

Health and work in Brazil: physical and psychosocial demands

Saúde e trabalho no Brasil: demandas físicas e psicossociais

Salud y trabajo en Brasil: exigencias físicas y psicosociales

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Abstract

This study aims to describe the prevalence and factors associated of physical and psychosocial demands among Brazilian workers. Data were obtained from the 2013 Brazilian National Health Survey. Physical demand was defined as jobs that require intense physical effort or excessive walking, whereas psychosocial demand was defined as involvement in stressful activities. Multivariate logistic regression was used to estimate the association between demands and health conditions, occupational characteristics, and work conditions. Out of 39,590 participants, 54.4% reported physical demands and 35.5% psychosocial demands at work. After adjustment for sociodemographic characteristics, health conditions, occupational characteristics, and work conditions remained significantly associated with physical or psychosocial workload. The results suggest that in Brazil the work has a high level of physical and psychosocial demands, which are associated with occupational features and health conditions. It is necessary to incorporate work activities as significant factors to investigate the causes of diseases. And the interventions and policies aimed at preventing the negative occupational exposures are urgent, and can contribute to improve physical and psychosocial health at the workplace.

Occupational Health; Working Conditions; Workplace, Work Stress

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Introduction

Work-related diseases are common ¹. Working conditions and the nature of employment can affect health and well-being, work productivity, and workplace safety ^{2,3}. Adverse psychosocial factors in terms of high job demands or low job control have been associated with sickness and absence at work ⁴. Also, the physically hard work has been associated with musculoskeletal pain ⁵.

Occupational stressors can trigger illnesses and cause significant dysfunctions ⁶. There are associations between physical and psychosocial workload of oil industry workers and sleep disorders, high blood pressure and musculoskeletal disorders ⁷; public service or freight handlers and musculoskeletal pain ^{8,9,10}; depression disorder and the teacher category ¹¹; noise and shift work has been associated with hypertension ¹². However, this association has not yet been investigated in a national sample of workers, especially when it comes to the context of developing countries and with constant changes in the workforce.

In recent decades, studies on workers' health have identified the association between exposure to occupational risks and a greater chance of becoming ill ¹³. When sick, if protected, the workers will have the right to leave for treatment. However, many workers attend the work, even when they are weakened by the symptoms and sequels resulting from clinical conditions. In the informal labor market, this may be even more frequent. The manifestations of physical and psychological incapacity reveal the degree of effort required to respond to the physical and psychosocial demands of work ¹⁴. In this sense, when the demands are high, workers who are sick or have few resources are likely to feel embarrassed or pressured by the difficulties they face. Thus, the effort to perform the tasks, in a situation of decreased physical, cognitive, and emotional capacities, can lead to exhaustion ^{15,16}. If exhausted, they will be less empowered to carry out their work activities, constituting a loss spiral ¹⁷.

In this sense, the diagnosis of work and health characteristics in Brazil, and their association with physical and psychosocial demands may help elaborate measures to protect workers' health. Moreover, such study may raise awareness among policy makers, especially those involved in the revision of labor laws in Brazil, to review what may be contrary to the improvement of working conditions. Thus, this study used data from a large population-based survey to investigate the prevalence and factors associated with physical and psychosocial demands among Brazilian workers.

Methods

Data source and study population

This cross-sectional study used data from the 2013 *Brazilian National Health Survey* (PNS, in Portuguese) in Brazil, a population-based survey conducted by the Brazilian Institute for Geography and Statistics (IBGE, in Portuguese), in partnership with the Brazilian Ministry of Health. This survey aims to assess the health, lifestyle, and the use of health services.

A three-stage cluster sampling was performed: (1) census tracts form the primary sampling units, selected by random sampling; (2) households compose the secondary sampling units; and (3) adults aged > 18 years form the tertiary sampling units. Adults were selected from a list of eligible residents at the time of interview. Details about the sampling process were published elsewhere ¹⁸.

Data were collected face-to-face from August 2013 to February 2014, in 62,986 households among the 81,767 randomly individuals sampled ¹⁹. A total of 60,202 people participated in the individual interviews ¹⁸. The data collection instrument is available at the PNS website (<https://www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html>).

This study included selected adults who reported a job or internship paid in money or products, informal paid work, or unpaid work.

Physical and psychosocial demands

Physical demand at work was defined by a positive response in at least one of the questions: “In your job, do you walk a lot?” and “In your job, do you do heavy cleaning, heavy lifting, or any other activity that requires intense physical effort?”. The first question is original of the PNS, and the second is widely used in others occupational surveys ^{20,21,22,23}.

