Rev Saúde Pública 2012;46(3):407-16

Luiz Sérgio Silva

Sandhi Maria Barreto

Stressful working conditions and poor self-rated health among financial services employees

Condições estressantes no trabalho e pior auto avaliação de saúde entre bancários

ABSTRACT

OBJECTIVE: To assess the association between exposure to adverse psychosocial working conditions and poor self-rated health among bank employees.

METHODS: A cross-sectional study including a sample of 2,054 employees of a government bank was conducted in 2008. Self-rated health was assessed by a single question: "In general, would you say your health is (…)." Exposure to adverse psychosocial working conditions was evaluated by the effort-reward imbalance model and the demand-control model. Information on other independent variables was obtained through a self-administered semi-structured questionnaire. A multiple logistic regression analysis was performed and odds ratio calculated to assess independent associations between adverse psychosocial working conditions and poor self-rated health.

RESULTS: The overall prevalence of poor self-rated health was 9%, with no significant gender difference. Exposure to high demand and low control environment at work was associated with poor self-rated health. Employees with high effort-reward imbalance and overcommitment also reported poor self-rated health, with a dose-response relationship. Social support at work was inversely related to poor self-rated health, with a dose-response relationship.

CONCLUSIONS: Exposure to adverse psychosocial work factors assessed based on the effort-reward imbalance model and the demand-control model is independently associated with poor self-rated health among the workers studied.

DESCRIPTORS: Workload. Working Conditions. Job Satisfaction. Occupational Health. Cross-Sectional Studies. Banking work.

Depto Medicina Preventiva e Social. Faculdade de Medicina. Universidade Federal de Minas Gerais. Belo Horizonte, MG, Brasil

Correspondence:
Luiz Sérgio Silva
Av. Alfredo Balena, 190 sala 814
Santa Efigênia
30190-100 Belo Horizonte, MG, Brasil
E-mail: luizsergios@yahoo.com.br

Received: 7/5/2011
Approved: 12/1/2011

Article available from: www.scielo.br/rsp

RESUMO

OBJETIVO: Analisar a associação entre exposição a condições psicossociais adversas no trabalho e avaliação ruim de saúde entre bancários.

MÉTODO: Foi realizado estudo transversal com 2.054 trabalhadores de um banco estatal brasileiro em 2008. Utilizou-se uma pergunta simples e direta: "Em geral, você diria que a sua saúde é" para aferir como eles avaliam seu estado de saúde atual. As condições psicossociais adversas no trabalho foram avaliadas pelos modelos desequilíbrio esforço-recompensa e demanda-controle. Informações sobre as demais variáveis independentes foram obtidas por meio de questionário semiestruturado, autoadministrado. A presença e a magnitude das associações independentes entre avaliação ruim do próprio estado de saúde e as condições psicossociais adversas no trabalho foram determinadas por meio de odds ratio obtidos por regressão logística.

RESULTADOS: A prevalência geral de auto-avaliação ruim de saúde foi de 9%, sem diferença estatística entre os sexos. A exposição a ambientes de trabalho com alta demanda e baixo controle esteve associada à pior auto-avaliação da saúde. O mesmo foi verificado para trabalhadores com desequilíbrio esforço-recompensa e comprometimento excessivo, com gradiente dose-resposta. A presença de suporte social no trabalho apresentou associação inversa com pior auto avaliação de saúde, também com gradiente dose-resposta.

CONCLUSÕES: A exposição a fatores psicossociais adversos no trabalho, avaliada pelos modelos desequilíbrio esforço-recompensa e demanda-controle, está associada de forma independente à pior auto-avaliação da saúde entre os trabalhadores estudados.

DESCRITORES: Carga de Trabalho. Condições de Trabalho. Satisfação no Emprego. Saúde do Trabalhador. Estudos Transversais. Trabalho bancário.

INTRODUCTION

Self-rated health is a major robust indicator of overall health among general[15] and working populations.[11,19] Despite its subjective nature, longitudinal studies showed that poor self-rated health independently predicts the occurrence of future health events, including hospitalization and death, after adjusting for health variables and socioeconomic conditions.[8,9] Also, it has been validated and widely used in different countries and populations.[19]

Population studies show that self-rated health is influenced by demographic, socioeconomic, cultural, lifestyle, and work environment factors and health conditions such as chronic diseases and work-related health conditions.[11] They found greater prevalence of poor self-rated health among subjects exposed to precarious working conditions[5] and adverse psychosocial conditions at work.[28]

The present study aimed to assess the association between poor self-rated health and exposure to adverse psychosocial working conditions among Brazilian financial services employees.

