

Chronic fatigue among bank workers in Brazil

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The present study examines the prevalence of chronic fatigue (CF) among bank workers in Brazil and possible associations with gender and working conditions. The study sample included all 735 workers from the department of data processing of a state bank. CF was assessed using the Chalder Fatigue Scale. Working conditions and socio-demographic, socio-economic and psychosocial factors at work were analysed. Psychiatric symptoms were measured with the SRQ-20. The overall estimate of the prevalence of CF was 8.7% [95% confidence intervals (95% CI) = 6.4–10.9%]; 7.8% (95% CI = 5.5–10.7%) among men and 11.0% (95% CI = 6.7–16.9%) among women. The male–female difference was not statistically significant, even after adjusting for minor psychiatric disorders. The overall prevalence of CF without minor psychiatric disorders was 4.5% (95% CI = 2.7–6.3%); 3.9% (95% CI = 1.9–5.9%) among men and 6.4% (95% CI = 2.0–10.1%) among women. In the final model, risk factors for CF were fast work speed [odds ratio (OR) = 3.5], dissatisfaction at work (OR = 3.1), minor psychiatric disorders (OR = 6.8), and medium (OR = 1.8) and heavy domestic workload (OR = 12.0). CF is common among these bank workers and is associated with psychosocial factors at work. Particularly among women, domestic workload, marital status and the presence of young children were associated with CF in the stratified analysis. Domestic workload may add physical and mental stress, putting employees at risk for CF from overload, or CF may cause workers to perceive domestic work as heavy.

Key words: Bank workers; chronic fatigue; domestic work; double work-day; epidemiology; gender; occupational health.

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Introduction

Fatigue has been studied in several different disciplines: physiology, psychology and medicine. Chronic fatigue (CF) has been defined as severe fatigue with a reduction in the patient's functional capacity, unrelieved by rest, with a duration of ≥ 6 months [1].

CF is common in primary care patients, in some occupations and in the population in general. Its prevalence ranges from 3 to 32%, depending on the definition and the measure used [2–14]. Fatigue is therefore an important public health problem associated with func-

tional impairment, impaired mental health [10] and inability to carry out normal activities [15]. Some studies have shown an association between CF and socio-demographic factors (age, gender, presence of children, socio-economic status), physical disease, or psychological distress or symptoms [6,8,11,14,16–19].

CF differs from industrial fatigue. According to Wisner [20], industrial fatigue occurs frequently among workers, reflecting both work demands and the effects of physical and chemical exposures. Some degree of fatigue has long been recognized as an inevitable consequence of work, especially work that demands heavy muscular effort [20]. The present study examines CF among Brazilian bank workers, profiting from data gathered primarily to evaluate the prevalence of, and risk factors for, repetitive strain injury (RSI). Since the study was not originally

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intended to measure CF syndrome, the medical examination did not cover fatigue, but some useful information about CF was gained from analysis of questionnaire responses. The aim of the present study is to examine the prevalence of CF among bank workers and possible associations with gender and working conditions.

Methodology

Study population

The study sample comprised all 735 workers from the department of data processing of a state bank in São Paulo City. The department carries out all bank operations, printing and distribution of cheque books and of magnetic client cards, and financial transactions (paying cheques and bills). The cheque section prints ~55 000 cheques per day. The compensation section processes ~500 000 cheques per day, and ~65 000 bill payments and inter-bank transfers. The time legally allowed for cheque compensation in Brazil is 24 h for a cheque with a value of US\$117.40 or more, or 48 h for smaller cheques, so there is considerable time pressure. Between 1986 and 1993, 230 000 jobs were cut in Brazilian banks, so that the number of unemployed bank workers increased in the following years, leading to competition and fear of job loss among the remaining workers [21].

The measure of CF

CF was assessed by a questionnaire, the Chalder Fatigue Scale, developed originally for a hospital study of CF syndrome [22]. The scale measures both physical and mental fatigue [22,23]. It has been used in several studies of CF, both in health care settings and with population-based samples [6,10]. The scale's sensitivity is 75.5% and specificity 74.5% in the original population [22].