Despite the possibility of measurement bias when non-validated questions are used, the answer to the first question was included in the elaboration of the variable physical demand for work. Two reasons justify this procedure, firstly, because of the characteristics of work in Brazil. In 2012 and 2013, 45.1% and 45.3%, respectively, of the employed persons worked in the services activity group ²⁴. In this contingent, standing work for long periods is a frequent condition, as seen in the groups of commercial workers, teachers, health personnel, among others ²⁴. Furthermore, the proportion of musculoskeletal diseases attributable to the demands of physical work is greatly significant in this population making this condition relevant to the study, although with limitations in the investigation. Thus, the joint use of the variables could possibly result in losses in the identification of this important contingent of workers in Brazil. The second reason is related to the data collected, the national surveys cited incorporate more than one question to assess physical demand at work, but none of the complementary questions used are included in the PNS.

Psychosocial demand at work was assessed by the following question: “Thinking about all of your work, are you exposed to any of these factors that may affect your health?”. A positive response to the sub-item referring to “involvement in activities that lead to nervousness” was defined as psychosocial demand. The nervousness is a possible manifestation in the causal chain of occupational stress, besides reproducing the manifestation of anxiety in common sense. Generally, nervousness is a manifestation of the nervous system, represented by a shaken behavior ²⁵.

Explanatory variables

Factors associated with the presence of physical and psychosocial demands were analyzed in two blocks of variables: (1) health conditions and (2) occupational features.

Health conditions evaluated were: self-reported conditions (diabetes, hypertension, work-related musculoskeletal disorder – WMSD, depression, and chronic back pain), smoking (yes, no), self-rated health (very good/good, regular/poor/very poor), and nutritional status (underweight, adequate pre-obesity, and obesity).

Occupational features evaluated were: number of current jobs (one, two or more), working night shifts (yes, no), open or closed work environment (closed, open, both), time at the current job (up to 2 years, 2 to 10 years, more than 10 years), working 24 hour shifts (yes, no), weekly workload (up to 20 hours, 20 to 40 hours, more than 40 hours).

Weight and height were measured at the time of the individual’s interview. Nutritional status was verified according to the recommendations of the World Health Organization (WHO) ²⁶.

Covariates

Individual sociodemographic characteristics included sex (female, male), age (18-24 years, 25-34 years, 35-44 years, 45-54 years, and ≥ 55 years old), educational level (illiterate/no formal education, elementary school, high school, higher education), marital status (married/have a partner, separated/divorced/widowed or widower, never married) that could have confounded the association of health and work conditions with physical and psychosocial demands.

Statistical analysis

Analyses were performed in the Stata software, version 14 (<https://www.stata.com>), and accounted for the sampling complex design and unequal selection probabilities. Variables were described by frequencies and 95% confidence intervals (95%CI).

Demographics, occupational features and health conditions were described according to the presence of physical and psychosocial demands.

Factors associated with physical and psychosocial demands were investigated with univariate and multivariate logistic regression models. Models were constructed for each block of variables (health conditions, occupational features) and adjusted for socio-demographics characteristics. For all models, the possibility of multicollinearity for explanatory variables was tested. Only variables with no multicollinearity relationship were maintained in the models. A 5% significance level was adopted.

Results

Out of 39,590 Brazilian workers, 57.1% (95%CI: 56.2-58.1) were male, 26.8% (95%CI: 26.0-27.6) had 25-34 years old, and 37.5% (95%CI: 36.6-38.4) had complete high school (Table 1). The main self-reported health conditions were hypertension (15.7%; 95%CI: 15.0-16.4) and chronic back pain (16.3%; 95%CI: 15.6-17.1). The prevalence of smoking was 15.2% (95%CI: 14.6-15.9). Most workers self-rated their health as "very good" or "good" (73.4%; 95%CI: 72.6-74.2), and 19.5% (95% CI: 18.7-20.3) were classified as obese (Table 2).

The prevalence of physical demand in Brazilians was 53.9% (95%CI: 52.9-54.9) and of psychosocial demand was 35.2% (95%CI: 34.2-36.3). After adjustment for sociodemographic characteristics, different health conditions were associated with occurrence of physical and psychosocial demand (Table 2).

Table 1

Characteristics of Brazilian workers by presence of physical and psychosocial demands. 2013 *Brazilian National Health Survey*.