METHODS

All employees of a large Brazilian government bank working at branches in all state capitals and the Federal District at the end of 2007 – a total of 40,005 workers – were eligible to participate in the study. A cross-sectional study was conducted in a random sample of 2,500 workers stratified by gender (1,250 males and 1,250 females). Details about the population and sampling method have been published elsewhere.[31]

A self-administered questionnaire was used covering five areas of interest: sociodemographic, behavioral, health, psychosocial and work-related factors. The sociodemographic characteristics included gender, age, marital status, education, race/skin color, having children, household ownership, and being the head of the household.

The behaviors assessed were smoking, alcohol use, and physical activity. Regarding health, the questionnaire collected information about physician-diagnosed chronic diseases (hypertension, diabetes, asthma,

bronchitis, myocardial infarction, stroke, and musculoskeletal disorders), hospitalizations during the preceding 12 months, sleep problems, and regular use of medications. General psychosocial factors included exposure to stressful situations and experience of any form of discrimination.

Work-related factors included length of service in the company, current job, and psychosocial characterization of the job, which is the exposure of interest in the current study. All covariates described above were considered as potential confounders in the assessment of the relationship between exposure to adverse psychosocial working conditions and poor self-rated health.

The independent associations with the outcome were assessed using the demand-control model[13] and effort-reward imbalance (ERI) model.[26] To assess adverse psychosocial working conditions we used the short version of the Job Content Questionnaire (JCQ) adapted to the Brazilian Portuguese by Araújo et al (2003)[1] and the Brazilian Portuguese version of the Effort-Reward Imbalance Scale.[30]

The JCQ consists of 22 questions with Likert-type responses that range from "strongly agree" to "strongly disagree." The responses were coded according to the JCQ User's Guide.[14] Based on the assumptions of Karasek's model, variables were dichotomized at their median and grouped into four distinct categories. Employees whose work was performed under conditions of exposure to a high demand and low control (high strain) combination were included in the group with the greatest exposure to stressful conditions. Employees whose work exposed them to high demand but high control (active work) were included in the intermediate exposure group. Workers exposed to low control and low demand (passive work) were also included in the intermediate exposure group. Employees who worked under low demand and high control (low strain) were regarded as not exposed to stress and were the reference category in the statistical analysis. Cronbach's alpha values for the demand-control scale were 0.80, 0.86 and 0.90 for demand, control and social support at work, respectively.

The ERI scale has three subscales: effort (6 items), reward (11 items) and overcommitment (6 items). The first two subscales comprise questions with Likert-type responses with varying degrees of agreement or disagreement, and scores ranging from 1 to 5. The overcommitment subscale also has Likert-type responses ranging between agree and strongly disagree, with scores from 1 to 4. Using the theoretical assumptions of the model, a work-related stress index for the ERI model was constructed using cutoffs based on the tertiles of the distribution.[12] The highest one was the most exposed group, the second the intermediate exposure, and the first tertile were those with the lowest exposure and the reference category in the analysis. Overcommitment was similarly categorized into tertiles. Cronbach's alpha values for the ERI scales were 0.82, 0.80 and 0.85 for effort, reward and overcommitment, respectively.

Self-rated health, the dependent variable in this analysis, was obtained by answering a single question: "In general, compared to people of your age, would you say your health is (…)," with five response options (excellent, very good, good, poor, and very poor). For the analysis, responses were grouped into "good" and "poor." "Good" groups together responses "excellent," "very good," and "good" while "poor" aggregates responses "poor" and "very poor."

The magnitude of the statistical association between poor self-rated health (poor/very poor) and psychosocial working conditions was determined by odds ratio (OR) obtained by multiple logistic regression, with a 95% confidence interval. Different weights were assigned to male and female participants reflecting the difference in the probability of each gender participating in the study, as the eligible population comprised 61.1% males and 38.9% females, and the sample 50% of each gender. The analysis was performed using Stata Statistical Package version 9.2.

All variables associated with poor self-rated health in the univariate analysis at $p<0.20$ were included in the multivariate analysis carried out in two stages. First, the sociodemographic variables associated with poor self-rated health were adjusted for other covariates in this domain. Next, the variables in the behavioral domain were added to the model, then the variables of the health domain, followed by psychosocial exposures. Finally, work-related variables were added, including exposure to adverse psychosocial working conditions. This final exposure variable was assessed separately, with two models, one based on the demand-control scale and the other based on the ERI scale. All variables that remained associated with poor self-rated health at $p<0.05$ were retained in the final models.

The study was approved by the Ethics Research Committee of the Federal University of Minas Gerais (process nr. 350/07, Aug 2007) and all participants signed an informed consent form.