As suggested by the authors of the questionnaire, we used 11 items and a bimodal scoring system to create the dependent variable for the data analysis [22]. The overall fatigue score can range from 0 to 11. CF was defined in the present study as a score of four or more, reported by the worker in a separate question to have lasted for ≥ 6 months [6,10,22]. The definition of CF as a self-reported fatigue lasting ≥ 6 months follows the suggestion of the International CF Syndrome Study Group [24]. The scale was administered by either an occupational therapist or a physiotherapist who interviewed workers once, during their shift, in a room reserved for this purpose.

Potential risk factors

The socio-demographic and socio-economic factors were: age (three categories); gender; salary (five cat-

egories); educational level (three categories); marital status (married/not); living with children 12 years old or under (yes/no); and domestic workload (three categories). Domestic workload was measured using a question about the domestic work carried out in the previous week ('regarding physical strain, how would you classify your domestic workload: don't do any domestic work/light/moderate/heavy'). The question was preceded by a definition of domestic work that included washing clothes, house cleaning, ironing clothes, cooking and child care.

Psychiatric symptoms were measured with the SRQ-20 (Self-report Questionnaire) [25], which was validated in Brazil by Mari and Williams [26]. In this study, men who had six or more positive answers and women with eight or more positive answers were considered positive for minor psychiatric disorders. This method showed 89% sensitivity and 81% specificity for men, and 86% sensitivity and 77% specificity for women. Increasing the level to eight for men resulted in a decreased predictive positive value for men (66%) compared with women (83%) for minor psychiatric disorders. We therefore adopted sex-specific cut-off points. Using non-sex-specific cut-off points did not change the results of the analysis presented here.

The work factors analysed were: shift (day, night, evening); length of shift (6 or 8 h per day); seniority at the bank; hierarchical position; satisfaction at work (satisfied/not); and psychosocial factors at work (fast work speed, repetitive work, monotonous work, work speed control). The workstation ergonomics variable was the sum of 10 variables describing chair comfort, comfortable position of the legs, shoulders and arms during work, and comfort with working height, in terciles: good/medium/poor workstation ergonomics.

The psychosocial factors at work were divided into three categories (never/rare, sometimes, frequently). The original items were based on the Stress Research Reports carried out by Johnson *et al.* [27] as translated by Fischer *et al.* [28].

Data analysis

The crude prevalence of CF was estimated and its 95% confidence interval (95% CI) calculated. We also calculated the prevalence of CF without minor psychiatric disorders. The associations between CF and socio-demographic variables, psychiatric symptoms, psychosocial, ergonomic and other work factors were examined. The χ^2 test was first used to compare the prevalence of CF among two or more categories of exposure variables. A χ^2 test for linear trend was used when exposure variables had ordered categories. For the analysis of differences between means, parametric or non-parametric tests were used, depending on the distribution and variance of the dependent variable.

Stratified analysis was performed to analyse the relationship between CF, gender and domestic workload, using the Mantel–Haenzel estimate of the odds ratio (OR).

Variables from the literature (sex, presence of children, marital status and educational level) and variables associated at $P \leq 0.15$ with CF during univariate analysis were included in a logistic regression using a forward strategy [29]. The adequacy of the regression model was assessed by goodness of fit [29,30]. The analysis was performed with Stata v. 6.0 software [31].

Results

Characteristics of the population studied

All 735 workers in the bank offices were eligible to participate in the study. Of these, 92 (12.5%) did not participate: 28 refused; eight were excluded because they

were telephone operators and their work differed substantially from that of the others; and 56 were out of work during the period of data collection (on sick leave, maternity leave, study leave or retired). Of the 643 workers interviewed, 612 (95.2%) answered all the questions about fatigue and were included in the present study.

The mean age was 38 ± 5.9 years (mean \pm SD). Mean bank seniority was 16 ± 5 years. Table 1 shows socio-demographic characteristics by gender. Seniority of men and women differed ($F = 5.2$, $P = 0.023$), with means of 16.4 ± 4.9 years for men and 15.4 ± 4.9 years for women. Women earned lower salaries than men (US\$1296 versus US\$1708; Kruskal–Wallis = 39.3; $P < 0.001$), even after controlling for the length of the work day, hierarchical position and shift ($\chi^2 = 51.6$, $P < 0.001$).