Characteristics	Brazilian workers % (95%CI)	Physical demand % (95%CI)	Psychosocial demand % (95%CI)
Age (years)			
18-24	15.7 (14.9-16.3)	15.8 (15.6-17.4)	16.3 (15.4-17.2)
25-34	26.8 (26.0-27.6)	25.2 (24.0-26.0)	25.0 (23.6-25.9)
35-44	23.9 (23.1-24.7)	24.3 (23.2-25.3)	22.8 (21.8-23.8)
45-54	19.9 (19.0-20.6)	20.8 (19.9-21.8)	20.5 (19.6-21.4)
55 or older	13.7 (13.1-14.4)	13.9 (13.0-14.8)	15.4 (14.6-16.3)
Sex			
Male	57.1 (56.2-58.1)	62.3 (61.0-63.6)	58.6 (57.2-60.1)
Female	42.9 (41.9-43.8)	37.7 (36.4-39.0)	41.4 (39.9-42.8)
Education level			
Illiterate/No formal education	30.2 (29.2-31.1)	37.5 (36.2-38.8)	34.5 (33.9-36.0)
Elementary school	16.0 (15.3-16.7)	17.6 (11.8-13.7)	16.9 (16.1-17.8)
High school	37.5 (36.6-38.4)	34.4 (33.1-35.6)	34.9 (33.8-36.0)
Higher education	16.3 (15.4-17.3)	10.5 (9.7-11.3)	13.2 (12.4-14.2)
Marital status			
Have a partner	44.7 (43.7-45.6)	42.8 (41.6-44.1)	43.4 (42.2-44.6)
Separated/Divorced/Widowed or widower	9.5 (9.0-10.1)	9.2 (8.4-10.0)	9.7 (9.0-10.3)
Never married	45.8 (44.9-46.8)	48.0 (46.7-49.2)	46.9 (45.7-48.1)

95%CI: 95% confidence interval.

Table 2Health conditions of Brazilian workers according to the presence of physical and psychosocial demands. 2013 *Brazilian National Health Survey*.

Characteristics	Brazilian workers		Physical demand		Psychosocial demand		
	% (95%CI)	% (95%CI)	Unadjusted OR (95%CI)	Adjusted * OR (95%CI)	% (95%CI)	Unadjusted OR (95%CI)	Adjusted * OR (95%CI)
Hypertension							
No	84.3 (83.6-85.0)	84.4 (83.5-85.4)	Reference	Reference	83.9 (82.6-85.2)	Reference	Reference
Yes	15.7 (15.0-16.4)	15.6 (14.6-16.5)	0.97 (0.88-1.07)	0.91 (0.82-1.02)	16.1 (14.8-17.4)	1.04 (0.93-1.17)	1.23 (1.09-1.39)
Diabetes mellitus							
No	96.2 (95.8-96.6)	96.4 (95.9-96.9)	Reference	Reference	96.2 (95.6-96.9)	Reference	Reference
Yes	3.8 (3.4-4.2)	3.6 (3.1-4.1)	0.88 (0.73-1.07)	0.82 (0.67-1.02)	3.8 (3.1-4.4)	0.98 (0.79-1.23)	1.17 (0.93-1.47)
WMSD							
No	97.2 (96.9-97.5)	97.2 (96.8-97.6)	Reference	Reference	95.8 (95.2-96.4)	Reference	Reference
Yes	2.8 (2.5-3.1)	2.8 (2.4-3.2)	0.99 (0.79-1.25)	1.19 (0.94-1.50)	4.2 (3.6-4.8)	2.10 (1.68-2.62)	2.10 (1.68-2.63)
Depression							
No	93.8 (93.3-94.3)	93.8 (93.2-94.4)	Reference	Reference	91.6 (90.8-92.5)	Reference	Reference
Yes	6.2 (5.7-6.7)	6.2 (5.6-6.8)	1.01 (0.86-1.17)	1.16 (0.99-1.37)	8.4 (7.5-9.2)	1.73 (1.49-2.01)	1.98 (1.68-2.32)
Chronic back pain							
No	83.7 (82.9-84.4)	81.8 (80.8-82.8)	Reference	Reference	81.4 (80.2-82.7)	Reference	Reference
Yes	16.3 (15.6-17.1)	18.2 (17.2-19.2)	1.36 (1.24-1.50)	1.32 (1.20-1.47)	18.6 (17.3-19.8)	1.28 (1.16-1.42)	1.51 (1.35-1.68)
Smoking							
No	84.8 (84.1-85.4)	81.8 (80.8-82.8)	Reference	Reference	85.1 (84.0-86.2)	Reference	Reference
Yes	15.2 (14.6-15.9)	18.2 (17.2-19.2)	1.69 (1.52-1.88)	1.41 (1.26-1.58)	14.9 (13.8-16.0)	0.96 (0.87-1.07)	1.11 (0.99-1.24)
Self-rated health							
Very good/Good	73.4 (72.6-74.2)	70.6 (69.5-71.7)	Reference	Reference	72.3 (70.9-73.6)	Reference	Reference
Regular/Poor/ Very poor	26.6 (25.8-27.4)	29.4 (28.3-30.5)	1.37 (1.27-1.48)	1.19 (1.09-1.29)	27.7 (26.4-29.1)	1.09 (1.00-1.19)	1.45 (1.32-1.59)
Nutritional status							
Adequate	40.7 (39.7-41.7)	42.8 (41.4-44.3)	Reference	Reference	39.4 (37.8-41.1)	Reference	Reference
Underweight	2.0 (1.7-2.2)	2.2 (1.8-2.6)	1.15 (0.89-1.48)	1.20 (0.92-1.56)	1.9 (1.5-2.4)	1.02 (0.77-1.34)	1.05 (0.78-1.40)
Pre-obesity	37.0 (36.1-37.9)	36.7 (35.4-38.0)	0.88 (0.80-0.96)	0.85 (0.77-0.93)	37.3 (35.8-38.8)	1.06 (0.98-1.16)	1.09 (1.00-1.19)
Obesity	19.5 (18.7-20.3)	17.6 (16.6-18.5)	0.72 (0.65-0.80)	0.73 (0.65-0.81)	20.4 (19.1-21.7)	1.12 (1.01-1.25)	1.17 (1.05-1.31)

