Research Article
Artigo de Pesquisa
Artículo de Investigación

DOI: http://dx.doi.org/10.12957/reuerj.2022.70535

Workloads and health deterioration of primary health care workers in the COVID-19 pandemic

Cargas de trabalho e desgastes dos trabalhadores da atenção primária à saúde na pandemia COVID-19

Cargas de trabajo y desgaste de los trabajadores de la atención primaria durante la pandemia COVID-19

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ABSTRACT
Objective: to analyze the association of workloads and health deterioration in workers during the COVID-19 pandemic in Basic Health Units. **Method:** quantitative, descriptive, and cross-sectional study, with 132 workers of a medical and nursing staff, in Basic Health Units in 14 Brazilian states and the Federal District. Data collecting was carried out from August to November 2020, through online questionnaire. It has been carried out a descriptive statistic and Pearson Qui-squared test. **Results**: the workloads that were most identified were secretions (81,8%), uncomfortable positions (72,7%), accidents with sharp instrument (76,5%), fear of contamination by COVID-19 (64,3%), work overload (56,8%) and conflicts (47,7%), obtaining significant statistical associations with health damage. **Conclusion:** the workloads generate strain on health, sometimes unnoticed during the daily work practice, but which can be aggravated if this relationship is not identified.
Descriptors: Workload; Primary Health Care; Coronavirus Infections; COVID-19.

RESUMO
Objetivo: analisar a associação entre as cargas de trabalho e os desgastes à saúde dos trabalhadores atuantes durante a pandemia da COVID-19 em Unidades Básicas de Saúde. **Método:** estudo quantitativo, descritivo, transversal, com 132 trabalhadores da equipe médica e de enfermagem, em Unidades Básicas de Saúde de 14 Estados Brasileiros e Distrito Federal. A coleta de dados ocorreu de agosto a novembro de 2020, através de um questionário on-line. Realizou-se estatística descritiva e teste Qui-quadrado de Pearson. **Resultados:** as cargas de trabalho mais identificadas foram as secreções (81,8%), posições incômodas (72,7%), acidente com perfurocortantes (76,5%), medo da contaminação pela COVID-19 (64,3%), excesso de trabalho (56,8%) e conflitos (47,7%), obtendo-se associações estatísticas significativas com os desgastes à saúde. **Conclusão:** as cargas de trabalho geram desgastes à saúde, por vezes despercebidos durante o cotidiano de prática laboral, mas que podem ser agravados, caso essa relação não seja identificada.
Descritores: Carga de Trabalho; Atenção Primária à Saúde, Infecções por Coronavírus; COVID-19.

RESUMEN
Objetivo: analizar la asociación entre las cargas de trabajo y los desgastes a la salud de los trabajadores actuantes durante la pandemia del COVID-19 en Unidades Básicas de Salud. **Método:** estudio cuantitativo, descriptivo, transversal, junto a 132 trabajadores del equipo médico y de enfermería, en Unidades Básicas de Salud de 14 Estados Brasileños y el Distrito Federal. La recolección de datos tuvo lugar de agosto a noviembre de 2020, mediante un cuestionario en línea. Se realizó una estadística descriptiva y la prueba Chi-cuadrado de Pearson. **Resultados:** las cargas de trabajo más identificadas fueron: secreciones (81,8%), posiciones incómodas (72,7%), accidente con objetos punzantes (76,5%), miedo de la contaminación por COVID-19 (64,3%), exceso de trabajo (56,8%) y conflictos (47,7%). Se obtuvieron asociaciones estadísticas significativas con los desgastes a la salud. **Conclusión:** las cargas de trabajo generan desgastes a la salud que son, a veces, inadvertidos, durante la práctica laboral diaria, pero que puede agravarse si no se identifica esta relación.
Descriptores: Carga de Trabajo; Atención Primaria de Salud; Infecciones por Coronavirus; COVID-19.