Prevalence of CF and factors associated

The overall estimate of the CF prevalence was 8.7%

Table 1. Socio-demographic characteristics of Brazilian bank workers according to gender

Variables	Total, n = 643 (%)	Men, n = 470 (%)	Women, n = 173 (%)	P^a
Age group				
<30 years	39 (6.1)	28 (6.0)	11 (6.4)	
30–39 years	310 (48.6)	218 (46.8)	92 (53.5)	
≥ 40 years	289 (45.3)	220 (47.2)	69 (40.1)	0.274
Five missing values				
School				
College	273 (43.0)	196 (42.0)	77 (45.4)	
High school	253 (39.6)	190 (41.0)	63 (37.0)	
<High school	111 (17.4)	81 (17.0)	30 (17.6)	0.691
Six missing values				
Marital status				
Not married	165 (25.8)	97 (20.8)	68 (39.5)	
Married	474 (74.2)	370 (79.2)	104 (60.1)	<0.001
Four missing values				
Seniority				
<10 years	78 (12.2)	53 (11.4)	25 (14.6)	
10–15 years	184 (28.8)	126 (27.1)	58 (33.5)	
>15 years	376 (58.9)	286 (58.8)	90 (52.0)	0.096
Four missing values				
Salary per month				
>US\$2032	142 (23.0)	123 (27.1)	19 (11.6)	
US\$1634–2032	108 (17.5)	90 (19.8)	18 (11.0)	
US\$1260–1633	114 (18.4)	89 (19.6)	25 (15.2)	
US\$850–1259	159 (25.7)	99 (21.8)	60 (36.6)	
<US\$850	95 (15.4)	53 (11.7)	42 (25.6)	<0.001
Twenty-five missing values				
Domestic workload				
Do not do/light	387 (60.6)	319 (68.8)	67 (38.7)	
Medium	234 (36.6)	140 (30.2)	93 (53.8)	
Heavy	18 (2.8)	5 (1.1)	13 (7.5)	<0.001
Six missing values				
Has child <13 years old				
No	276 (42.9)	186 (39.6)	90 (52.0)	
Yes	367 (57.1)	284 (60.4)	83 (48.0)	0.005

^a χ^2 test comparing men and women.

(95% CI = 6.4–10.9%): 7.8% (95% CI = 5.5–10.7%) among men and 11.0% (95% CI = 6.7–16.9%) among women. The male–female difference was not statistically significant ($\chi^2 = 1.6$, $P = 0.21$), even after adjusting for minor psychiatric disorders (OR = 1.2, 95% CI = 0.6–2.3). The mean of the CF scale (Likert scoring) was 11.7 (11.3–12.1), with a significant difference between men (11.4, 95% CI = 11.0–11.9) and women (12.6, 95% CI = 11.8–13.4) ($t = 2.45$, $P = 0.015$). The prevalence of CF without minor psychiatric disorders was 4.5% (95% CI = 2.7–6.3%): 3.9% among men (95% CI = 1.9–5.9) and 6.4% among women (95% CI = 2.0–10.1%). The sex difference was not significant ($\chi^2 = 1.4$, $P = 0.242$).

In univariate analysis, age, marital status, having children under 13 and salary level were not associated with CF. The risk for CF increased with low level of education (OR = 1.5, CI = 1.0–2.2). Heavy (OR = 6.3, 95% CI = 2.0–19.3) and medium domestic workload (OR = 1.9, 95% CI = 1.1–3.5) were risks for CF, as well as case status for minor psychiatric disorders (OR = 7.6, 95% CI = 4.1–13.8).

Poor workstation ergonomics were associated with a risk of CF in univariate analysis. Time and length of shift and hierarchical position did not show significant associations. Psychosocial factors at work associated with CF were: frequent or 'sometimes' fast work speed; frequent monotony at work; little control over work speed; and dissatisfaction with work (Table 2). There was a highly significant association between work speed and control over work speed, with workers who reported rare or no control of speed also reporting a frequent fast work speed.

Logistic regression model

Variables retained in the final model were: fast work speed; dissatisfaction with work; minor psychiatric disorders; and domestic workload. The logistic model showed a good adjustment ($P = 0.43$; Table 3). Table 4 shows a model in which other variables emerged after removal of dissatisfaction with work (see Discussion).