95%CI: 95% confidence interval; OR: odds ratio; WMSD: work-related musculoskeletal disorder.

Note: values in bold are statistically significant ($p < 0.05$).

* Adjusted for sex, age and education.

Moreover, almost all occupational characteristics and work conditions were significantly associated with physical and psychosocial demands at work, except for night shifts and 24 hour shifts for physical demand (Table 3).

According to the final multivariate model, greater odds of physical demand were found in workers: with chronic back pain, smokers, those who self-rated their health as regular/poor or very poor, those who reported work in two or more jobs and work 20 to 40 hours a week or more than 40 hours a week. Lower odds of physical demand were observed in those classified as pre-obese or obese, and work exclusively at open environment (Table 4).

On the other hand, greater odds of psychosocial demand were found in workers who have WMSD, depression, chronic back pain, and who self-rated their health as regular/poor or very poor. And those who reported working in two or more jobs, working night shifts or 24 hour shifts, work in mixed environments (closed and open environment), have been working at the current job for 2 to 10 years or for more than 10 years, work 20 to 40 hours a week, or more than 40 hours a week (Table 5).

Table 3Occupational features and work conditions of Brazilian workers according to the presence of physical and psychosocial demands. 2013 *Brazilian National Health Survey*.

Characteristics	Brazilian workers		Physical demand		Psychosocial demand		
	% (95%CI)	% (95%CI)	Unadjusted OR (95%CI)	Adjusted * OR (95%CI)	% (95%CI)	Unadjusted OR (95%CI)	Adjusted * OR (95%CI)
Number of jobs or equivalent							
1	95.7 (95.3-96.1)	95.8 (95.4-96.3)	Reference	Reference	94.0 (93.2-94.8)	Reference	Reference
2 or more	4.3 (3.9-4.7)	4.2 (3.7-4.6)	0.94 (0.78-1.13)	1.22 (1.01-1.48)	6.0 (5.2-6.8)	1.84 (1.54-2.21)	1.61 (1.35-1.91)
Night shifts							
No	85.1 (84.4-85.8)	85.8 (84.9-86.7)	Reference	Reference	79.1 (77.7-80.5)	Reference	Reference
Yes	14.9 (14.2-15.6)	14.2 (13.3-15.1)	0.89 (0.80-0.98)	0.91 (0.81-1.02)	20.9 (19.5-22.3)	2.02 (1.82-2.25)	1.92 (1.73-2.14)
Open or closed environment							
Closed	28.0 (27.1-28.9)	36.2 (34.9-37.5)	Reference	Reference	22.9 (21.6-24.2)	Reference	Reference
Open	51.6 (50.6-52.6)	40.0 (38.6-41.4)	0.31 (0.28-0.34)	0.40 (0.36-0.45)	52.2 (50.6-53.8)	1.37 (1.24-1.51)	1.12 (1.00-1.25)
Mixed (both)	20.4 (19.6-21.2)	23.8 (22.6-25.0)	0.73 (0.66-0.82)	0.88 (0.78-0.99)	24.9 (23.5-26.3)	1.87 (1.67-2.09)	1.62 (1.44-1.82)
Time at the current job (years)							
Up to 2	40.0 (39.1-41.0)	39.9 (38.5-41.2)	Reference	Reference	37.7 (36.2-39.3)	Reference	Reference
2-10	31.3 (30.5-32.0)	29.6 (28.6-30.7)	0.90 (0.83-0.98)	0.96 (0.88-1.05)	33.0 (31.6-34.4)	1.19 (1.09-1.30)	1.23 (1.12-1.36)
More than 10	28.7 (27.8-29.6)	30.5 (29.3-31.7)	1.16 (1.05-1.28)	1.19 (1.06-1.33)	29.2 (27.8-30.7)	1.13 (1.02-1.24)	1.34 (1.19-1.51)
24 hour shifts							
No	98.3 (98.1-98.5)	98.2 (97.9-98.5)	Reference	Reference	96.9 (96.4-97.3)	Reference	Reference
Yes	1.7 (1.5-1.9)	1.8 (1.5-2.1)	1.15 (0.90-1.46)	1.20 (0.93-1.56)	3.1 (2.7-3.6)	3.53 (2.74-4.54)	3.21 (2.45-4.19)
Weekly workload (hours)							
Up to 20	11.5 (10.8-12.1)	10.5 (9.7-11.3)	Reference	Reference	7.5 (6.7-8.2)	Reference	Reference
20-40	44.6 (43.5-45.6)	42.3 (40.9-43.7)	1.07 (0.95-1.20)	1.16 (1.03-1.31)	43.0 (41.5-44.6)	1.73 (1.51-1.99)	1.50 (1.30-1.72)
Over 40	44.0 (42.9-45.1)	47.2 (45.8-48.7)	1.41 (1.25-1.59)	1.33 (1.18-1.52)	49.5 (48.0-51.1)	2.22 (1.94-2.54)	2.04 (1.77-2.34)

