

Job strain and other work conditions: relationships with psychological distress among civil servants in Rio de Janeiro, Brazil

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Abstract

Background In developing countries, traditional sources of employment and work practices have changed rapidly and work environment has appeared as an important factor associated with an increased prevalence of mental disorders in these countries.

Aims To investigate the association between job strain and other work characteristics with psychological distress, and to estimate the contextual effects of different working environments on psychological distress, using cross-sectional data from an occupational cohort.

Methods The subjects were 3,574 non-faculty civil servants working at university campuses in Rio de Janeiro, Brazil (Pró-Saúde Study). Psychological distress was measured by the 12-item General Health Questionnaire.

Work characteristics were measured by the modified version of the Karasek model and through questions about night shift work and occupational status.

Results After adjusting for age, education, income and other work characteristics, low social support at work and high job strain were associated with psychological distress. For low social support, the association was stronger in men (Prevalence Ratio = 2.02; 95% Confidence Interval 1.6–2.6) than in women (PR = 1.46; 95% CI 1.2–1.4). High job strain was similarly significant in both women (PR = 1.43; 95% CI 1.2–1.7) and men (PR = 1.30; 95% CI 1.0–1.7). Men having a routine non-manual work presented 29% more psychological distress than those undertaking professional roles. Night shift work did not show significant association with psychological distress. In the multilevel analysis, the prevalence of psychological distress did not vary significantly across work units.

Conclusion Job strain and poor support at work seem important psychological stressors in the workplace in Brazil. Our findings are comparable to those found in more developed countries, providing additional evidence of an association between an adverse psychosocial work environment and psychological distress, being thus useful for policy-makers in planning and promoting healthier and happier working force necessary for economic development.

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Introduction

Brazil, the largest Latin American economy, has experienced major social, economic and demographic transformations over the last 40 years. Its population has increased

from 52 to 170 million with a rapid growth in urbanization and most people living in densely populated cities. Traditional sources of employment and forms of social support have also changed markedly. Today, the service sector is the main source of employment in Brazil, accounting for over a third of the economically active population. In large metropolitan areas, these percentages are even larger, ranging from 36 to 50% [18]. The consequences of these socio-demographic changes on health are still poorly understood. For instance, the services sector has expanded greatly and it has become the main source of employment in most large Brazilian cities today [18]. The rapid introduction of technological advances has also changed the nature of work, with a decrease in physical and an increase in psychological demands.

The health profile of the Brazilian population is also changing rapidly, with newer problems emerging. Mental disorders, especially depression and anxiety, figure as important challenges. Recent estimates of the global burden of disease in Brazil have shown that depression is the fourth most common cause of disability [11]. Psychiatric household surveys also show high prevalence rates of mental disorders [2, 5, 25]. In a representative sample of the adult population living in three Brazilian urban centers ($n = 6,470$) [2], age-adjusted prevalence of cases of mental disorders ranged from 19 to 34%. The most prevalent disorders were anxiety (18%) and depression (10%). More recently, in a population-based survey conducted with an urban sample ($n = 2,302$) in the Northeast of Brazil, the overall 12-month prevalence of depressive symptoms was 12% [3].

Psychiatric symptoms figure prominently among problems encountered in certain working environments [32]. Mental disorders in the workplace greatly reduce quality of life, worker productivity, and increase the utilization and costs of health care [22, 40]. Among those work characteristics most frequently associated with mental disorders are: work of a repetitive nature, stressful environments, working at fast pace, and excessive supervision and pressure from superiors [12, 42, 44, 45].

One of the most widely quoted work stress theories is the job strain model also known as the *demand-control model* [20, 21]. According to this model, high job demands, low job control and, in particular, a combination of both often referred as *job strain*, represent an evident health risk. Studies mostly in the developed world have shown that psychological distress is common among employees with high-strain jobs [12, 34, 44, 45, 48]. Other work characteristics, including shift work, occupational status and low social support at work are also associated with an increased prevalence of adverse health outcomes [34, 41]. A question that remains, however, is whether job strain operates at the individual

level, group level, or both. Thus, an additional focus of research has been the evaluation of the characteristics of workplaces for different individual health outcomes. Some studies using multilevel models have found that workplace and organizational-level characteristics are related to poor mental health [8, 10, 43, 47].

