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RESEARCH

COVID-19 AMONG BRAZILIAN PHYSIOTHERAPISTS: ANALYSIS OF PREVALENCE AND ASSOCIATED FACTORS

COVID-19 ENTRE PROFISSIONAIS FISIOTERAPEUTAS BRASILEIROS: ANÁLISE DE PREVALÊNCIA E FATORES ASSOCIADOS

COVID-19 ENTRE LOS FISIOTERAPEUTAS BRASILEÑOS: ANÁLISIS DE PREVALENCIA Y FACTORES ASOCIADOS

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ABSTRACT

Objective: to estimate the prevalence of COVID-19 among Brazilian physiotherapists and its associated factors. **Method:** cross-sectional study, according to an online survey, with the participation of 670 physiotherapists from all regions of Brazil. An adaptation of the respondent driven sampling method to the virtual environment was used to collect data. Bivariate and multiple logistic regression analyzes were used to identify associations between the diagnosis of COVID-19 and demographic and occupational variables. Variables were considered statistically significant based on $p<0.05$. **Results:** the prevalence of COVID-19 was 30% (95%CI: 27.8-32.3). In the Southeast region, physiotherapists were less likely to be diagnosed with COVID-19. Physiotherapists who provided care in a field hospital, who were isolated from their families and who have children under 12 years of age at home had an increased chance of being diagnosed with the infection. Conclusion: sociodemographic and occupational issues impact the increase in COVID-19 diagnoses among physiotherapists, which emphasizes the need for a quality and egalitarian health system in different Brazilian regions.

Keywords: COVID-19; Betacoronavirus; Physical Therapists; Occupational Exposure; Public Health.

RESUMO

Objetivo: *estimar a prevalência de covid-19 entre os fisioterapeutas brasileiros e seus fatores associados.* ***Método:*** *estudo transversal, segundo inquérito on-line, com a participação de 670 fisioterapeutas de todas as regiões do Brasil. Utilizou-se uma adaptação do método respondent driven sampling ao ambiente virtual para a coleta de dados. Análises bivariadas e de regressão logística múltipla foram utilizadas para identificar associação entre o diagnóstico de COVID-19 e variáveis demográficas e ocupacionais. Consideraram-se variáveis estatisticamente significativas com base em um p<0,05.* ***Resultados:*** *a prevalência de COVID-19 foi de 30% (IC95%: 27,8-32,3). Fisioterapeutas da região Sudeste tiveram menores chances de receber diagnóstico de COVID-19. Fisioterapeutas que prestaram assistência em hospital de campanha, que ficaram isolados da família e que têm crianças menores de 12 anos em casa tiveram chances aumentadas de diagnóstico da infecção.* ***Conclusão:*** *questões sociodemográficas e ocupacionais impactam no aumento do diagnóstico de COVID-19 entre profissionais fisioterapeutas, o que enfatiza a necessidade de um sistema de saúde de qualidade e igualitário nas diferentes regiões brasileiras.*

Palavras-chave: *COVID-19; Betacoronavirus; Fisioterapeutas; Exposição Ocupacional; Saúde Pública.*

RESUMEN

Objetivo: *evaluar la tasa de prevalencia del COVID-19 en fisioterapeutas de Brasil y analizar sus factores asociados.* ***Método:*** *realizamos un estudio transversal mediante una encuesta on-line, en la que participaron 670 fisioterapeutas de todas las áreas de Brasil. Para la recogida de datos se utilizó una adaptación del método respondent driven sampling al entorno virtual. Se utilizaron análisis bivariados y de regresión logística múltiple para identificar la asociación entre el diagnóstico COVID-19 y variables demográficas y ocupacionales. Las variables se consideraron estadísticamente significativas en función de una p<0,05.* ***Resultados:*** *la prevalencia de COVID-19 fue del 30% (IC 95%: 27,8-32,3). Los fisioterapeutas del sudeste tenían menos probabilidades de ser diagnosticados de COVID-19. Los fisioterapeutas que prestaban asistencia en un hospital de campaña, que estaban aislados de sus familias y que tenían hijos menores de 12 años en casa tenían más probabilidades de que se les diagnosticara la infección.* ***Conclusiones:*** *aspectos sociodemográficos y ocupacionales inciden en el aumento del diagnóstico de COVID-19 entre los fisioterapeutas profesionales, lo que enfatiza la necesidad de un sistema de salud de calidad e igualitario en las diferentes regiones brasileñas.*