95%CI: 95% confidence interval; OR: odds ratio.

Note: values in bold are statistically significant ($p < 0.05$).

* Adjusted for sex, age and education.

Discussion

The results suggest that there is a high level of physical and psychosocial demands at work in Brazil, which were associated with health and occupational features. Individuals with chronic back pain, poor health report, two or more jobs, and higher weekly demand presented a greater chance to report physical or psychosocial demands. The physical demand was also positively associated with smoking, whereas psychosocial demand was directly associated with WMSD, and depression. Overweight and working exclusively in an open environment reduced the chance of physical demand. On the other hand, working in a mixed environment (open and closed) was directly associated with psychosocial demand, as well as night work, 2 or more years at the current job, and 24 hours work.

This is the first study to investigate physical and psychosocial demands in the Brazilian working population. Previous studies have analyzed the relationship between several occupational exposures and health outcomes, such as Oenning et al.²⁷ who investigated depressive disorder. However, most studies were restricted to specific occupational categories as healthcare professionals, teachers, civil servants, and oil rig workers^{7,9,28}.

Table 4

Multivariate logistic regression model assessing factors associated with physical demands. 2013 *Brazilian National Health Survey*.

Characteristics	Model 1 * OR (95%CI)	Model 2 * OR (95%CI)	Model 3 * OR (95%CI)
Health conditions			
Chronic back pain			
No	Reference		Reference
Yes	1.29 (1.17-1.44)		1.25 (1.12-1.39)
Smoking			
No	Reference		Reference
Yes	1.35 (1.20-1.51)		1.34 (1.19-1.51)
Self-rated health			
Very good/Good	Reference		Reference
Regular/Poor/Very poor	1.15 (1.05-1.25)		1.12 (1.02-1.22)
Nutritional status			
Adequate	Reference		Reference
Underweight	1.16 (0.90-1.51)		1.22 (0.93-1.61)
Pre-obesity	0.86 (0.78-0.94)		0.87 (0.79-0.96)
Obesity	0.73 (0.65-0.81)		0.74 (0.66-0.83)
Occupational features			
Number of jobs or equivalent			
1		Reference	Reference
2 or more		1.07 (0.89-1.29)	1.30 (1.06-1.59)
Open or closed environment			
Closed		Reference	Reference
Open		0.31 (0.28-0.34)	0.41 (0.37-0.46)
Mixed (both)		0.73 (0.65-0.82)	0.88 (0.79-1.00)
Time at the current job (years)			
Up to 2		Reference	Reference
2-10		0.87 (0.79-0.95)	0.95 (0.86-1.04)
Over 10		1.03 (0.93-1.13)	1.12 (1.00-1.25)
Weekly workload (hours)			
Up to 20		Reference	Reference
20-40		1.07 (0.95-1.20)	1.19 (1.05-1.34)
Over 40		1.40 (1.24-1.58)	1.45 (1.28-1.65)

95%CI: 95% confidence intervals; OR: odds ratio.

Note: values in bold are statistically significant ($p < 0.05$).

* Adjusted for sex, age and education.

Most Brazilian workers reported physical demand at work. A study in Denmark showed that 25% of workers engage in activities with high or very high physical demand²⁹. Another study showed that 44.7% of workers rated their physical demand at work as very demanding³⁰, and sometimes the demand is related to the profession. However, the place, activities developed and time at work can also be related to the physical demand of the job. Operators and manual workers in general are more exposed to physical demand compared to workers in intellectual occupations⁷. Occupational hazards linked to physical demand include noise, vibration, exposure to cold, and ergonomic stress from manual, repetitive tasks that require force³¹.

More than a third of Brazilian workers reported psychosocial demand. Studies in different countries showed prevalence of approximately 50% with health professionals^{32,33}. Among European

Table 5

Multivariate logistic regression model assessing factors associated with psychosocial demands. 2013 *Brazilian National Health Survey*.