RESULTS

Of the 2,500 workers enrolled to participate in the study, 163 were ineligible because they were retired, on medical leave, or their employment contract was temporarily discontinued. There were no statistically significant differences between these 163 ineligible workers and those eligible to participate in the study with regard to gender, age, marital status, schooling, or

length of services in the company. Of the 2,337 eligible, 2,054 (88%) were included in the study, being 49.7% male and 50.3% female. The mean age was 40 years (SD = 9.17), and the average length of service in the company was 15 years (SD = 9.64). The majority were married, college-educated, self-referred as white, and non-smokers. The most commonly reported diseases were hypertension (28%), bronchitis (23%), and work-related musculoskeletal disorders (23%).

The overall prevalence of poor self-rated health was 9.00% (95%CI 7.54; 9.99); 8.42% (95%CI 6.72; 10.13) among men, and 9.10% (95%CI 7.34; 10.86) among women, with no significant gender difference (p = 0.588).

In the univariate analysis, age over 40 years, being a smoker or former smoker, physical inactivity, moderate alcohol consumption, sleep problems, use of medications, or having one or more chronic diseases were each significantly associated with poor self-rated health (Table 1).

Working at the company for more than five years, as well as exposure to adverse psychosocial working conditions, assessed by the demand-control and ERI models, were also significantly associated with poor self-rated health (Table 2).

Tables 3 and 4 present models with progressive adjustments for the variables identified in the univariate analysis as associated with poor self-rated health at p<0.20, for the demand-control and ERI models, respectively. After adjustments for the variables from all domains (model 4, Table 3), older age, physical inactivity, presence of one or more chronic diseases, sleep problems, regular use of medications, length of service in the company between six and 14 years, as well as exposure to high strain work, and lack of social support at work remained statistically associated with poor self-rated health. Cigarette smoking and moderate use of alcohol did not remain statistically associated with poor self-rated health. The final model showed that after adjusting for all confounders high strain working conditions was statistically associated with poor self-rated health. High social support at work reduced by about 4-fold the likelihood of reporting poor self-rated health.

Table 4 shows that older age, physical inactivity, smoking, presence of chronic diseases, sleep problems and regular use of medications were significantly associated with poor self-rated health in the final model. This model shows that the exposure to effort-reward imbalance as well as being overcommitted to work increased the likelihood of reporting poor self-rated health, and these associations were independent of all confounding variables included in the analysis.

DISCUSSION

The results of this study further support the relationship between exposure to adverse psychosocial work environment and poor self-rated health. This effect was seen in both demand-control and ERI models. In the demand-control model, it was stronger among workers exposed to high strain and low control and those who lacked social support at work. In the ERI model, high effort-reward imbalance and high level of commitment at work increased the likelihood of poor self-rated health. To our knowledge, this is the first study to investigate the association between exposure to adverse psychosocial environment and poor self-rated health among financial services employees.

The overall prevalence of self-rated health in the present study was greater than that found by Barros et al (2006),[2] using a similar question, among active adults living in Brazilian state capitals. Dachs & Santos (2006)[4] analyzed data from the Brazilian National Household Survey and also found a lower prevalence of poor self-rated health among Brazilians aged 15 and older (6%). However, Giatti et al (2010)[6] found a much higher prevalence of poor self-rated health (20%) among adults aged 15 to 64 years living in four Brazilian cities included in the National Household Survey on Risk Behaviors and Reported Morbidity from Non-Communicable Disease. Nonetheless, considering that we studied a sample of relatively more educated, active young individuals, the observed prevalence of poor self-rated health is quite high. This may be explained by the fact that financial service employees experience high levels of psychological stress,[31] and have high rates of absenteeism, especially due to work-related musculoskeletal and mental disorders.[29]

International studies[20] have shown that the prevalence of poor self-rated health increases with age. This finding is consistent with that found in the present study that a higher proportion of individuals aged 40 and above rated their health status as poor.

Considering the adjusted models using both the demand-control and the ERI models age, physical inactivity, presence of one or more chronic conditions, sleep problems, and regular use of medications were statistically associated with poor self-rated health. Having one or more chronic diseases, regular medication use, and sleep problems were positively associated with poor self-rated health according to findings of other studies.[3,9,10] Medication use –inasmuch as it suggests the presence and severity of a condition– would be expected to be associated with poorer self-rated health.