Stratified analysis

The association between domestic workload and CF did not change after adjustment by sex. The OR for CF, adjusted by sex, was 2.0 ($P = 0.028$, 95% CI = 1.1–3.6) for medium domestic workload and 5.8 ($P = 0.005$, 95% CI = 1.4–23.6) for heavy workload.

None of the 13 men reporting a heavy domestic workload had CF. The risk of CF was significantly associated with a medium-level domestic workload for men and with a heavy domestic workload for women (Table 5). The CF risk was associated with being married for women, but not men (Table 5).

Table 2. Prevalence and OR for CF according to work factors

Variables	Total, n = 612 (100%)	CF, n = 53 (8.7%)	OR (95% CI) ^a
Position in hierarchy			
Chief/manager	34 (5.4)	4 (12.2)	1.0
Systems analyst	117 (18.6)	7 (6.3)	0.5 (0.1–1.8)
Technician	122 (19.4)	6 (5.1)	0.4 (0.1–1.5)
Administrative/ secretarial	356 (56.6)	34 (10.1)	0.8 (0.3–2.5)
Shift work			
Day	368 (61.0)	34 (9.2)	1.0
Evening	154 (25.5)	11 (7.1)	0.8 (0.4–0.5)
Night	81 (13.4)	7 (8.6)	0.9 (0.4–2.2)
Length of shift			
6 h per day	275 (45.4)	25 (9.1)	1.0
8 h per day	331 (54.6)	26 (7.9)	0.9 (0.5–1.5)
Workstation ergonomics			
Good	337 (56.5)	19 (5.9)**	1.0
Medium	125 (20.1)	9 (7.4)	1.3 (0.6–2.9)
Poor	134 (22.5)	21 (16.4)	3.1 (1.6–6.0)
Fast work speed			
Rare/none	183 (28.7)	7 (4.0)*	1.0
Sometimes	358 (56.2)	32 (9.4)	2.5 (1.1–5.7)
Frequently	96 (15.1)	13 (14.0)	3.9 (1.5–10.1)
Monotony at work			
Rare/none	228 (35.9)	15 (6.9)*	1.0
Sometimes	262 (41.3)	17 (6.8)	1.0 (0.5–33.1)
Frequently	145 (22.8)	19 (13.9)	2.2 (1.1–4.4)
Repetitive work			
Rare/none	52 (8.2)	1 (2.0)	1.0
Sometimes	142 (22.3)	11 (8.0)	4.2 (0.5–33.1)
Frequently	443 (69.5)	40 (9.5)	5.1 (0.7–37.6)
Control over work speed			
Rare/none	75 (11.8)	9 (12.3)**	1.0
Sometimes	172 (27.0)	25 (15.9)	1.3 (0.6–3.1)
Frequently	389 (61.2)	18 (4.8)	0.4 (0.2–0.8)
Satisfaction at work			
Satisfied	202 (33.3)	7 (3.5)**	1.0
Dissatisfied	404 (66.7)	45 (11.1)	3.5 (1.5–7.9)

^aOR, crude odds ratio.

* $P < 0.05$; ** $P < 0.01$.

Discussion

According to the data from the present study, CF is a common problem among bank workers in Brazil. Perceived fast work speed, monotony, repetition, dissatisfaction with work and domestic workload were associated with high prevalence. The causal direction of these associations cannot be ascertained, however.

All the workers were currently employed at the time of the interview and the observed prevalence of CF was within the range observed in population-based studies, such as those of Pawlikowska *et al.* [6] and Wessely [1]. If domestic work of a type most often carried out by women is causally implicated in CF (see below), it would be important to report prevalence by gender, but this is not always done, making comparisons difficult.