Characteristics	Model 1 * OR (95%CI)	Model 2 * OR (95%CI)	Model 3 * OR (95%CI)
Health conditions			
Hypertension			
No	Reference		Reference
Yes	1.10 (0.97-1.25)		1.12 (0.99-1.27)
WMSD			
No	Reference		Reference
Yes	1.80 (1.42-2.28)		1.68 (1.32-2.15)
Depression			
No	Reference		Reference
Yes	1.70 (1.44-2.01)		1.74 (1.47-2.06)
Chronic back pain			
No	Reference		Reference
Yes	1.32 (1.18-1.48)		1.30 (1.16-1.46)
Self-rated health			
Very good/Good	Reference		Reference
Regular/Poor/Very poor	1.31 (1.19-1.44)		1.36 (1.23-1.49)
Nutritional status			
Adequate	Reference		Reference
Underweight	1.02 (0.76-1.36)		1.08 (0.80-1.47)
Pre-obesity	1.08 (0.99-1.17)		1.05 (0.96-1.15)
Obesity	1.11 (0.99-1.24)		1.05 (0.93-1.18)
Occupational features			
Numbers of jobs or equivalent			
1		Reference	Reference
2 or more		1.70 (1.41-2.07)	1.47 (1.22-1.76)
Night shifts			
No		Reference	Reference
Yes		1.72 (1.53-1.94)	1.69 (1.50-1.91)
Open or closed environment			
Closed		Reference	Reference
Open		1.36 (1.24-1.51)	1.09 (0.97-1.23)
Mixed (both)		1.82 (1.62-2.05)	1.59 (1.40-1.80)
Time at the current job (years)			
Up to 2		Reference	Reference
2-10		1.18 (1.08-1.29)	1.23 (1.11-1.35)
More than 10		1.13 (1.03-1.25)	1.32 (1.17-1.49)
24 hour shifts			
No		Reference	Reference
Yes		1.94 (1.45-2.59)	1.80 (1.33-2.43)
Weekly workload (hours)			
Up to 20		Reference	Reference
20-40		1.74 (1.52-1.99)	1.60 (1.39-1.84)
More than 40		2.19 (1.91-2.51)	2.14 (1.86-2.46)

95%CI: 95% confidence interval; OR: odds ratio; WMSD: work-related musculoskeletal disorder.

Note: values in bold are statistically significant ($p < 0.05$).

* Adjusted for sex, age and education.

teachers, emotional exhaustion was reported by 25.6%³⁴. Psychic and behavioral disorders are among the leading causes of absence from public service in Brazil³⁵. Approximately 7.8% of teachers reported absence because they experienced stressful situations at school³⁶.

Our study found an association between physical demand and health conditions, including the association with smoking. We hypothesized that this association reflects the perception of the worker's effort, which may be higher with smokers. The physical and psychosocial demands were also associated with chronic back pain, and these problems are often related to inappropriate posture during long working hours and absence of breaks. The consequences go beyond reducing work performance, also affecting the quality of life and limiting daily activities³⁷. In South Korea, for example, the most frequently reported work-related symptoms are musculoskeletal disorders followed by stress and fatigue³⁸, this result can be seen in our study, since individuals who reported poorer self-related health had higher odds of physical and psychosocial demand compared to individuals who rated their health positively.

High demand was associated to noncommunicable chronic diseases that will have long-term effects on health, quality of life, and costs for health system and employers³⁹. A previous study using PNS data indicated regional and gender differences in the prevalence of musculoskeletal disorders, including WMSD, which was associated with the presence of comorbidities and environmental noise⁸.

Hypertension is one of the most studied health outcomes associated with stress, and the report of being diagnosed with it, surprisingly, was not associated with work demands. The direct activation of neuroendocrine responses to stressors or unhealthy behaviors, and smoking, physical inactivity or excessive alcohol consumption are the explanatory mechanisms for the increase in blood pressure^{40,41}. Factors such as shift work, working at night, and exposure to noise can contribute to the emergence of cardiometabolic diseases¹². However, we have found divergent results in the literature⁴².

This study shows that individuals with self-reported depression have higher odds of psychosocial demand when compared to those without the disease. Nowadays, depression is among the most significant chronic diseases. A study with PNS data estimates a 2.8% prevalence of major depressive disorder in the Brazilian working population, being associated with workplace violence²⁷. Depression is a disabling disease because it affects the cognitive, emotional, and physical functioning of workers. It is known that the chance of absences is greater in workers diagnosed with depression, and is observed the reduction in productivity of individuals who continue to work when sick, a phenomenon called presenteeism⁴³. Chronic stress exposures also have been linked to hypertension, insulin resistance, musculoskeletal illness, anxiety, and depression. There is also a substantial body of literature suggesting that cumulative stress at work can lead to burnout syndrome⁴⁴.