Physical inactivity was positively associated with poor self-rated health in the demand-control analysis, corroborating international evidence.[21,32] Smoking, on the other hand, was only associated with poor self-rated

Table 1. Prevalence and odds ratio of poor self-rated health among bank employees according to sociodemographic, lifestyle, and health factors, and exposure to stressful conditions and discrimination. Brazil, 2008. (N=2054)

Variable/Category	Prevalence	OR (95%CI)	p-value
Gender			
Male	8.42	1	
Female	9.10	1.09 (0.80;1.48)	0.588
Age (years)			
20–29	3.76	1	
30–39	6.67	1.75 (0.91;3.37)	0.096
40–49	9.61	2.64 (1.42;4.92)	0.002
50–59	15.18	4.69 (2.48;8.89)	0.001
Schooling			
Primary/ Middle school	9.72	1	
College	8.55	0.86 (0.58;1.26)	0.430
Graduate	8.42	0.90 (0.55;1.46)	0.656
Marital status			
Married	8.97	1	
Single	8.03	0.90 (0.65;1.26)	0.551
Separated/ divorced	12.27	1.44 (0.84;2.46)	0.186
Self-referred skin color or race			
White	8.74	1	
Black	9.33	1.00 (0.44;2.25)	0.991
Other	8.76	1.01 (0.70;1.47)	0.947
Head of household			
Husband	9.07	1	
Wife	10.93	1.14 (0.69;1.89)	0.600
Other	5.20	0.53 (0.29;0.97)	0.038
Caregiver for disabled person			
Yes	8.94	1	
No	6.34	0.62 (0.31;1.27)	0.192
Living with an unemployed person or person with informal job			
Yes	8.21	1	
No	10.64	1.27 (0.89;1.80)	0.192
Current smoking			
Non-smoker	6.22	1	
Former smoker	10.29	1.79 (1.11;2.88)	0.017
Smoker	19.56	3.66 (2.56;5.23)	0.001
Physical activity			
Yes	13.04	1	
No	6.34	0.43 (0.31;0.59)	0.001
Alcohol use in past 14 days (one or more drinks)			
No	5.82	1	
Yes	9.98	1.92 (1.30;2.83)	0.001
Exposure to stressful situations (last 12 months)			
No	9.14	1	
Yes	7.87	0.85 (0.59;1.21)	0.360
Exposure to discrimination (last 12 months)			
No	8.29	1	
Yes	11.60	1.46 (0.97;2.19)	0.270
Sleep problems			
No	2.41	1	
Sometimes	11.67	5.51 (3.46;8.77)	0.001
Almost always/ always	26.53	15.11 (9.16;24.94)	0.001
Regular use of medications			
Yes	2.88	1	
No	14.82	6.34 (4.20;9.59)	0.001
One or more chronic diseases			
No	4.31	1	
One	14.99	4.13 (2.89;5.90)	0.001
Two or more	36.46	13.55 (8.20;22.41)	0.001
Hospital admission in the last 12 months			
No	8.63	1	
Yes	10.92	1.23 (0.66;2.27)	0.512

health in the ERI model, which is a finding that does not agree with that reported by Kouvonen et al (2005)[16] that found smoking related to stress when evaluated using both models. Physical inactivity and smoking are behavioral factors associated with many physical and mental health problems. Both are also related in different ways to stress. The reason why in the present study each of them remained statistically significant

Table 2. Prevalence and odds ratio of poor self-rated health among bank employees according to job characteristics and psychosocial working conditions. Brazil, 2008. (N=2054)

Variables	Prevalence	OR (95%CI)	p-value
Title			
Manager	9.12	1	
Bank teller	9.15	1.23 (0.64;2.36)	0.530
Assistant	8.28	0.90 (0.60;1.36)	0.619
Analyst	10.38	1.20 (0.68;2.13)	0.525
Clerk	8.33	0.87 (0.56;1.35)	0.537
Years of service in the company			
0–5	4.98	1	
6–14	8.23	1.79 (1.08;4.09)	0.029
15–24	9.77	2.10 (1.08;4.09)	0.029
25 +	11.12	2.48 (1.54;4.00)	0.001
Demand-control model			
Low strain	3.03	1	
Active work	6.67	2.38 (1.30;4.36)	0.005
High strain	7.67	3.00 (1.60;5.59)	0.001
Passive work	16.37	6.36 (3.88;10.41)	0.001
Social support at work			
Low support at work	17.73	1	
Average	6.40	0.32 (0.22;0.47)	0.000
High	2.71	0.12 (0.07;0.19)	0.000
Effort-reward Imbalance			
Low	2.64	1	
Average	7.61	2.99 (1.71;5.23)	0.000
High	16.12	7.01 (4.15;11.85)	0.000
Overcommitment			
Low	2.99	1	
Average	5.67	1.91 (1.07;3.40)	0.028
High	16.14	6.20 (3.81;10.07)	0.000

only in one of the final models may be lack of power or related to the constructs of the demand-control and ERI models as the other confounding variables in these models are the same. For instance, only a weak association was found between exposure to high occupational effort and low reward and sedentary lifestyle.[17]