Table 3. Risk for chronic fatigue according to minor psychiatric disorders, domestic work and psychosocial factors at work

Risk factors	Crude OR (95% CI)	Adjusted ^a OR (95% CI)	P ^b
Minor psychiatric disorders			
No	1.0	1.0	–
Yes	7.6 (4.1–13.8)	6.8 (3.5–13.3)	<0.001
Domestic workload			
Do not do/light	1.0	1.0	–
Medium	1.9 (1.1–3.5)	1.8 (0.9–3.7)	0.082
Heavy	6.3 (2.0–19.3)	12.0 (2.7–53.3)	0.001
Fast work speed			
Rare/none	1.0	1.0	–
Sometimes	2.5 (1.1–5.7)	2.7 (0.9–7.5)	0.064
Frequently	3.9 (1.5–10.1)	3.5 (1.1–11.3)	0.037
Satisfaction at work			
Satisfied	1.0	1.0	–
Not satisfied	3.5 (1.5–7.9)	3.1 (1.2–8.4)	0.024

Goodness of fit: number of observations = 530; $\chi^2 = 23.5$; $P = 0.431$.

^aOdds ratio adjusted by all variables present in the table by logistic regression.

^bWald test.

The prevalence of CF was 13.6% using a Likert scale in the study by Pawlikowska *et al.* [6], compared with 11.7% in the present study. The Wessely study [1] reported a point prevalence of 11.3%, compared with 8.7% in the present study. The fact that prevalence and mean CF were slightly lower in the present study may be due to a healthy worker effect or to cultural differences. In the Wessely study, carried out in England among primary care patients, a prevalence of 8% was observed for men and 12% for women at follow-up, and the difference remained significant when adjusted for psychological morbidity. These values are very close to those in the present study.

Although the prevalence of CF did not show a significant sex difference, we observed a small but significant gender difference in mean fatigue. Fatigue has been more commonly reported by women in most studies, whether population based, among primary care patients or among state employees [3,6,10–14].

Socio-demographic factors (age, income and the presence of children <13 years old) were not associated with CF. Low household income and educational level have been associated with fatigue by Shefer *et al.* [11]. However, in the present study, intra-population variation may have been insufficient to show an association, since the level of income was fairly uniform by Brazilian standards and all workers earned more than the Brazilian average.

Domestic workload showed an association with CF. It is possible that the domestic workload adds physical and mental stress, putting employees at risk for CF from overload. It is also possible that domestic work is

Table 4. Logistic regression model without minor psychiatric disorders and dissatisfaction at work

Risk factors	Crude OR (95% CI)	Adjusted OR (95% CI) ^a
Domestic workload		
Do not do/light	1.0	1.0
Medium	1.9 (1.1–3.5)	1.7 (0.9–3.2)
Heavy	6.3 (2.0–19.3)	8.6 (2.3–32.7)
Fast work speed		
Rare/none	1.0	1.0
Sometimes	2.5 (1.1–5.7)	2.9 (1.1–7.8)
Frequently	3.9 (1.5–10.1)	4.1 (1.3–12.7)
Monotony at work		
Rare/none	1.0	1.0
Sometimes	1.0 (0.5–2.0)	0.8 (0.4–1.7)
Frequently	2.2 (1.1–4.4)	1.8 (0.8–3.9)
Workstation ergonomics		
Good	1.0	1.0
Medium	1.3 (0.6–2.9)	0.9 (0.4–2.2)
Poor	3.1 (1.6–6.0)	2.2 (1.1–4.4)

Goodness of fit: number of observations = 532; $\chi^2 = 54.6$; $P = 0.375$.

^aOR adjusted for domestic workload, work speed, monotony at work and workstation ergonomics.