INTRODUCTION

The COVID-19 pandemic demanded actions and measures beyond containing the virus transmission, requiring health systems to promote life protection. Sanitary responses were mainly provided at the Primary Health Care (PHC) level, considering its fundamental strategies due to knowledge of the territory, access and bonds established with the community, assistance, the monitoring of families, and the follow-up of cases[1].

PHC is the main gateway to the Brazilian Unified Health System (SUS) because of its proximity and accessibility to the community and patients[2]. Health professionals working in Basic Health Units (UBS) became exposed to the disease during the COVID-19 pandemic for being in direct contact with patients[3].

Despite the changes implemented to improve the effectiveness of care delivery and the protection of workers and users of the health system, PHC had to deal with a shortage of workers, restricted physical structure, insecurity during care

This study was financed in part by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* - Brazil (CAPES) – Financing code 001.
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Scientific Editor: Cristiane Helena Gallasch; Associated Editor: Magda Guimarães de Araujo Faria

Received: Oct 30th 2022 – Accepted: Dec 30th 2022

DOI: http://dx.doi.org/10.12957/reuerj.2022.70535

delivery, and the rationed use of limited Personal Protective Equipment (PPE), exposing workers and their families to the risk of contamination and dissemination of the virus[4,5].

PHC workers are exposed to factors that interfere with their health and increase the workloads in their work environment. For example, the pandemic increased workloads and affected the mental health of workers due to the need to provide care to infected patients, the risk of COVID-19 infection, the high number of patients, the shortage of workers, and the constant use of PPE, resulting in fatigue and increased body temperature caused by the intense care provided to patients[6-9].

Workers' health is a priority field of research, as it enables understanding and analyzing the health-disease continuum at collective and individual levels. Hence, it is necessary to identify workloads characterized by dynamic elements existing in the work environment, which negatively affect workers' physiological and nervous balance, causing wear and tear. Such unbalance, defined as the loss of physical or mental capacity, is related to the organization of work[10].

Therefore, identifying the presence of workloads and associated wear and tear enables verifying the need for changes in health practices and work environments. In this sense, the following research question emerged: what are the potential associations between biological, mechanical, physical, and chemical workloads and wear and tear on the health of professionals working in Basic Health Units during the COVID-19 pandemic?

The objective was to analyze the association between these workloads and wear and tear on the health of professionals working during the COVID-19 pandemic in Basic Health Units.

METHOD

This cross-sectional, descriptive, and quantitative study followed the guidelines of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[11]. It was performed online, from August to November 2020, in Basic Health Units in the following Brazilian states, in addition to the Federal District: Alagoas, Amapá, Amazonas, Bahia, Goiás, Minas Gerais, Pará, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, Santa Catarina, São Paulo, and Sergipe.

Sampling considered the population of 2,829,835 health workers in Brazil. The sample calculation was conducted in the EPI InfoTM7® software, using a 97% confidence level and a 10% sample error margin, obtaining the minimum sample of 118 participants.

A total of 132 medical and nursing workers participated in the study. A non-probabilistic convenience sampling technique was used considering the following inclusion criterion: currently working in a medical or nursing team at UBS nationwide during the COVID-19 pandemic. Exclusion criteria were: not having access to the Internet, being under 18 years of age, or being unable to respond to the survey due to illness.

The electronic research instrument consisted of two parts. The first included the participants' characterization: occupation (i.e., physician, nurse, nursing technician, or nursing assistant), biological sex (male or female) and age.

The second part of the instrument comprised questions addressing the object of study. The theoretical framework proposed by Laurell and Noriega[10] was used to develop the variables related to workloads and wear and tear on health concerning sleep disorders, ulcers or gastritis, pathological fatigue, and nervousness with irritability. In addition, we searched the current literature for symptoms experienced by health workers during the COVID-19 pandemic to determine physical and mental exhaustion, distress from having lost colleagues or patients, concerns about one's own safety, stress, anxiety, exhaustion, anguish, and depression[12-14].

An electronic questionnaire was developed in Google Forms®, generating a link to the survey, which was sent to the participants through the social network, which was considered an easy strategy to access the survey and related information quickly.