Considering the demand-control model, the odds that workers exposed to a hostile work environment (high demand and low control) reported poor self-rated health was about six (unadjusted) and two times (after adjustment) higher than that of unexposed workers. Social support, as proposed in Karasek's model (1979),[13] showed an inverse association, reducing by half the odds of poor self-rated health. These results are corroborated by findings of prospective, cross-sectional studies. Niedhammer et al (2003)[22] found a similar relationship regardless of potential confounders in a longitudinal analysis. Among individuals who worked in an unfavorable environment, Borg et al (2000)[3] found a two-fold higher prevalence rate of poor self-rated health. Molarius et al (2006)[21] found that workers exposed to high demand and low control also have a higher prevalence of poor self-rated health. In this study and that of Hasson et al (2006)[9] lack of social support at work also had a harmful effect on perceived health, doubling the odds of poor self-rated health.

This study also showed similar results in the analysis of adverse psychosocial exposure using the ERI model. Workers exposed to high effort-reward imbalance were about seven (unadjusted) and three times (after adjustment) more likely to self-rate their health as poor. These findings are also consistent with those of prospective studies in other countries. Krause et al (2010)[18] reported poorer general health in workers exposed to a high effort-reward imbalance. Siegrist et al (2004)[27] found that the odds ratios for poor self-rated health was significantly high among workers exposed to a high effort-reward imbalance in 14 of 16 studies in European countries. Pikhart et al (2001)[25] also reported that an effort-reward imbalance is a powerful determinant of poor self-perceived health, with increasing rates among most exposed workers. The same phenomenon was reported in Weyers et al study (2006).[33]

Overcommitment increased the odds of poor self-rated health by 2.7 for workers in the highest tertile. Weyers et al (2006)[33] found a similar association with high level of job commitment. Niedhammer et al (2004)[23] also reported a similar finding in their cross-sectional study, but in the prospective component of the study the association between overcommitment and poorer self-rated health was seen among males only. Job overcommitment is a subjective measure, an intrinsic component, related to the individual's ability to cope with job demands (Siegrist 1996). As self-assessment of health is also very subjective, it is possible that this result is influenced by an intrinsic relationship of outcome and exposure in the study.[7]

In the present study we used two models because several studies have pointed to their complementarity as they emphasize different aspects of the work environment. Slightly stronger associations were found using the ERI model. This seems to be in accordance with de Jonge et al (2000)[12] findings that high efforts and low occupational rewards were stronger predictors of poor well-being than low job control when both job stress models were simultaneously adjusted. Some authors

Table 3. Factors associated with poor self-rated health among bank employees including job characteristics defined in the demand- control model. Brazil, 2008. (n=2054)

Variable/Category	Model 1[a] OR (95%CI)	Model 2[b] OR (95%CI)	Model 3[c] OR (95%CI)	Model 4[d] OR (95%CI)	Model 5[e] OR (95%CI)
Age (years)	1.05 (1.03;1.07)	1.04 (1.02;1.06)	1.03 (1.01;1.05)	1.02 (1.00;1.04)	1.02 (1.00;1.05)
Physical inactivity					
No		1	1	1	1
Yes		2.11 (1.53;2.92)	1.69 (1.19;2.38)	1.77 (1.22;2.57)	1.81 (1.26;2.62)
Smoking					
Non-smoker		1	1	1	-
Former smoker		1.40 (0.86;2.30)	1.05 (0.62;1.76)	1.13 (0.65;1.96)	-
Smoker		2.75 (1.93;3.91)	1.78 (1.20;2.64)	1.30 (0.83;2.03)	-
Alcohol use in past 14 days (1 or + drinks)					
No		1	1	1	-
Yes		1.59 (1.06;2.38)	1.63 (1.05;2.53)	1.22 (0.76;1.96)	-
Chronic conditions					
No			1	1	1
One			2.21 (1.50;3.25)	2.09 (1.39;3.14)	2.09 (1.39;3.14)
Two or more			5.77 (3.30;10.09	5.69 (3.04;0.65)	5.68 (3.05;10.59)
Sleep problems					
No			1	1	1
Sometimes			3.25 (2.02;5.25)	2.07 (1.24;3.43)	2.12 (1.28;3.53)
Almost always/always			5.64 (3.32;9.56)	4.05 (2.27;7.23)	4.17 (2.34;7.43)
Regular use of medications					
No			1	1	1
Yes			2.73 (1.78;4.18)	3.10 (1.98;4.84)	3.20 (2.05;5.00)
Years of service in the company					
0–5				1	1
6–14				1.80 (1.01;3.20)	1.83 (1.03;3.27)
15–24				1.56 (0.70;3.46)	1.53 (0.68;3.42)
25 +				1.50 (0.79;2.86)	1.50 (0.79;2.87)
Working characteristics					
Low strain				1	1
Demand-control model					
Active work				1.90 (0.98;3.70)	1.89 (0.98;3.67)
Passive work				1.41 (0.71;2.78)	1.44 (0.72;2.86)
High strain				2.07 (1.10;3.89)	2.26 (1.22;4.19)
Social support at work					
Low support at work				1	1
Moderate support at work				0.40 (0.25;0.64)	0.39 (0.24;0.62)
High support at work				0.23 (0.12;0.43)	0.22 (0.12;0.42)