Palabras clave: *COVID-19; Betacoronavirus; Fisioterapeutas; Exposición Profesional; Salud Pública.*

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INTRODUCTION

In December 2019, in Wuhan, China, the SARS--CoV-2 coronavirus was detected for the first time, responsible for the viral acute respiratory syndrome, COVID-19. Due to the high number of deaths recorded worldwide due to COVID-19, on March 11, 2020, the World Health Organization (WHO) took a stance, declaring it a global pandemic[1-3].

COVID-19 is an easily transmissible disease, whose main routes of spread include inter-human contamination and human-surface contact, in a direct manner, sneezing or coughing, nosocomial transmission, in addition to transmission via the oral, nasal, ocular, or mucosal mucosa, or other bodily secretions. Transmission of the virus via human-surface contact can occur up to 7 hours after contamination of the place/object by SARS-CoV-2, which can vary from 5 hours to 7 days, depending on the type of object, temperature, and ventilation of the environment. and the cleaning method and, therefore, make the virus even more resistant[3-5].

The pandemic caused by SARS-CoV-2 has frightening numbers of infected people and deaths among healthcare professionals who worked on the front line in the fight against the virus, overcoming limits and creating an emergency public health scenario with sui generis characteristics, becoming necessary as the measures must be taken at the collective level to ensure the protection of workers' health. In China, lethality surpassed the mark of more than 5 thousand cases in 2020, among which more than 1,700 healthcare workers were infected (the majority in Hubei province)[6,7].

In Brazil, official data on the contamination of affected workers and death cases related to COVID-19 were disseminated mainly through communication channels and by class representatives. According to the International Nursing Council, in 2020, Brazil was the country where the most nurses died, with approximately 157 deaths of Nursing professionals (nurses, technicians and assistants – categories divided by level of education in the Brazilian system). This number surpassed that of the United States (146 deaths) and the United Kingdom (77 deaths) in the same period[6].

Despite the level of experience of many professionals who work in the area of physiotherapeutic assistance, during the pandemic, there were numerous risks of contamination by SARS-CoV-2 related to accidents and complications arising from the various procedures in this category[6,7]. In the initial periods of COVID-19, physiotherapists workers faced an additional challenge, due to the high risk of contamination and spread of SARS-CoV-2, caused not only by close contact with the patient's airways, but also by other means of transmissibility via human-surface contact, namely: public transport and materials used during rehabilitation procedures, among other artifacts and surfaces in the service area[4,6].

Studies[7-9] presented the hypothesis that contamination levels were high among healthcare professionals, due to the significant viral load to which they are exposed in their work routine, associated with other factors: age, comorbidities, work overload, occupational stress and worker safety, aspects that need to be deeply sought[7,9]. From this perspective, the intense transmissibility of the virus, associated with the large number of oligosymptomatic and/or asymptomatic infected people, needed to be constantly monitored[2].

Although Brazil has a public health system, the Unified Health System (Sistema Único de Saúde, SUS), its vast territory, unequal economic distribution, the variability of health systems (public, private and philanthropic) and the distinct cultural issues that permeate the Brazilian people are challenges for the effectiveness of surveillance in the area of workers' health, especially given the reduction in investments and the constant process of precariousness of the SUS. Aspects such as the lack of preparation and lack of protection of healthcare teams in relation to the pandemic were identified as important points to be discussed, as they put countless workers at risk[6].

In this sense, the objective of this study was to estimate the prevalence of COVID-19 among Brazilian physiotherapists and its associated factors.