In Brazil, studies that evaluated the association between work stressors and mental disorders using the Karasek scale (demand-control model) have shown that the prevalence of psychological distress was much higher among professionals in high-strain (high demand, low control) rather than low-strain jobs [31, 36, 38]. However, most of these studies were based on very specific occupational subgroups such as teachers or health professionals, investigating a small number of risk factors and did not account for other work characteristics that may influence psychological distress such as the contextual effect of workplace units.

This study reports cross-sectional data on the first occupational cohort of a stable middle-aged sample of civil servants working in Rio de Janeiro, Brazil. To our knowledge this is the largest occupational cohort in Latin America, involving a large number of risk factors to account for mental health problems at work. The aims of this study were: (1) to investigate the association between job strain, social support at work, occupational status and night shift work with psychological distress; and (2) to evaluate, through a multilevel analysis, the contextual effects of different working environments on psychological distress, adjusting for individual-level data.

Methods

Design and study population

This is a cross-sectional analysis of a cohort study (Pró-Saúde Study) of all non-faculty civil servants ($n = 4,283$) working at a university in Rio de Janeiro, Brazil. Data from the second phase of data collection (2001) was used for this study. Response rate was 83.5% ($n = 3,574$). Workers on a non-medical leave of absence or temporarily transferred to other institutions at the time of data collection were excluded. Among those eligible who did not participate in this phase ($n = 709$), 156 individuals refused and the remaining 533 were unreachable after repeated attempts. Participants were grouped into 30 workplace units, with 30–250 people in each unit, each representing different types of work such as administrative, academic, services, or clerical support. Written informed consent was obtained from all participants. Ethical approval was obtained from the State University of Rio de Janeiro Ethics Committee.

Measures

Self-administered questionnaires were used which included sections on socio-demographic characteristics, occupational and medical history, self-reported health, psychosocial and lifestyle factors, social network and support, job strain, and psychological distress. Diverse methods to improve the quality of the information gathered were applied, including pilot studies, validation of scales and reliability testing.

Psychological distress

Psychological distress was evaluated using the Brazilian version of the General Health Questionnaire-12 items (GHQ-12) [14, 28]. Scores for individual items were coded as absent or present (0 or 1) and then added and those whose total scores were 3 or more (out of 12) were classified as cases [15]. In Brazil, the GHQ-12 was validated against a structured psychiatric interview and a similar cut-off point of 3 or more for cases of psychological distress was identified with a sensitivity of 85% and a specificity of 79% [28]. More recently, a study conducted among a community sample of Chinese living in Brazil, found that this cut-off point (3 or more) yield a sensitivity of 75% and specificity of 71% [49].

Job strain and other work characteristics

Job strain was assessed using the short version—17 questions—of the Karasek and Theorell Job Content Questionnaire [21, 46]. This instrument has three sub-scales, namely “job demands”, “job control”, and “support from colleagues and supervisors at work”. The section on demand includes four questions measuring time and speed for performing tasks, and one question assessing conflicts between different demands. The section on control includes four questions related to the use and development of abilities, and two related to decision latitude in relation to the work process. The section on social support at work includes six questions measuring feedback and support from colleagues and supervisors.

Our translation and adaptation of this scale to Portuguese showed good test-retest reliability, with intraclass correlation coefficients for the demand, control and social support at work dimensions of the scale estimated at 0.88, 0.87, and 0.85, respectively. Internal consistency (Cronbach’s alpha) estimates for these dimensions were 0.79, 0.67, and 0.85, respectively [4].

With respect to shift work, the subjects were asked to answer whether they were engaged in night shift work [41].