[a]Adjusted for sociodemographic variables;
[b]Adjusted for sociodemographic and behavioral variables;
[c] Adjusted for sociodemographic, behavioral and health variables;
[d] Adjusted for sociodemographic, behavioral, health, and working variables;
[e] Final model

attribute to the ERI model greater explanatory power to capture the influence of psychosocial job stress on health: while the demand-control model addresses dimensions of how work is organized, the ERI model is based on the reciprocity between effort demanded and reward received.[7,12,24]

Table 4. Factors associated with poor self-rated health among bank employees including job characteristics defined in the effort-reward imbalance model. Brazil, 2008. (n=2054)

Variable/Category	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]	Model 5[e]
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Age (years)	1.05 (1.03;1.07)	1.04 (1.02;1.06)	1.03 (1.01;1.05)	1.02 (1;1.06)	1.03 (1.01;1.05)
Physical inactivity					
Yes		1	1	1	1
No		2.11 (1.53;2.92)	1.69 (1.19;2.38)	1.86 (1.29;2.69)	1.80 (1.26;2.58)
Smoking					
Non-smoker		1	1	1	1
Former smoker		1.40 (0.86;2.30)	1.05 (0.62;1.76)	1.15 (0.67;1.98)	1.22(0.71;2.11)
Smoker		2.75 (1.93;3.91)	1.78 (1.20;2.64)	1.58 (1.04;2.40)	1.71(1.14;2.58)
Alcohol use in past 14 days (one or more drinks)					
No		1	1	1	-
Yes		1.59 (1.06;2.38)	1.63 (1.05;2.53)	1.37 (0.88;2.14)	-
Chronic conditions					
No			1	1	1
One			2.21 (1.50;3.25)	2.11 (1.41;3.16)	2.07 (1.39;3.08)
Two or more			5.77 (3.30;10.09	5.74 (3.05;10.81)	5.66 (3.05;10.48)
Sleep problems					
No			1	1	1
Sometimes			3.25 (2.02;5.25)	2.21 (1.36;3.61)	2.26 (1.39;3.68)
Almost always/always			5.64 (3.32;9.56)	3.60 (2.03;6.35)	3.64 (2.08;6.37)
Regular use of medications					
No			1		1
Yes			2.73 (1.78;4.18)	2.87 (1.87;4.41)	2.90 (1.89;4.45)
Years of service in the company					
0–5				1	-
6–14				1.62 (0.88;2.99)	-
15–24				1.52 (0.67;3.45)	-
25+				1.41 (0.71;2.79)	-
Effort-reward Imbalance					
Low				1	1
Moderate				2.13 (1.16;3.90)	2.14 (1.17;3.93)
High				2.95 (1.57;5.51)	2.96(1.58;5.54)
Overcommitment					
Low				1	1
Moderate				1.08 (0.58;2.03)	1.08 (0.58;2.03)
High				2.62 (1.45;4.75)	2.68 (1.48;4.82)

[a]Adjusted for sociodemographic variables;
[b]Adjusted for sociodemographic and behavioral variables;
[c]Adjusted for sociodemographic, behavioral and health variables;
[d] Adjusted for sociodemographic, behavioral, health, and working variables;
[e] Final model

Notwithstanding the consistent relationships found in this study between an adverse psychosocial work environment and poor self-rated health, some limitations should be considered when interpreting the results. Workers absent for medical reasons did not participate in the study, which contributed to underestimating the prevalence of poor self-rated health and reduced the magnitude of the associations found with adverse psychosocial environment. The use of a self-administered questionnaire has disadvantages and advantages. On one hand, it made a national study feasible, increasing the representativeness of the study. On the

other, it is possible that difficulty in understanding the questionnaire might have affected the quality of responses. Considering that the average schooling level of the participants is high, it is unlikely that respondents had any major difficulty with the questionnaire. Finally, owing to the cross-sectional design, we cannot exclude a reverse causality or make causal inferences. Despite these limitations, it is important to emphasize that the study included a significant sample of bank employees and achieved a high response rate (88%). Moreover, the findings are consistent with several international studies, both cross-sectional and prospective, as discussed before.