METHOD

Cross-sectional, analytical study, of the online survey type applied throughout Brazilian territory. Physiotherapists who work in direct patient care at different levels of health care participated in the study. For this research, physiotherapists who provided direct assistance to patients during the COVID-19 pandemic were eligible, regardless of the patients' diagnosis for this assistance support. The study followed the recommendations of the checklist of items that should be included in reports of observational studies, Strengthening the Reporting of Observational Studies in Epidemiology checklist (STROBE), and was guided by the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).

For the sample calculation, information on the number of physiotherapists by region of Brazil in 2020 was considered as a reference, according to data from the Federal Council of Physiotherapy and Occupational

Therapy (Conselho Federal de Fisioterapia e Terapia Ocupacional, COFFITO)[10]. A 95% confidence interval was adopted with a margin of error equal to 5%[11], obtaining a minimum sample of 385 physiotherapists. Therefore, following online data collection, 670 physiotherapists participated in the study.

Data collection was carried out from October to December 2020. Professionals were recruited from network references in a virtual environment. In this perspective, the participant is encouraged to recruit other participants in the same professional category through social networks; these, in turn, underwent prior training, the aim of which was to improve the conduct of online surveys. Each physiotherapist researcher identified healthcare professionals who met the study inclusion criteria, namely: being a physiotherapist and providing direct patient care. Obtaining a significant sample took place through the selection of the first eligible professionals, and particularly the identification of other professionals.

The pilot test was carried out with 27 professionals, and participants were contacted through social media applications and asked to participate in the pilot study. Afterwards, respondents were invited to send feedback or comments about the survey via WhatsApp®. All suggested changes were considered, in addition to small adaptations to terminology.

Data collection began right after the pilot study. Using a form, a link was sent to access the Free and Informed Consent Form (ICF) and the research form, created, and validated (face and content) by a group of 15 experts, professionals and researchers, with experience in communicable diseases, who were recruited through the Lattes platform. The completed instruments were hosted in the SurveyMonkey® software, which allows a single submission of the form via Internet Protocol (IP), aiming to ensure the security of the information collected.

The instrument included multiple choice questions, some of which were mandatory to proceed. It was divided according to demographic variables, variables related to the professional category, the type of assistance provided, availability, access to Personal Protective Equipment (PPE), the use of N95 masks and the presence of skin changes resulting from the use of the mask.

The outcome variable was the diagnosis of COVID-19 according to a laboratory diagnosis report detecting RNA-SARS-CoV-2 or anti-SARS-CoV-2 antibodies. The independent variables comprised the following sociodemographic data: gender (male; female), skin color (white; black; brown; yellow), marital status (single; divorced or married; stable union), religion (yes; no), region of Brazil and prevention measures in family life. The following occupational data were also considered: assistance in a field hospital (yes; no), provision of care to patients with or without COVID-19 (yes; no), access and quality of PPE and adoption of preventive measures.

The collected data were exported and analyzed using the statistical software R, version 4.0.4. The descriptive analysis was carried out using absolute and relative frequency distribution and standard deviation. Prevalences were calculated with a 95% confidence interval (95% CI). The Chi-square test was used to test differences between strata. Statistically significant associations were considered with p-values < 0.05.

To estimate the odds ratio (Odds Ratio), initially, the binary logistic regression model was used to obtain the crude OR with 95% CI. The variables that presented a p-value < 0.20 were simultaneously included in the multiple logistic regression model using the stepwise method to obtain the adjusted ORs and their respective 95% CI. In the final model, variables that showed a statistically significant association with a p-value ≤ 0.05 were considered. To check multicollinearity, the Variance Inflation Factor (VIF) variance inflation factor test was considered.

RESULTS

In the association between the variables, the physiotherapists' diagnosis of Covid-19 was associated with sex ($p<0.017$). Physiotherapists who assisted patients with COVID-19 or patients with another diagnosis (both) had the diagnosis more frequently compared to those who assisted patients in general ($p<0.016$), to those who assisted only to patients with COVID-19 and those who assisted only to patients with other diagnoses. Professionals who worked in field hospitals also had the disease more frequently when compared to those who did not work in field hospitals ($p<0.001$). The data are presented in Table 1.