Search strategies were used on Facebook® by tracking keywords such as "Basic Health Unit" and "Family Health Strategy" typed in the search tab. This strategy was intended to identify the users' potential workplaces. Next, we searched the "people" item to identify the cities of origin of those who explicitly reported working in a "Basic Health Unit" or "Family Health Strategy." Finally, the invitation was sent to the workers on the platform's chat tool, Facebook Messenger®.

Additionally, images publicizing the survey were sent to WhatsApp® groups composed of health workers, asking them to disseminate it to reach the largest number of Brazilian health workers. The invitation to all workers identified in the online platforms was reinforced every week during the data collection period.

Data were recorded in a virtual environment, organized and exported using licensed Microsoft Office Excel®

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software. Afterwards, they were referred to the Statistical Package for Social Sciences (SPSS®) tool, version 25.0, for statistical analysis.

Descriptive statistics were used for the general data analysis using frequency distribution, mean, and standard deviation. The normality of data was verified using the Kolmogorov-Smirnov and Shapiro-Wilk tests, which resulted in a p=0.000. The statistical significance was established at p-value <0.05 in all analyses. Pearson's chi-square test was used to verify the statistical associations between the biological, mechanical, physical, and chemical workloads and wear and tear on health variables.

This study complied with the ethical principles concerning research involving human subjects, following Resolutions 466/2012 and 510/2016, National Health Council, and was approved by the Institutional Review Board. A free and informed consent form was sent by email after the workers confirmed their consent in the Google Forms® application.

RESULTS

This study included 77 (58.3%) nurses, 30 (22.7%) nursing technicians, 22 (16.7%) physicians, and 3 (2.3%) nursing assistants. Most were women, 108 (81.8%), aged 36.7(±10.67) years on average. These workers were distributed among the following Brazilian states: 4 (3%) Minas Gerais, 1 (0.8%) Pará, 6 (4.5%) Paraná, 1 (0.8%) Pernambuco, 1 (0.8%) %) Rio de Janeiro, 3 (2.3%) Alagoas, 84 (63.3%) Rio Grande do Sul, 16 (12.1%) Santa Catarina, 1 (0.8%) São Paulo, 1 (0 .8%) Sergipe, 3 (2.3%) Amapá, 1 (0.8%) Amazonas, 1 (0.8%) Bahia, 8 (6.1%) Federal District, and 1 (0.8%) Goiás.

The biological workloads identified by the workers in their work environments were: secretions by 108 (81.8%), viruses by 103 (78%), handling patients with infectious diseases by 97 (73.4%), handling contaminated materials by 83 (62.8%), and bodily secretions by 70 (53%). Additionally, there was a statistically significant association between secretions and physical and mental exhaustion (p=.000), viruses and sleep disorders (p=.030), handling patients with infectious diseases and anxiety (p=0.035), handling contaminated materials and exhaustion (p=0.002), and bodily excretions and distress from having lost colleagues or patients (p=.003), as shown in Table 1:

TABLE 1: Biological workloads and associations with wear and tear on health in Basic Health Units during the COVID-19 pandemic, Rio Grande, RS, Brazil, 2020.