Occupational status was determined through five questions involving type of work, level of responsibility, and

other features of the occupation. This allowed us to classify individuals in three categories based on the Erikson–Goldthorpe–Portocarrero scheme: “routine non-manual work” (65%), which had a large proportion of registered nurses (23%) and administrative clerical and information technology (IT) staff (26%); “professional and managerial role” (26%) including professionals or other high-ranked employees (e.g., doctors and managers); and “manual work” (9%) encompassing janitors, cooks, security personnel, or other similar jobs [16]. Although occupational status can depict socio-economic status it is also an important feature of the work a person undertakes.

Covariates: demographic and socio-economic characteristics

The covariates were: age, sex, income and education. Per capita monthly income was calculated as total family income divided by the number of family members living on that income and categorized in Brazilian minimum wages. Education was measured using the Brazilian educational system and categorized in three levels: elementary (up to 6 years), secondary (up to 12 years), and superior (more than 12 years).

Data analysis

The primary outcome measure, psychological distress according to the GHQ-12, was treated as a dichotomous variable using a cutoff point of 3 or more. Our main exposure variables were job demands, job control, job strain, support at work, night shift-work, and occupational status.

As in the original measure of Karasek, the job demand and job control scales were dichotomized at their median values and allocated into four quadrants, so as to express the relationship between demand and control. This model classifies jobs as: (a) high strain (high job demands and low control); (b) low strain (low job demands and high control); (c) active (high job demands and high control); and (d) passive (low job demands and low control). According to this model, low job strain is the “ideal” scenario and is considered as the reference category in our analyses. As in previous studies [9, 45, 48], the two scales were also analyzed separately. Continuous scores of each scale were transformed into three exposure levels by using tertiles as cut-off points. Scores for the support at work scale were also grouped into tertiles for the analysis. These categorical variables entered in the analyses with low demands, high control and high support at work as reference categories.

Descriptive data on the sample and frequency distributions of the main outcome and exposure variables are presented. Psychological distress prevalence ratios for all

the main exposure variables were estimated using a generalized linear model (robust Poisson method) [35] before and after adjusting for other variables. Statistical interaction, or effect modification, was assessed quantitatively by formal statistical tests introducing product terms into the regression models. The likelihood ratio test (LRT) was used to examine whether the effect of job strain on psychological distress was modified by social support at work (ISO-STRAIN model), occupational status and by night shift-work. All the analyses were also stratified by gender, as most studies throughout the world have found that women report more psychological symptoms than men, but much less is known about factors contributing to the increase of risk among women in countries with different levels of development [25, 26, 39].

We also tested for the effect of the workplace environment on psychological distress before and after adjusting for individual level data using multilevel models [37]. Data were arranged in a two level hierarchical structure in which workers were nested within work units. We used multilevel poisson regression models to estimate the proportion of the total variance of psychological distress that was due to differences between work units and individual factors. In order to test for a group-level effect of job strain using multilevel methods, we split the variables control and demand using the group mean (group-level variable) and the within-group deviation variable (individual score minus group mean). In this random coefficients model, the association between job strain and psychological distress is allowed to vary across work units. The model parameters were estimated using STATA 10.0.

Results

Table 1 shows the characteristics of study participants according to gender. Age distribution was similar for men and women. Almost half of all men were in the lower income tertile, whilst women were equally distributed amongst all income tertiles. In line with this more women (60%) than men (50%) had higher levels of education. Regarding occupation, most of the sample had routine non-manual occupations, with more men in this sub-group but similar proportion of men and women as professionals. Women had a higher prevalence of psychological distress (38.5%) than men (26.9%) and more women (16.4%) than men (11.7%) fell in the high strain quadrant (high job demands and low control). Likewise more women than men reported high demands and low social support at work but low control at work was reported equally by men and women. More women (33.3%) than men (25.5%) were night shift workers, which may reflect the larger number of hospital workers in this group.