As shown in Table 2, it was observed that physiotherapists in the Southeast region were less likely to receive a diagnosis of COVID-19 when compared to professionals in the Northeast region (OR=0.42; 95% CI=0.26-0.68). On the other hand, in these regions, physiotherapists who reported having assisted in a field hospital had the chances of receiving a diagnosis of COVID-19 increased by 1.72 times when compared to those who did not assist in a field hospital (OR= 1.72; 95%CI= 1.20-2.47).

Physiotherapist professionals who reported having been isolated from their family were 4.20 times more likely to be diagnosed with COVID-19 when compared to

professionals who reported not having been isolated from their family (OR = 4.20; 95% CI = 2.64- 6.69). Physiotherapists who reported having children under 12 years of age at home had a 1.75 times greater chance of being diagnosed with COVID-19 when compared to those who did not have children under 12 years of age at home (OR = 1.75; 95%CI = 1.19-2.58).

DISCUSSION

This study estimated the prevalence of COVID-19 among Brazilian physiotherapists and its associated factors according to demographic and occupational characteristics. A total of 670 physiotherapists from all regions of Brazil participated in the study. It is estimated that the prevalence of COVID-19 was 30% (95% CI: 27.8–32.3) among physiotherapists. In the Southeast region, physiotherapists were less likely to be diagnosed with COVID-19. Physiotherapists who provided care in a field hospital, who were isolated from their families and who have children under 12 at home had an increased chance of diagnosing the infection. Updated scientific evidence presents data regarding the risks of infection for healthcare workers who are in contact with or care for patients with COVID-19[5,6,9].

Table 1 - Characterization of physiotherapists according to demographic and individual variables regarding the diagnosis of COVID-19 (n=670). Brazil, 2020.

Variables	COVID-19 diagnoses		*p-value*
	No n(%)	Yes n(%)	
Gender			**0,017[1]**
Male	108 (62.8)	64 (37.2)	
Female	361 (72.5)	137 (27.5)	
Skin Color			0,257[1]
White	281 (73,0)	104 (27,0)	
Black	28 (68,3)	13 (31,7)	
Brown	150 (65,8)	78 (34,2)	
Yellow	10 (62,5)	6 (37,5)	
Marital Status			0,121[1]
Single/Divorced	250 (72,7)	94 (27,3)	
Married/Stable union	219 (67,2)	107 (32,8)	
Religion			0,805[1]
Have a religion	407 (70,2)	173 (29,8)	
Does not have a religion	62 (68,9)	28 (31,1)	
Regiões			**<0,01[1]**
Norte	50 (62,5)	30 (37,5)	
Nordeste	168 (65,6)	88 (34,4)	
Centro-Oeste	63 (61,8)	39 (38,2)	
Sudeste	151 (83,0)	31 (17,0)	
Sul	37 (74,0)	13 (26,0)	
For those assisting			**0,016[1]**
With COVID-19	92 (70,2)	39 (29,8)	
In general	171 (76,7)	52 (23,3)	
Both	206 (65,2)	110 (34,8)	
Assisted in a field hospital			**<0,01[1]**
Yes	146 (60,8)	94 (39,2)	
No	323 (75,1)	107 (24,9)	

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Table 1 - Characterization of physiotherapists according to demographic and individual variables regarding the diagnosis of COVID-19 (n=670). Brazil, 2020.