	WORKLOADS (n=132) Biological									
	Bodily excretions n=70 (53%)		Handling patients with infectious diseases n= 97 (73.4%)		Handling contaminated materials n= 83 (62.8%)		Secretions n= 108 (81.8%)		Virus n= 103 (78%)	
Wear and Tear	**n(%)**	**p***	**n(%)**	**p***	**n(%)**	**p***	**n(%)**	**p***	**n(%)**	**p***
Sleep disorders		0.105		0.128		0.099		0.176		0.030
Present	48 (68.6)		64 (66.0)		56 (67.5)		70 (64.8)		69 (67.0)	
Absent	22 (31.4)		33 (34.0)		27 (32.5)		38 (35.2)		34 (33.0)	
Physical and mental exhaustion		0.006		0.013		0.001		0.000		0.002
Present	55 (78.6)		72 (74.2)		65 (78.3)		81 (75.0)		77 (74.7)	
Absent	15 (21.4)		25 (25.8)		18 (21.7)		27 (25.0)		26 (25.3)	
Distress for having lost colleagues or patients		0.003		0.183		0.138		0.933		0.712
Present	37 (52.8)		43 (44.3)		38 (45.8)		44 (40.7)		43 (41.7)	
Absent	33 (47.2)		54 (55.7)		45 (54.2)		64 (59.3)		60 (58.3)	
Concerns with one's own safety		0.031		0.062		0.087		0.104		0.040
Present	51 (72.8)		67 (69.0)		58 (69.9)		73 (67.6)		71 (68.9)	
Absent	19 (27.2)		30 (31.0)		25 (30.1)		35 (32.4)		32 (31.1)	
Anxiety		0.312		0.035		0.001		0.178		0.011
Present	54 (77.1)		76 (78.3)		69 (83.1)		82 (75.9)		81 (78.6)	
Absent	16 (22.9)		21 (21.7)		14 (16.9)		26 (24.1)		22 (21.4)	
Fatigue		0.006		0.044		0.002		0.001		0.042
Present	46 (65.7)		58 (59.8)		54 (65.0)		66 (61.1)		61 (59.2)	
Absent	24 (34.3)		39 (40.2)		29 (35.0)		42 (38.9)		42 (40.8)	
Anguish		0.119		0.926		0.034		0.151		0.047
Present	40 (57.1)		49 (50.5)		48 (57.8)		58 (53.7)		57 (55.3)	
Absent	30 (42.9)		48 (49.5)		35 (42.2)		50 (46.3)		46 (44.7)	

Legend: * Pearson's Chi-square.

DOI: http://dx.doi.org/10.12957/reuerj.2022.70535

The mechanical workloads: needle-stick and sharps accidents, physical violence, and bruises were identified by 101 (76.5%), 40 (30.3%) and 36 (27.2%) workers, respectively, which were statistically associated with the following wear and tear on health: stress (p=.038), nervousness with irritability (p=.018) and physical and mental exhaustion (p=.000). The physical workload difference in temperature was identified by 96 (72.7%) workers, which was statistically associated with concerns with one's own safety (p=.012). Finally, the chemical workload medications was identified by 81 (61.3%) participants, which was statistically associated with nervousness and irritability (p=.000), as shown in Table 2:

TABLE 2: Mechanical, physical, and chemical workloads and associations with wear and tear on health in Basic Health Units during the COVID-19 pandemic, Rio Grande, RS, Brazil, 2020.

	WORKLOADS (n=132)									
	Physical violence		Mechanical Bruises		Sharps injuries		Physical difference of temperature		Chemical Medications	
Wear and	n= 40 (30,3%)		n= 36 (27,2%)		n= 101 (76,5%)		n= 96 (72,7%)		n= 81 (61,3%)	
Tear	n(%)	p*	n(%)	p*	n(%)	p*	n(%)	p*	n(%)	p*
Sleep disorders		0.219		0.143		0.246		0.079		0.036
Present	28 (70.0)		26 (72.2)		60 (59.4)		64 (66.6)		56 (69.1)	
Absent	12 (30.0)		10 (27.8)		41 (40.6)		32 (33.4)		25 (30.9)	
Nervousness with irritability		0.018		0.046		0.143		0.722		0.000
Present	25 (62.5)		22 (61.1)		51 (50.4)		46 (47.9)		48 (59.2)	
Absent	15 (37.5)		12 (38.9)		50 (49.6)		50 (52.1)		33 (40.8)	
Physical and mental exhaustion		0.767		0.000		0.952		0.849		0.148
Present	28 (70.0)		33 (91.6)		69 (68.3)		65 (67.7)		59 (72.8)	
Absent	12 (30.0)		3 (8.4)		32 (31.7)		31 (32.3)		22 (27.2)	
Concerns with one's own safety		0.924		0.941		0.680		0.012		0.071
Present	29 (72.5)		23 (63.9)		66 (65.3)		68 (70.8)		57 (70.3)	
Absent	14 (27.5)		13 (36.1)		35 (34.7)		28 (29.2)		24 (29.7)	
Stress		0.441		0.146		0.038		0.068		0.645
Present	28 (70.0)		27 (75.0)		61 (60.4)		67 (69.8)		54 (66.7)	
Absent	12 (30.0)		9 (25.0)		40 (39.6)		29 (30.2)		27 (33.3)	
Fatigue		0.945		0.035		0.653		0.301		0.084
Present	22 (55.0)		25 (69.4)		54 (53.4)		55 (57.2)		49 (60.4)	
Absent	18 (45.0)		11 (30.6)		47 (46.6)		41 (42.8)		32 (39.6)	