Table 1 Characteristics of the study population by gender

	Men (<i>n</i> = 1,574) <i>n</i> (%)	Women (<i>n</i> = 2,000) <i>n</i> (%)	<i>P</i> value
Age (years)			
≤34	344 (22.0)	346 (17.3)	0.003
35–44	695 (44.3)	900 (45.1)	
45–54	417 (26.6)	575 (28.8)	
≥55	112 (7.1)	175 (8.8)	
Education			
Elementary or less	259 (16.9)	202 (10.3)	<0.0001
High school	512 (33.3)	542 (27.6)	
College or more	766 (49.8)	1,219 (62.1)	
Marital status			
Married	970 (69.6)	946 (54.1)	<0.0001
Divorced/widow	151 (10.9)	418 (23.9)	
Never married	272 (19.5)	386 (22.0)	
Household per capita income (tertiles)			
Lower	679 (44.6)	611 (31.5)	<0.0001
Intermediate	420 (27.6)	641 (33.0)	
Upper	424 (27.8)	690 (35.5)	
Job strain quadrants			
Low Strain	544 (36.0)	655 (34.1)	<0.0001
Passive	437 (28.9)	482 (25.1)	
Active	354 (23.4)	470 (24.4)	
High Strain	177 (11.7)	316 (16.4)	
Job demands			
Low	522 (34.1)	597 (30.7)	0.001
Medium	473 (30.9)	543 (27.9)	
High	535 (35.0)	807 (41.4)	
Job control			
Low	620 (40.5)	795 (40.7)	0.97
Medium	443 (29.0)	558 (28.6)	
High	467 (30.5)	600 (30.7)	
Support at work			
Low	559 (36.2)	805 (41.1)	<0.0001
Medium	408 (26.4)	588 (30.0)	
High	578 (37.4)	566 (28.9)	
Occupational status			
Professionals	399 (25.6)	517 (25.9)	<0.0001
Routine non-manual	913 (58.7)	1,408 (70.7)	
Manual workers	244 (15.7)	67 (3.4)	
Night shift-work			
Yes	368 (25.5)	605 (33.3)	<0.0001
No	1,074 (74.5)	1,212 (66.7)	
Psychological distress			
Yes	402 (26.9)	729 (38.5)	<0.0001
No	1,093 (73.1)	1,164 (61.5)	

Table 2 shows the prevalence of psychological distress according to socioeconomic and demographic characteristics of the sample. Lower income ($P < 0.0001$) and lesser

Table 2 Prevalence rates of psychological distress (GHQ-12) according to sample characteristics ($n = 3,574$), by gender

Variable	Men		Women	
	GHQ-12 <i>n</i> (%)	<i>P</i> value	GHQ-12 <i>n</i> (%)	<i>P</i> value
Age (years)				
≤34	85 (25.2)	0.71	128 (37.8)	0.38
35–44	190 (28.4)		350 (40.3)	
45–54	100 (26.1)		195 (37.1)	
≥55	25 (26.0)		53 (34.0)	
Education				
Elementary or less	61 (26.9)	0.85	79 (46.8)	0.02
High school	129 (26.4)		202 (40.2)	
College or more	206 (27.6)		430 (36.2)	
Marital status				
Married	262 (28.4)	0.24	340 (37.8)	0.51
Divorced/widow	37 (25.2)		162 (41.2)	
Never married	60 (23.4)		144 (38.6)	
Household per capita income (tertiles)				
Lower	188 (29.7)	0.07	266 (46.9)	<0.001
Intermediate	111 (26.8)		241 (39.1)	
Upper	95 (23.2)		202 (30.6)	

Pró-Saúde Study, Rio de Janeiro, Brazil (Phase 2, 2001)

education among women only ($P = 0.02$) were the only variables clearly associated with psychological distress.