In conclusion, the present study shows that the prevalence of poor self-rated health is high among bank workers. These results corroborate the findings of several cross-sectional and prospective studies about an independent association between adverse psychosocial work conditions and poor self-rated health. Finally, the study shows that these associations are present in the analyses based on the demand-control model as well as the ERI model.

Further investigation, especially with different study designs such as prospective studies, involving other financial services workers is needed to clarify the relationships found here.

REFERENCES

1. Araújo TM, Graça CC, Araújo E. Estresse ocupacional e saúde: contribuições do Modelo Demanda-Controle. *Cienc Saude Coletiva*. 2003;8(4):991-1003. DOI:10.1590/S1413-81232003000400021
2. Barros MBA, Zanchetta LM, Moura EC, Malta DC. Self-rated health and associated factors, Brazil, 2006. *Rev Saude Publica*. 2009;43(Suppl 2):27-37. DOI:10.1590/S0034-89102009000900005
3. Borg V, Kristensen TS. Social class and self-rated health: can the gradient be explained by differences in life style or work environment? *Soc Sci Med*. 2000;51(7):1019-1030. DOI:10.1016/S0277-9536(00)00011-3
4. Dachs JNW, Santos APR. Auto-avaliação do estado de saúde no Brasil: análise dos dados da PNAD/2003. *Cienc Saude Coletiva*. 2006;11(4):887-94. DOI:10.1590/S1413-81232006000400012
5. Giatti L, Barreto SM, César CC. Household context and self-rated health: the effect of unemployment and informal work. *J Epidemiol Community Health*. 2008;62(12):1079-85. DOI:10.1136/jech.2007.069740
6. Giatti L, Barreto SM, César CC. Unemployment and self-rated health: neighborhood influence. *Soc Sci Med*. 2010;71(4):815-23. DOI:10.1016/j.socscimed.2010.05.021
7. Griep RH, Rotenberg L, Landsbergis P, Vasconcellos-Silva PR. Uso combinado de modelos de estresse no trabalho e a saúde auto-referida na enfermagem. *Rev Saude Publica*. 2011;45(1):145-52. DOI:10.1590/S0034-89102011000100017
8. Halford C, Anderzén I, Arnetz B. Endocrine measures of stress and self-related health: a longitudinal study. *J Psychosom Res*. 2003;55(4):317-20. DOI:10.1016/S0022-3999(02)00634-7
9. Hasson D, Arnetz BB, Theorell T, Anderberg UM. Predictors of self-rated health: a 12-month prospective study of IT and media workers. *Popul Health Metr*. 2006;4:8. DOI:10.1186/1478-7954-4-8
10. Höfelmann DA, Blank N. Auto-avaliação de saúde entre trabalhadores de uma indústria no sul do Brasil. *Rev Saude Publica*. 2007;41(5):777-87. DOI:10.1590/S0034-89102007000500012
11. Holmgren K, Dahlin-Ivanoff S, Björkelund C, Hensing G. The prevalence of work-related stress, and its association with self-perceived health and sick-leave, in a population of employed Swedish women. *BMC Public Health*. 2009;9:73. DOI:10.1186/1471-2458-9-73
12. Jonge J, Bosma H, Peter R, Siegrist J. Job strain, effort-reward imbalance and employee well-being: a large-scale cross-sectional study. *Soc Sci Med*. 2000;50(9):1317-27. DOI:10.1016/S0277-9536(99)00388-3
13. Karasek RA. Job demand, job decision latitude, and mental strain: implications for job redesign. *Adm Sci Q*. 1979;24(2):285-308.
14. Karasek RA. Job Content Questionnaire and user's guide. Lowell: University of Massachusetts, Department of Work Environment; 1985.
15. Kondo N, Sembajwe G, Kawachi I, van Dam RM, Subramanian SV, Yamagata Z. Income inequality, mortality, and self-rated health: meta-analysis of multilevel studies. *BMJ*. 2009;339:b4471. DOI:10.1136/bmj.b4471
16. Kouvonen A, Kivimäki M, Virtanen M, Pentti J, Vahtera J. Work stress, smoking status, and smoking intensity: and observational study of 46,190 employees. *J Epidemiol Community Health*. 2005;59(1):63-9. DOI:10.1136/jech.2004.019752
17. Kouvonen A, Kivimäki M, Elovainio M, Pentti J, Linna A, Virtanen M, et al. Effort-reward imbalance and sedentary lifestyle: an observational study in a large cohort. *Occup Environ Med*. 2006;63(6):422-7. DOI:10.1136/oem.2005.020974
18. Krause N, Rugulies R, Maslach C. Effort-reward imbalance at work and self-rated health of Las Vegas hotel room cleaners. *Am J Ind Med*. 2010;53(4):372-86. DOI:10.1002/ajim.20732
19. Manderbacka K, Lundberg O, Martikainen P. Do risk factors and health behaviours contribute to self-ratings of health? *Soc Sci Med*. 1999;48(12):1713-20. DOI:10.1016/S0277-9536(99)00068-4
20. Mavaddat N, Kinmonth AL, Sanderson S, Surtees P, Bingham S, Khaw KT. What determines Self-Rated Health (SRH)? A cross-sectional study of SF-36 health

