Y, et al. Burnout and well-being of healthcare workers in the post-pandemic period of COVID-19: a perspective from the job demands-resources model. *BMC Health Serv Res.* 2022;22(1):1-15. <https://doi.org/10.1186/s12913-022-07608-z>
44. Zareei M, Tabanejad Z, Oskouie F, Ebadi A, Mesri M. Job burnout among nurses during COVID-19 pandemic: a systematic review. *J Educ Health Promot.* 2022;11:107. http://doi.org/10.4103/jehp.jehp_797_21
45. Sagherian K, McNeel CA, Steege L M. Did rest breaks help with acute fatigue among nursing staff on 12-h shifts during the COVID-19 pandemic? a cross-sectional study. *J Adv Nurs.* 2021;77:4711-21. <https://doi.org/10.1111/jan.14944>
46. Sadati AK, Falakodin Z, Shahabi S, Zarei L, Heydari ST, Lankarani KB. A qualitative study on the experiences of COVID-19 Ward Nurses in Shiraz, Iran. *Shiraz E-Med J.* 2022;23(9):e120838. <https://doi.org/10.5812/semj-120838>
47. Silva LFM, Almeida AGA, Pascoal LM, Santos MN, Lima FET, Santos FS. Skin injuries due to personal protective equipment and preventive measures in the Covid-19 context: an integrative review. *Rev Latino-Am Enfermagem.* 2022;30:e3551. <https://doi.org/10.1590/1518-8345.5636.3551>
48. De Lucca SR, Rodrigues MSD. Absenteísmo dos profissionais de enfermagem de um hospital universitário do estado de São Paulo, Brasil. *Rev Bras Med Trab [Internet].* 2015 [cited 2022 mar 21];13(2):76-82. Available from: <https://www.rbmt.org.br/details/7/pt-BR/absenteismo-dos-profissionais-de-enfermagem-de-um-hospital-universitario-do-estado-de-sao-paulo--brasil>