Overweight also has severe health consequences, being a significant illnesses risk factor, and associated with lifestyle and occupational factors. In this study, overweight individuals had lower odds of physical demand. This result can be related to work activities that exclude people with obesity from activities that have high physical demand^{45,46}. People with obesity are sometimes seen as incapable and lazy. Such situations can also lead to health problems, including damage physical and psychological. Occupational features were associated to overweight in other studies. A study with nurses found an increased risk of overweight associated with high office workers, working full-time, and working more than 40 hours per week⁴⁶. On the other hand, a study with public servants showed that being overweight is associated with a reduction in work breaks⁴⁷.

Regarding work characteristics, this study showed that number of jobs and weekly demand are associated to physical and psychosocial demands. According to the literature, having more than one job is frequent among nurses, teachers, and physicians, which may be related to job instability, low wages, and poor working and employment conditions³³. Longer time (years) at the current job and 24 hour shifts were also positively associated with psychosocial demand. These variables may indicate a greater responsibility of the worker and pressure on management or coordination positions can result in stressful situations. Employment in health care, social work, and education also suggest associations with psychological distress³⁴. Therefore, reducing demand and improving the working environment can play a significant role in reducing job stress.

Working night shifts or in a mixed environment (open and closed) was also directly associated with psychosocial demand. On the other hand, work in an open environment was negatively associated with physical demand, this type of work can be related to changes in circadian rhythm, sleep dis-

turbances, stress, and unhealthy habits¹². Furthermore, a review and meta-analysis showed that night work or shift work has a higher psychosocial demand and is associated with depressive disorders or symptoms⁴⁸. Surprisingly, people who work in an open environment had a lower chance of physical demand, when compared to those who work exclusively indoors, which may be associated with the type of work, but this variable was not analyzed in our study.

These results strengthen the need to consider the demands of work when addressing health, for this, it is essential to obtain accurate information about working conditions. Despite the PNS advance in including the module M about worker health, it is still necessary to deepen this study, taking international surveys as example^{20,21,22,23}. These studies can provide significant data and inputs, besides highlighting what is happening inside the workplace⁴⁹.

The methodological limitations to define physical and psychosocial demands require caution when interpreting the results. The definition of these outcomes varies in literature and different characteristics are used to define the physical and psychosocial demands. However, we chose to use the most significant factors, the physical effort at work and activities that lead to stress, as markers of physical and psychosocial demands^{31,39,44}, which are available in PNS. Therefore, data comparison is limited. Furthermore, since outcomes and exposures were based on self-reports, there may be a reporting bias that leads to inflated associations, besides the reverse causation cannot be ruled out.

Limitations that may affect our results include the healthy worker effect. Healthy workers may be able to continue working long hours, whereas sick workers are more likely to work part time or to be away from work. Although the PNS has the advantage of avoiding the under-representation of those exposed, as the case with studies investigating samples of workers formally linked to their job, there are limits to capturing cumulative effects, especially when the source of the health problem is multifactorial. It is convenient to consider the survival bias in cross-sectional studies, since people intervene in their own situations, for example, changing jobs or moving away from stressful demands. Those who fell ill may be absent more frequently from work due to incapacity⁵⁰.

In spite of data collection has been conducted in 2013, the related associations made possible a reliable characterization of the health conditions of Brazilian workers. Notably, for the first time, there are national results on exposure to physical and psychosocial demands. The ones with association between the health situation and these demands will be useful to fill the gaps in knowledge about health and work relationships, even if the labor market is reconfigured. Furthermore, sectional studies allow for investigations of the temporal trend of the outcomes of interest, especially considering the reproduction of the PNS in 2019.

Another possible limitation of the study is that it does not include information about the main job (occupational activity). Physical and psychosocial demands, observed or self-reported, are generated in the context of production, depending on its organization and work management model, which defines the task, and whether or not it makes resources available to facilitate the implementation of strategies to regulate the workload job. These characteristics cross over as occupations and activities, being, therefore, less relevant to examine the distribution of prevalence according to the main work.

Despite these limitations, our study has significant strengths. Gaps of information are expected when the sample is limited to the workforce employed under a formal contract, excluding those segments that are difficult to address in surveys that focus exclusively on specific categories of employees in the industry, agriculture, and services groups. In fact, the new configurations of the workforce give rise to almost unavoidable research limits. Using data collected at home to analyze a sample of economically active workers the PNS can fill that gap.