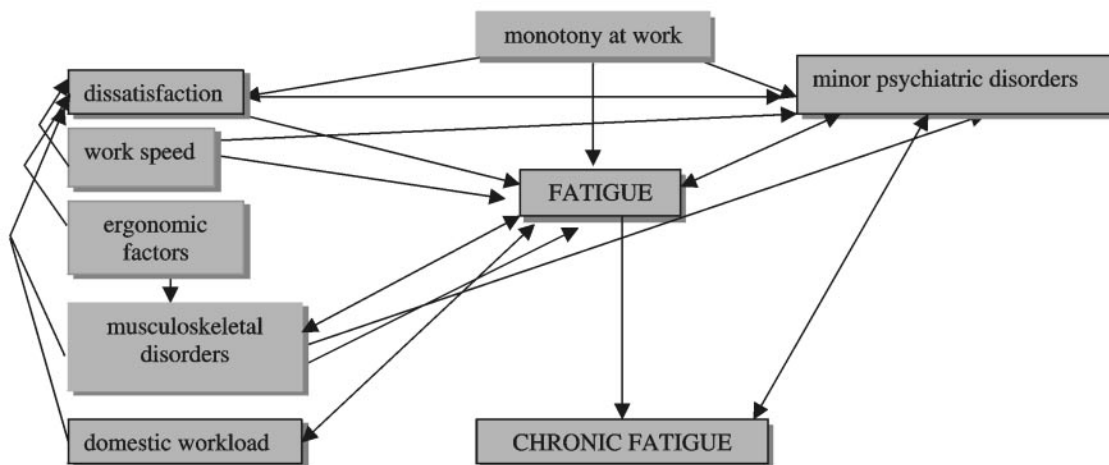
perceived as more tiring by those suffering from CF. We examined this association separately according to gender, since it is not certain that men and women report domestic workload as ‘heavy’ by the same standards. An association was found for both sexes, but was stronger for women. A ‘double work-day’ has previously been associated with exhaustion and insomnia in a population of employed women in Quebec [32].

The association observed between CF and marriage for women, but not for men, supports the idea that a difficult ‘double work-day’ is an important risk factor or consequence of fatigue. Since married women are more likely to experience a ‘double work-day’, it would be important to devise a study to explore the relationships among gender, domestic workload and fatigue. Since our definition of domestic workload did not include domestic tasks usually performed by men in Brazil, it would be important to include a wider range of daily domestic tasks in future studies.

Our study is in agreement with that of Borges [33], showing that minor psychiatric disorders are frequent among bank workers in Brazil. Minor psychiatric disorder was the factor most strongly associated with CF in this study. Cross-sectional, case-control and prospective studies have also shown an association between fatigue and psychiatric symptoms [6,8,14,16–19]. Fatigue was a predictive factor for current psychiatric disorder in a prospective study and patients with new (incident) CF had a higher probability of having a psychiatric disorder [19].

Table 5. Prevalence and OR for CF according to domestic factors among men and women

	Men		Women	
	Prevalence	OR (95% CI)	Prevalence	OR (95% CI)
Domestic workload				
Do not do/light	19 (6.3)	1.0	4 (6.3)	1.0
Medium	16 (12.0)	2.1 (1.0–4.1)	9 (10.3)	1.7 (0.5–5.9)
Heavy	0 (0)	–	5 (41.7)	10.7 (2.3–49.5)
Marital status				
Not married	7 (7.5)	1.0	3 (4.7)	1.0
Married	27 (7.6)	1.0 (0.4–2.4)	15 (15.3)	3.7 (1.0–13.3)
Has child <13 years old				
No	18 (9.9)	1.0	6 (7.0)	1.0
Yes	17 (6.4)	0.6 (0.3–1.2)	12 (15.6)	2.5 (0.9–6.9)

Figure 1. Possible causal relationship among fatigue, chronic fatigue and work.

We observed a risk of CF for those who perceived a frequent fast work speed. A fast work speed could cause physical and/or mental exhaustion. Worker fatigue has been linked with the working environment in other studies, but not all the associated factors were present in the bank. Relationships between fatigue and a long work-day, exposure to dust, noise, high temperature, monotonous work, static effort and heavy physical and mental workload have been previously reported [2,9,16, 34–36]. Control over work speed was not retained in the final model, probably because of the strong association between work speed and control over speed.

If dissatisfaction with work is an integrative value more closely associated with CF than are individual workplace conditions, the latter would have been displaced from the model shown in Table 3, as observed. Similarly, minor psychiatric disorders may be an outcome rather than a causal factor. Possible mechanisms are proposed in Figure 1. Some support for the suggested mechanism is provided by the regression model shown in Table 4, where

poor ergonomic conditions and monotony were significantly associated with CF once dissatisfaction with work and psychiatric disorders were withdrawn. Thus, the observed association of CF with dissatisfaction with work may indicate not that dissatisfaction itself is a risk factor, but that it is a global indicator of problems at work that may be associated with CF, as observed by others [35].

Any interpretation of a cross-sectional study must be limited in scope. The associations found in the present study between CF and workplace and domestic workload must be confirmed by a prospective study.

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