Table 3 presents prevalence of psychological distress according to working characteristics and prevalence ratios of this association. After adjusting for age, education, and per capita monthly income, men and women classified in the high strain quadrant of the job strain model and those reporting high demands and low control separately were more likely to experience psychological distress. Low support at work showed the clearest association with psychological distress in both sexes, but especially among men. Having a routine-non-manual or manual work was associated with psychological distress in men but not in women. Subsequently we adjusted each work characteristic for all the other work features simultaneously in order to test whether these effects were mutually confounded (Model 2). As it can be seen, this resulted in a reduction of the strength of the association between all job strain variables and the prevalence of psychological distress. For those in the high strain quadrant, the association remained significant (PR = 1.30; 95% CI 1.0–1.7 for men and PR = 1.43; 95% CI 1.2–1.7 for women) after these adjustments. However the association between job demands and control sub-scales with psychological distress was attenuated in women and disappeared in men. Low support at work remained clearly associated with psychological distress for

both men and women. Men having a routine non-manual work were 29% more likely to present psychological distress than those undertaking professional roles in the fully adjusted models; for women occupational status was not associated with psychological distress. Night shift-work did not show significant associations with psychological distress, neither for men nor women. Finally, the results obtained through the multilevel model (Model 3) were similar to those found in Model 2, which does not take into consideration the hierarchical structure of the data. However, under the multilevel approach, some associations between work characteristics and psychological distress were attenuated: among men in the high strain quadrant, the prevalence ratio decreased and became only marginally significant; among women in the low tertile of job control, the association turned to be not significant. The random coefficients model did not indicate that the prevalence of psychological distress or the association between job strain and psychological distress significantly varied across work units. For all multilevel models, second-level variance and the intraclass correlation coefficient approached to zero.

No statistically significant interaction was found between social support at work and job strain for either men (LRT = 3.39; $P = 0.85$) or women (LRT = 4.09; $P = 0.78$). Similarly, we found no evidence of significant moderating effect of occupational status and night shifts on the association between job strain and psychological distress neither among men (LRT = 7.13; $P = 0.31$ for occupational status, and LRT = 4.73; $P = 0.19$ for night shifts) or women (LRT = 1.66; $P = 0.95$ for occupational status, and LRT = 0.36; $P = 0.95$ for night shifts).

Discussion

This is one of a few studies assessing work characteristics and psychological distress in a large sample of workers from a middle-income country. We found that almost a third of the employees reported psychological distress, and high strain jobs and lack of support at work were closely associated with this distress. These associations were independent of sex, age, education, per capita monthly income and other work characteristics. These are important findings bearing in mind the economic consequences psychological distress in the workplace may have in terms of reduced work productivity in these so-called emerging economies.

According to the job strain model of Karasek and Theorell [21], the combination of high job demands and low job control should have a stronger negative effect on health outcomes than the components acting separately. Our findings lend support to this theory. We found a clear association between job strain and psychological distress

Table 3 Prevalence of psychological distress (GHQ-12) according to job strain and other work conditions