Variables	COVID-19 diagnoses		*p-value*
	No n(%)	Yes n(%)	
Assistance in the Intensive Care Unit			**0,011[1]**
Yes	263 (66,2)	134 (33,8)	
No	206 (75,5)	67 (24,5)	
The institution where you work has provided sufficient PPE3			0,189[1]
Yes	374 (71,0)	153 (29,0)	
No	21 (56,8)	16 (43,2)	
Partially	74 (69,8)	32 (30,2)	
The institution you worked at provided good quality PPE			**0,266[1]**
Yes	299 (72,0)	116 (28,0)	
No	32 (62,7)	19 (37,3)	
Partially	138 (67,6)	66 (32,4)	
During the pandemic, you were isolated from your family for a period			**<0,01[2]**
Yes	285 (62,6)	170 (37,4)	
No	175 (86,2)	28 (13,8)	
Not applicable	9 (75,0)	3 (25,0)	
You had to move away from your children and family to pursue his profession			**<0,01[1]**
Yes	133 (60,5)	87 (39,5)	
No	245 (73,4)	89 (26,6)	
Not applicable	91 (78,4)	25 (21,6)	
Children under 12 living in the same house			**0,025[1]**
Yes	142 (64,3)	79 (35,7)	
No	327 (72,8)	122 (27,2)	
Elderly people or people in a risk group living with you			0,422[1]
Yes	160 (72,1)	62 (27,9)	
No	309 (69,0)	139 (31,0)	
Adopted prevention measures and family life			0,277[2]
Yes	456 (70,5)	191 (29,5)	
No	6 (50,0)	6 (50,0)	
Not applicable	7 (63,6)	4 (36,4)	

[1]Chi-Square Test; [2]Fisher's Exact Test; [3]Personal Protection Equipment.

Table 2 - Crude and adjusted odds ratios and 95% confidence intervals by logistic regression for having or not being diagnosed with COVID-19 among physiotherapists (n=670). Brazil, 2020.

Variables	gOR (95% CI)	*p-value*	aOR (95% CI)	p-value
Region (Southeast compared to Northeast)	0,39(0,24-0,62)	<0,01	0,42(0,26-0,68)	**0,004***
Assisted in a field hospital (Yes)	1,94(1,38-2,72)	<0,01	1,72(1,20-2,47)	**0,006***
During the pandemic, you were isolated from your family for a period (Yes)	3,72(2,39- 5,79)	<0,01	4,20(2,64-6,69)	**<0,01***
Children under 12 living in the same house (Yes)	1,49(1,05-2,10)	0,024	1,75(1,19-2,58)	**0,004***

gOR: Gross Odds Ratio; aOR: Adjusted Odds Ratio; *p<0.05

In the context of the pandemic and with respect to the prevalence found in this study, for every 100 physiotherapists, around 30 presented a positive diagnosis according to a laboratory test for the detection of RNA--SARS-CoV-2 or anti-SARS-CoV2 antibodies. This percentage is high compared to the numbers of Chinese[7] and Italian[9] professionals who were working on the front line during 2020.

Although Brazilian laws and regulations regarding the use of Personal and Collective Protective Equipment (PPE and CPE) have been comprehensive and associated with the recommendations of the International Labor Organization (ILO) on actions to combat COVID-19, weaknesses are views regarding the following aspects: increase in teams of health professionals in hospitals; permanence of field hospitals in the capitals most affected by SARS--CoV-2 contamination; and supervision of occupational health and safety measures by the competent bodies[12,13].

With specific reference to physiotherapists participating in this research, a higher frequency of COVID-19 diagnoses was evident, both in those involved with direct assistance to patients affected by the disease and those affected by other conditions, to compare them with professionals who provide exclusive assistance to patients affected by other diagnoses. In this sense, a higher frequency of the disease was identified in professionals who worked in field hospitals, when compared to those who did not work there. This finding corroborates the research by Lazzerini and Putoto[14], which shows that worker safety is fundamental for health services to function efficiently.

Given the situation caused by the increase in contamination among physiotherapy professionals and the risks of even greater spread among other healthcare professionals, associating the work overload they face due to the widespread spread of the virus in Brazil, access to PPE and CPEs have become scarce, contributing to the high spread of the virus among healthcare workers[2,4,6]. This critical point needs to be analyzed in light of the working conditions of these professionals, as it puts the health and safety of physiotherapists at risk by not providing PPE and CPE, trivializing the situation and not complying with national and international standards and laws on health and safety in work environments[15-17].