Legend: * Pearson's Chi-square.

DISCUSSION

Worker experiences many workloads during their practice that summarizes the mediation between occupation and wear and tear on health, which can be mitigated and recovered when workloads in the work environment are identified, enabling new health practices[10].

Sleep disorder and anxiety, which were among the wear and tear on health evidenced in this study during the COVID-19 pandemic in UBS, were also identified by another study[15] assessing 426 health workers in Egypt and Saudi Arabia during the pandemic.

Wear and tear may be associated with both the work environment and the coronavirus, which affected the population and health workers worldwide. The pandemic was a situation in which workers needed to put their lives at risk to care for others. Exposure to the virus resulted in anxiety among health workers who, in addition to risking their physical well-being, experienced significant emotional situations[16].

Additionally, a lack of preparation for pandemics, which generated more stress in already challenging work environments, a mourning feeling, and fear that the disease would affect oneself or colleagues, were also factors that interfered with the health of workers, generating an increase in workloads[17] and consequent wear and tear on health.

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Health workers needed to give up their comfort during the COVID-19 pandemic, which resulted in long working hours and little contact with their families[18]. These factors may cause stress, exhaustion, anguish, nervousness, and physical and mental exhaustion, as they are related to the efforts made by workers to provide care to patients.

The fear of contaminating others, the rationed use of PPE, little information, or an exacerbated flow of information about the disease[19], may have led to the presence of the wear and tear identified in this study, which may be related to the working conditions experienced by workers and the type of protection used during care delivery.

Chemical, physical and mechanical workloads may be associated with the work environment, structural problems, inadequate equipment, unhealthy structures, humidity exposure, noise, and heat due to a lack of air conditioning[20]. As a result, these factors may lead to the health problems identified in this study, such as concerns about one's own safety, physical and mental exhaustion, and fatigue, among others.

Humidity in work environments is considered a physical workload[21], as well as temperature differences. Moreover, such workload may also lead to other biological workloads that favor the presence of mold, insects, poor lighting, and poor ventilation[20].

Biological workloads are present due to contact with COVID-19 patients. Wear and tear on health, such as physical and mental exhaustion, stress, anguish, concern for one's own safety, and anxiety may be related to the presence of excretions from patients, which may lead to the contamination of several workers[22].

In this sense, health promotion and disease prevention should be implemented among health workers[23]. Workloads represent a challenge for managers and health workers. Nevertheless, problems related to poor working conditions and structures also need to be addressed[20].

This study identified some workloads present during the COVID-19 pandemic in PHC work environments and how they negatively affected the workers' health. Even though data in this study was collected online and therefore were easily accessible, the low participation rate due to the difficulty of freely accessing this population represents a limitation.

CONCLUSION

The results support health promotion actions to be performed among the participants, leading to better working conditions and decreasing the presence of workloads that cause wear and tear on health, considering that these workloads will remain even after the end of the pandemic. In addition, this study enabled us to clearly identify the workloads that generate wear and tear on health during daily practice, which may often go unnoticed.

Identifying biological, mechanical, physical, and chemical workloads, known to harm workers' health, is expected to facilitate the planning and implementation of strategies to modify the working conditions of UBS health teams. Thus, public policies that ensure workers' health need to consider and observe the context of Brazilian UBS, in which workers experience considerable wear and tear on health, with effects at the individual and collective levels.

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