Exposure level	Men				Women					
	<i>n</i> (%)	Unadjusted PR (95% CI)	Model 1 ^b Adjusted PR (95% CI)	Model 2 ^c Adjusted PR (95% CI)	Model 3 ^d Adjusted PR (95% CI)	<i>n</i> (%)	Unadjusted PR (95% CI)	Model 1 ^b Adjusted PR (95% CI)	Model 2 ^c Adjusted PR (95% CI)	Model 3 ^d Adjusted PR (95% CI)
Occupational status										
Professionals	87 (22.5)	1.00	1.00	1.00	1.00	169 (34.0)	1.00	1.00	1.00	1.00
Routine non-manual	254 (29.2)	1.30 (1.0–1.6)	1.24 (1.0–1.6)	1.29 (1.0–1.6)	1.30 (1.0–1.7)	532 (40.0)	1.18 (1.0–1.4)	1.00 (0.9–1.2)	0.97 (0.8–1.2)	0.96 (0.8–1.2)
Manual workers	60 (26.7)	1.19 (0.9–1.6)	1.20 (0.9–1.7)	1.18 (0.8–1.7)	1.16 (0.8–1.7)	25 (41.2)	1.23 (0.9–1.7)	0.92 (0.6–1.3)	0.95 (0.7–1.4)	0.94 (0.6–1.6)
Night shift-work										
No	270 (26.1)	1.00	1.00	1.00	1.00	419 (36.1)	1.00	1.00	1.00	1.00
Yes	101 (29.0)	1.11 (0.9–1.3)	1.13 (0.9–1.4)	1.06 (0.9–1.3)	1.05 (0.8–1.3)	239 (41.1)	1.13 (1.0–1.3)	1.07 (0.9–1.2)	1.05 (0.9–1.2)	1.05 (0.9–1.2)
Job strain quadrants ^a										
Low Strain	129 (24.3)	1.00	1.00	1.00	1.00	206 (33.1)	1.00	1.00	1.00	1.00
Passive	99 (23.8)	0.98 (0.8–1.2)	0.96 (0.8–1.2)	0.84 (0.7–1.1)	0.82 (0.6–1.1)	173 (37.9)	1.14 (1.0–1.3)	1.11 (0.9–1.3)	1.10 (0.9–1.3)	1.10 (0.9–1.4)
Active	94 (28.0)	1.15 (0.9–1.4)	1.14 (0.9–1.4)	1.00 (0.8–1.3)	1.00 (0.8–1.3)	166 (35.9)	1.08 (0.9–1.3)	1.11 (0.9–1.3)	1.09 (0.9–1.3)	1.09 (0.9–1.4)
High Strain	67 (40.1)	1.65 (1.3–2.1)	1.59 (1.2–2.0)	1.30 (1.0–1.7)	1.26 (0.9–1.8)	159 (53.5)	1.62 (1.4–1.9)	1.52 (1.3–1.8)	1.43 (1.2–1.7)	1.44 (1.1–1.8)
Job demands										
Low	125 (24.8)	1.00	1.00	1.00	1.00	195 (33.9)	1.00	1.00	1.00	1.00
Medium	104 (22.8)	0.92 (0.7–1.2)	0.93 (0.7–1.2)	0.83 (0.6–1.0)	0.83 (0.6–1.1)	185 (36.0)	1.06 (0.9–1.3)	1.06 (0.9–1.2)	1.00 (0.8–1.2)	1.00 (0.8–1.3)
High	162 (32.1)	1.29 (1.1–1.6)	1.29 (1.1–1.6)	1.10 (0.9–1.4)	1.11 (0.9–1.4)	330 (43.1)	1.27 (1.1–1.5)	1.27 (1.1–1.5)	1.19 (1.0–1.4)	1.19 (1.0–1.4)
Job control										
High	105 (23.2)	1.00	1.00	1.00	1.00	190 (33.1)	1.00	1.00	1.00	1.00
Medium	122 (28.8)	1.24 (1.0–1.6)	1.26 (1.0–1.6)	1.23 (1.0–1.6)	1.14 (0.9–1.5)	188 (35.7)	1.08 (0.9–1.3)	1.01 (0.9–1.2)	0.92 (0.8–1.1)	0.80 (0.7–1.0)
Low	166 (28.2)	1.22 (1.0–1.5)	1.20 (1.0–1.5)	1.11 (0.9–1.4)	0.93 (0.7–1.2)	338 (44.4)	1.34 (1.2–1.5)	1.23 (1.1–1.4)	1.15 (1.0–1.3)	0.86 (0.7–1.1)
Support at work										
High	93 (17.2)	1.00	1.00	1.00	1.00	152 (28.8)	1.00	1.00	1.00	1.00
Medium	101 (25.8)	1.50 (1.2–1.9)	1.57 (1.2–2.0)	1.53 (1.2–2.0)	1.53 (1.1–2.1)	200 (35.7)	1.24 (1.0–1.5)	1.26 (1.1–1.5)	1.14 (0.9–1.4)	1.14 (0.9–1.4)
Low	194 (36.1)	2.11 (1.7–2.6)	2.14 (1.7–2.7)	2.02 (1.6–2.6)	2.03 (1.5–2.7)	359 (46.4)	1.61 (1.4–1.9)	1.64 (1.4–1.9)	1.46 (1.2–1.7)	1.46 (1.2–1.8)