domains in the EPIC-Norfolk cohort. *J Epidemiol Community Health*. 2011;65(9):800-6. DOI:10.1136/jech.2009.090845

21. Molarius A, Berglund K, Eriksson C, Lambe M, Nordström E, Eriksson HG, et al. Socioeconomic conditions, lifestyle factors, and self-rated health among men and women in Sweden. *Eur J Public Health*. 2006;17(2):125-33. DOI:10.1093/eurpub/ckl070

22. Niedhammer I, Chea M. Psychosocial factors at work and self reported health: comparative results of cross sectional and prospective analyses of the French GAZEL cohort. *Occup Environ Med*. 2003;60(7):509-15. DOI:10.1136/oem.60.7.509

23. Niedhammer I, Tek M, Starke D, Siegrist J. Effort-reward imbalance model and self-reported health: cross-sectional and prospective findings from the GAZEL cohort. *Soc Sci Med*. 2004;58(8):1531-41. DOI:10.1016/S0277-9536(03)00346-0

24. Ostry AS, Kelly S, Demers PA, Mustard C, Hertzman C. A comparison between the effort-reward imbalance and demand control models. *BMC Public Health*. 2003;3:10. DOI:10.1186/1471-2458-3-10

25. Pikhart H, Bobak M, Siegrist J, Pajak A, Rywik S, Kyshegyi J, et al. Psychosocial work characteristics and self-rated health in four post-communist countries. *J Epidemiol Community Health*. 2001;55(9):624-30. DOI:10.1136/jech.55.9.624

26. Siegrist J. Adverse effects of high-effort/low-rewards conditions. *J Occup Health Psychol*. 1996;1(1):27-41. DOI:10.1037/1076-8998.1.1.27

27. Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Niedhammer I, et al. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med*. 2004;58(8):1483-99. DOI:10.1016/S0277-9536(03)00351-4

28. Siegrist J. Work, health and welfare: new challenges. *Int J Soc Welf*. 2006;15(Suppl 1):S5-12. DOI:10.1111/j.1468-2397.2006.00439.x

29. Silva LS, Pinheiro TMM, Sakurai E. Reestruturação produtiva, impactos na saúde e sofrimento mental: o caso de um banco estatal em Minas Gerais, Brasil. *Cad Saude Publica*. 2007;23(12):2949-58. DOI:10.1590/S0102-311X2007001200016

30. Silva LS, Barreto SM. Adaptação transcultural para o português brasileiro da escala *effort-reward imbalance*: um estudo com trabalhadores de banco. *Rev Panam Salud Publica*. 2010;27(1):32-6. DOI:10.1590/S1020-49892010000100005

31. Silva LS, Barreto SM. Adverse psychosocial working conditions and minor psychiatric disorders among bank workers. *BMC Public Health*. 2010;10:686. DOI:10.1186/1471-2458-10-686

32. Tsai J, Ford ES, Li C, Zhao G, Balluz LS. Physical activity and optimal self-rated health of adults with and without diabetes. *BMC Public Health*. 2010;10:365. DOI;10.1186/1471-2458-10-365

33. Weyers S, Peter R, Boggild H, Jeppesen HJ, Siegrist J. Psychosocial work stress is associated with poor self-rated health in Danish nurses: a test of the effort–reward imbalance model. *Scand J Caring Sci*. 2006;20(1):26-34. DOI:10.1111/j.1471-6712.2006.00376.x

---

The authors declare no conflicts of interests.