Another relevant aspect to be considered and which corroborates the study[18] on the spread of the virus among young adults and the elderly, is that the vast majority of infected workers are female; therefore, women had more COVID-19 compared to men. This indicator may be associated with gender and work issues, which present the multi-diversity of women's roles in today's society[19]. This finding reveals the vulnerability of relationships between female workers, their work environment and their domestic life, especially regarding the predominant number of female physiotherapists in health systems. In these areas, gender disparities are more likely to be characterized as "essential", exposing female workers to a greater risk of contamination, as well as work-related stress and possible contamination of their children. This situation highlights the need to formulate occupational health and safety policies that are more sensitive to women[18,19].

In addition to this panorama, research shows that, traditionally, women have greater responsibility than men in caring for parents, grandparents, and children and in other domestic tasks. This responsibility may have been accentuated by the pandemic, particularly with social distancing, which reduced the support network, caused the partial and/or total closure of schools and reduced the availability of social and cultural services[18-21].

Following this line of reasoning, physiotherapists who reported having children under 12 years of age at home had a 1.75 times greater chance of receiving a diagnosis of COVID-19, when compared to those who did not have children under 12 years of age at home. It is assumed that these professionals provide direct assistance to patients suspected or diagnosed with COVID-19. Social and family distancing is necessary to reduce

contamination rates among frontline workers, as well as those caring for their families.

In Hubei, China, healthcare workers were accommodated in the city's hotel chain. This action was a way of reducing infectivity among their family members[20,21] .In São Paulo, private hospitals made agreements with a large hotel chain to serve doctors and nurses who lived more than 10 kilometers from work or who lived with people of the risk group.

Economic inequality in Brazil has historical roots, which also manifest such roots geographically. In the Northeast, around 10% of families are poorer than the rest of the Brazilian population. The Southeast is home to around 42% of Brazil's total population, in addition to being the region with the largest portion (56.2%) of the country's richest population, corresponding to the richest 10% of Brazil. There is a clear inversion in the relative socioeconomic weight between the Northeast and Southeast regions, with poverty being the phenomenon that reinforces the condition of social inequality in the country. This is explicitly presented in guaranteeing the health and safety of health workers[13,22].

In this way, we can infer that the different socioeconomic issues go beyond worker protection. When identifying the chances of diagnosis by region, it is observed that physiotherapists in the Southeast region were less likely to be diagnosed with COVID-19 when compared to professionals in the Northeast region. This finding may be related to social issues associated with the use and access to PPE, the lack of promotion for the equal distribution of resources via the SUS and the social and economic inequality in the distribution of wealth between Brazilian regions[23,24].

It is worth paying attention to the country's diversity, not only because of its territorial expansion, but also due to issues involving regional public policies, legislation or equitable action that guarantee the health and safety of workers. The focus on the humanization of work can also be a way to guarantee individual and collective protection in the field of work, considering psychological support for healthcare professionals.

The main limitation of this study concerns the recruitment of participants. Since the research was developed online, internet network failures and the time taken to complete the questionnaire may have interfered with the research. Another limiting factor is related to the difficulty of investigating low prevalence conditions, as this would imply a study with a sample relatively larger than the sample of this investigation. We consider, however, that this did not affect the results, as the number of participants exceeded the minimum necessary. Furthermore, the cross-sectional study design does not allow causal inferences to be made, but it does allow exploring associations and raising hypotheses.

CONCLUSION

This study analyzed the prevalence of COVID-19 among Brazilian physiotherapists and associated factors according to demographic and occupational characteristics. There was participation of 670 physiotherapists from different regions of Brazil, with an estimated prevalence of 30% of COVID-19 diagnosis. Those who provided care in a field hospital, who were isolated from their family and who have children under 12 years old living in the same house were considered factors that increased the chances of physiotherapists presenting a positive diagnosis for COVID-19.

In addition to having exacerbated the weaknesses of health systems (both public and private), given that occupational issues have a direct impact in the context of COVID-19, sociodemographic inequalities have a negative impact on workers' health. Illness among physiotherapy professionals has an intrinsic relationship with the exercise of the profession, due to care for people with COVID-19, signaling the need to reformulate health systems

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