Unadjusted and adjusted prevalence ratios (PR) and respective 95% confidence intervals (95% CI) for the associations between job strain, work conditions and psychological distress. Pr3-Saude Study, Rio de Janeiro, Brazil (Phase 2, 2001)

^a Low strain (low job demands and high control); passive (low job demands and low control); active (high job demands and high control); and high strain (high job demands and low control)

^b Model 1. Adjusted by age, education, and per capita monthly income

^c Model 2. Adjusted by age, education, per capita monthly income, and other work characteristics. For job strain, the main components (control and demand) were not included in the model

^d Model 3. Multilevel poisson regression models, adjusted by age, education, per capita monthly income, and other work characteristics. For job strain, the main components (control and demand) were not included in the model

for both men and women in keeping with other studies in Western countries [1, 12, 34, 41, 44, 48]. Our results confirm previous results from workplace studies among professionals in Brazil. Two studies conducted among school teachers found that psychological distress was 50–74% more prevalent among those classified in the high strain rather than the low strain quadrant [36, 38]. Doctors with high strain jobs were also almost three times more likely to experience psychological distress than those working in low strain jobs. However, these studies only included specific professional occupations and did not account for other work characteristics that may influence psychological distress. Our study confirms these findings in a much larger and diverse sample including manual workers as well.

Low social support at work was more commonly reported by women than men but equally in both sexes associated with psychological distress. This is one of the most consistent findings reported in the literature of work characteristics and health outcomes [12, 24, 34, 41, 44]. Our findings suggest that this effect may even be stronger in men than women, in line with other previous studies. Sekine et al. [41] showed that, after adjustment, low support at work was associated with poor mental functioning but mainly in men. Similarly, Stansfeld et al. [45] found that lack of support from colleagues and supervisors was a more powerful predictor of psychological distress in men than women. Melchior et al. [29] in a longitudinal study of the Dunedin cohort in New Zealand reported associations between psychiatric disorders (generalized anxiety disorders and major depression) and poor social support at work, but only among men. Although our replication of these previous findings is not novel it is nevertheless of importance given the relative absence of evidence in this field from non-western countries. These findings may inform policy makers involved in the elaboration of working policies and in the management of human resources in Brazil and possibly in other emerging economies.

We did not find associations between occupational status and psychological distress among women. For men, however, those having routine non-manual jobs presented a higher prevalence of psychological distress than professional workers. This finding is also in keeping with other studies showing that the role of occupational status in health outcomes is more prominent in men than in women [27, 41]. Parslow et al. [33] found no effect of employee level on their measures of mental or physical health among women, but men at more junior levels reported better mental health, more positive affect and used fewer GP services.

The finding of no association between night shift-work and psychological distress in both sexes is unexpected, as other studies had shown that night shift-work is associated

with poorer mental functioning in both men and women [34, 41]. In this study, unadjusted prevalence ratios showed an increase of psychological disorders associated with night shifts but in women only. However, in the fully adjusted model this association disappeared. A possible explanation for this finding is that the effect of night shifts on psychological distress is confounded by more subjective measures such as job strain or support at work, which in the fully adjusted models ultimately eliminate the association with night shifts.

We found a high prevalence of psychological distress in both women (38.5%) and men (26.9%) workers similar to studies conducted among more specific occupational groups. Brazilian studies conducted among different working populations using brief self-administered questionnaires, such as SRQ-20 or GHQ, to measure psychological distress have shown prevalences ranging from 20 to 44% [6, 31, 36]. Ferrie et al. [12], using data from a sample of British civil servants (the Whitehall Study), found a prevalence of GHQ-30 caseness of 34% for women and 27% for men, very similar to our estimates. Other studies using standardized case-identification methods have found similarly high prevalence rates of mental disorders in occupational settings [19]. Although not all such cases will necessarily require medical attention, associations of psychological distress (i.e., in our case, those positive to GHQ) have been observed with absenteeism, work productivity, and work-related injuries, among other important and relevant consequences [23, 48, 50].