Moreover, the health surveys have been conducted as valid resources for the base and evaluation of public policies⁵¹. Since the 1970s, several countries have initiated periodic surveys with questionnaires on working conditions and health in national or transnational workers' organizations in order to identify an exposure to occupational risk factors²³. The confirmation of the quality of the self-reported information encourages researchers to maintain this type of data collection strategy, depending on the custom and operability in populations, the advantages to identify the type of exposure and to define exposed and unexposed³⁹. Another advantage is the type of sample design of the PNS and the weightings used in the analyses, which guarantee representativeness of the data for Brazil, its large regions, federative units, metropolitan areas, state capitals, and other municipalities.

As seen, this dataset allowed an analysis of the physical and psychosocial demand scenario among Brazilian workers. The multivariate models suggest that there is a high level of physical and psychosocial demand in workers associated with the type of work and health, which reinforce the findings of previous studies. However, the recent changes in labor legislation, easing agreements between employers and employees, may lead to precarious work. There may be a tendency for increased employee turnover, number of jobs per worker, and increased weekly demand⁴⁸. Furthermore, it may have impacts on rest and benefits, which may enhance the already high demand of Brazilian workers, resulting in the increased exploitation of available working time and the physical and psychosocial exhaustion of the working population.

Note that, measures related to workers' health and current legislation emphasize actions to be taken after the illness process or the accident, and deal little with the causes of illness, that is, the process of work⁴⁹. The results of research such as this can subsidize and improve public policies, consolidating workers' health actions ranging from surveillance to assistance. Moreover, it is necessary to incorporate work activities as significant factors in investigating the causes of diseases. Interventions and policies designed to prevent all types of negative occupational exposures are necessary and urgent, and can contribute to improve physical and psychosocial health at work.

Contributors

P. P. Freitas contributed to the conceptualization, formal analysis, drafting of manuscript and review the final version of this manuscript, and approved its publication. M. S. Lopes contributed to the formal analysis, drafting of manuscript and review the final version of this manuscript, and approved its publication. A. A. Assunção contributed to the conceptualization and critical review the final version of this manuscript, and approved its publication. A. C. S. Lopes contributed to the conceptualization, data interpretation and review the final version of this manuscript, and approved its publication.

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Additional informations

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Resumo

O objetivo do estudo foi descrever a prevalência de demandas físicas e psicossociais e fatores associados entre trabalhadores brasileiros. Os dados foram obtidos da Pesquisa Nacional de Saúde de 2013. A demanda física foi definida como trabalhos que exigem esforço físico intenso ou caminhadas excessivas. A demanda psicossocial foi definida como envolvimento em atividades que levam ao nervosismo. A regressão logística multivariada foi utilizada para estimar a associação entre demandas e condições de saúde, características ocupacionais e condições de trabalho. Dos 39.590 participantes, 54,4% relataram demandas físicas e 35,5% demandas psicossociais no trabalho. Depois de ajustar para características sociodemográficas, as condições de saúde, características ocupacionais e condições de trabalho permaneceram associadas significativamente com a carga de trabalho física ou psicossocial. Os resultados sugerem que o trabalho no Brasil apresenta níveis elevados de demandas físicas e psicossociais. Essa demanda está associada a características ocupacionais e condições de saúde. É necessário incorporar as atividades laborais enquanto fatores importantes na investigação das causas de doenças. Além disso, são urgentes as intervenções e políticas de prevenção das exposições ocupacionais negativas, podendo contribuir para melhorar a saúde física e psicossocial no local de trabalho.

Saúde do Trabalhador; Condições de Trabalho; Local de Trabalho; Estresse Ocupacional

Resumen

El objetivo de este estudio fue describir la prevalencia y factores asociados a las exigencias físicas y psicosociales entre trabajadores brasileños. Los datos se obtuvieron de la Encuesta Nacional de Salud de 2013 en Brasil. La exigencia física fue definida como trabajos que requieren un esfuerzo físico intenso o caminar excesivamente. La exigencia psicosocial fue definida como la implicación en actividades que conducen al nerviosismo. Se utilizó una regresión logística multivariada para estimar la asociación entre exigencias y condiciones de salud, características ocupacionales y condiciones laborales. De los 39.590 participantes, un 54,4% informó de exigencias físicas y un 35,5% de psicosociales en el trabajo. Tras el ajuste por características sociodemográficas, las condiciones de salud, características y condiciones laborales continuaron significativamente asociadas a la carga de trabajo física o psicosocial. Los resultados sugieren que en Brasil el trabajo posee una alta exigencia física y psicosocial. Asimismo, esta exigencia está asociada con características laborales y condiciones de salud. Es necesario incorporar las actividades laborales como factores importantes para investigar las causas de enfermedades. Asimismo, son urgentes las intervenciones y políticas con el objetivo de prevenir exposiciones laborales negativas, y pueden contribuir a mejorar la salud física y psicosocial en el lugar de trabajo.

Salud Laboral; Condiciones de Trabajo; Lugar de Trabajo; Estrés Laboral

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