As for the variability in psychological distress across job sectors, our multilevel analysis showed that less than 1% of this variability lies in work units but most of it is found at an individual level. However it is possible that our crude way of conceptualizing work units may have failed to capture some of the true differences that might exist across job types. For instance the same work unit included professionals and non-professionals working together, such as for instance managers and cleaners, therefore the increased risk shown by non-professional workers might have been compensated by the lower risk attributed to better paid professionals working in the same unit. Likewise a truly contextual assessment of the quality and characteristics of the work environment in each one of these units may help to clarify better the associations between psychological distress and work. Study designs, in which geographical areas are assessed through observations rather than aggregating data of individuals, have been used for this purpose and similar methodologies could be applied here [7].

Strengths and limitations of the study

One of the main strengths of the investigation is that we have studied a relatively large sample consisting of civil

servants working across a wide range of work units. This allowed us to conduct multilevel analyses in order to evaluate the contextual effect of these different work environments on psychological distress. As far as we know, this is the first study of this nature carried out in Latin America.

Some limitations of the study must be considered. First, this is an occupational sample and as such it is not necessarily representative of the general population. There may be selection factors, whereby individuals who are employed may be healthier and have an increased sense of personal mastery, both of which are associated with better mental well-being [13]. Moreover, University employees may represent a biased sample of employees. It is possible that employees in other economic sectors, such as manufacturing industry, may be under more pressure than civil servants in the thriving Brazilian economy. However a similar criticism could be raised for other large cohorts of civil servants in Western countries such as the Whitehall-II and the GAZEL studies [34, 45]. Second, this study is based on cross-sectional data, restricting the inference concerning a causal direction of the association of work characteristics with psychological distress. We cannot exclude reverse causation where respondents with psychological distress perceive their psychosocial work environment as more stressful. At best, we can conclude that findings of the study are in line with those obtained from prospective longitudinal studies [34, 45, 48]. Future analysis of the prospective cohort currently underway may shed further light into the direction of causality. Third, both exposure and outcome are subjective and estimated using self-evaluations. Subjects with psychological distress may report work conditions in a more negative manner than non-distressed subjects. However if this form of bias had been introduced one would expect that it would apply similarly across all measures of work stress, an effect that was not found for the subscales of work stress. We had no objective measurement of the work environment and we could not establish whether objective conditions had caused the perception of high stress at work. However, other studies have shown that self-reported job stress is a stronger predictor of health outcomes than objective indexes of job stress [17, 45]. It is possible that external job assessments do not fully capture the extent to which stress is involved.

Finally, we used the GHQ, a screening instrument, rather than a standardized clinical interview that would generate a formal psychiatric diagnosis. Associations between working characteristics and social factors with psychological distress are generally larger in studies using standardized clinical interviews [9, 30, 34]. Since the GHQ is fairly sensitive to recent changes in psychological functioning, false positives might have included individuals with mild or transient

psychological disturbance, which could have biased associations toward the null. However, a psychiatric interview would not be feasible in a large study such as this, and similar measures have been used in other large Western cohorts [34, 45, 48].

Conclusion

This study provides additional evidence of an association between an adverse psychosocial working environment and psychological distress among Brazilian civil servants. High job strain and low social support, especially among men, are the main work characteristics associated with psychological distress. There was little variation across different occupations and night shifts showed no association with psychological distress. Although these results are similar to those found in developed countries, they are nevertheless useful information for those policy makers whose responsibility involves promoting a healthier and happier working force vital for future economic development. Future research should establish more clearly the specific features of working environments that increase psychological stress using large cohort of workers from diverse working sectors and countries at different stages of socio-economic development.

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