Rev Saúde Pública 2013;47(5):1-8

Original Articles

DOI:10.1590/S0034-8910.2013047004674

Eduardo de Paula Lima

Ada Ávila Assunção

Sandhi Maria Barreto

Smoking and occupational stressors in firefighters, 2011

ABSTRACT

OBJECTIVE: To analyze the prevalence of smoking in firefighters and associated factors.

METHODS: Cross sectional study of 711 firefighters in Belo Horizonte, MG, Southeastern Brazil, in 2011. The data were obtained using a self-applied structured questionnaire, which included sociodemographic characteristics, occupational stressors, health status and adverse life events. Smoking was analyzed as a dichotomous variable (multiple logistic regression).

RESULTS: The prevalence of smoking among firefighters was 7.6%. Currently smoking status was associated with low levels of schooling, a monthly income in the middle band, the existence of psychiatric problems in the past, high exposure to traumatic events in life, social discrimination, occupational stressors and low demand at work.

CONCLUSIONS: The low prevalence of smoking indicates the relevance of employment conditions in explaining harmful habits and health. Organizational and operational stressors contribute independently to explaining current smoking status in the population studied.

DESCRIPTORS: Firefighters. Smoking. Working Conditions. Job Satisfaction. Cross-Sectional Studies.

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

Correspondence:
Eduardo de Paula Lima
Faculdade de Medicina da Universidade Federal de Minas Gerais
Av. Alfredo Balena, 190 sala 705
30310-100 Belo Horizonte, MG, Brasil
E-mail: edpl@hotmail.com

Received: 12/4/2012
Approved: 5/28/2013

Article available from: www.scielo.br/rsp

INTRODUCTION

Chronic non-communicable diseases (CNCD) are the main causes of morbimortality and functional impairment in Brazil and worldwide.[3,17] In recent years, in Brazil, there has been a decrease in mortality attributable to CNCD, albeit with variations according to socioeconomic and ethnic characteristics of the groups studied.[9] These results indicate the success of health care policies, but also show clear inequalities in access to services and to information.[17]

Smoking is a significant risk factor to CNCD with elevated mortality rates, including cancer and chronic respiratory and cardiovascular disease.[7] Anti-smoking measures occur at various levels,[21,22] among which, the advantages of actions developed in the locus of work are recognized.[10]

There is evidence of the association between occupational stressors and smoking.[1,2,8,11] Twofold exposure is recorded in the emergency sector:[22] negative psycho-social factors (high demand and low control at work, conflicting tasks, among others) and operational stressors (the nature of the tasks). Exposure to these stressors in the workplace has negative consequences for health[6] and probably contribute to smoking, as the relationship between occupational stress and substance use is well known.[5]

The aim of this article is to analyze the prevalence of and factors associated with smoking in firefighters.

METHODS

This was a cross-sectional study (between February and August 2011), with all 794 firefighters in Belo Horizonte, Minas Gerais, Southeastern Brazil; workers active in the city's three battalions and having served at least one year in the institution were eligible for the study. Females and those who were absent from the unit, assigned to other units, on holiday or on sick leave were excluded, as were those who had taken part in the pilot study. A response rate of at least 80.0% for each battalion (First and Third Battalions and Air Operations Battalion) and for subunits in the various neighborhoods (Caiçara, Carlos Prates, Centro, Ipiranga, Pampulha, Sabará, Santa Lúcia, Saudade, Venda Nova and Vespasiano) was established as the criterion for calculating the sample.

The dependent variable – smoking – was designed as a combination of the responses to the following questions "Are you or have you ever been a smoker, i.e., have you smoked 100 or more cigarettes (five packets) in your life?" and "Do you currently smoke cigarettes?". Participants who responded "yes" to these two questions were classified as "smokers"; those who responded "no" to one or both were classes as "non-smokers".

Two types of stressors were covered: operational stressors (concerning the nature of the task) and organizational stressors, originating from psychosocial demands of the job (deriving from the model and functioning of the organization of the job)[20] and from the environmental conditions in which the firefighters carry out their daily activities.

Exposure to operational stressors was assessed using the Posttraumatic Diagnostic Scale (PDS), adapted for workers in hospital emergency units,[15] which includes a list of 15 potentially traumatic events typical to emergence service work. The respondent was asked about the frequency of such episodes in the preceding 12 months and to indicate which they found the most disturbing.[a] The PDS was included as a dichotomous variable in the analyses. The value of 1 (high exposure to operational stressors) was attributed to participants with scores above the fourth quintile in the scale.

The results obtained from the Job Content Questionnaire (JCQ)[4] were used to categorize organizational stressors. The JCQ was created to operationalize the Demand-Control-Support (DCS) model and includes the following dimensions: physical demand, psychological demand, work control and social support. Only the principle effects of the DCS model were analyzed. The three dimensions were analyzed as dichotomous variables. The value of 1 was attributed to participants with scores above the fourth quintile of the demand dimension (high physical/psychological demand). In the control and social support dimensions, the value of 1 was given to participants with scores below the first quintile (low control of work and scarce social support, respectively). This strategy aimed to avoid the controversial results of previous studies that used the original quadrants proposed by Karasek.[14]

The working conditions variable included four questions related to the availability of individual protective equipment, noise in the workplace, noise from outside of the workplace and availability of sufficient material resources with which to carry out the tasks. The responses were added to provide a composite score and analyzed as an ordinal variable.

The following data were requested: sex, age, schooling, marital status, number of children, self-reported race/skin color, monthly income, social activities and length of time working in the institution. Mental health status was investigated by asking about the occurrence of psychological and/or psychiatric treatment in the preceding 12 months, use of psychiatric medication and medical diagnosis of depression or anxiety disorder. The variable was developed according to confirmation

[a] Lima EP, Barreto SM, Assunção AA. Mensuração da exposição a eventos traumáticos ocupacionais em profissionais de emergências urbanas. In: VIII Congresso Brasileiro de Epidemiologia; 2011 Novembro 12-16; São Paulo, Brasil.

of at least one of the events investigated. General health status explored the following: absenteeism-illness, workplace accidents, chronic diseases (hypertension, diabetes, asthma/bronchitis, myocardial infarction, emphysema and musculoskeletal disorders) and problems with alcohol (measured using the CAGE scale[16] – Cut Down, Annoyed, Guilty, and Eye-opener).

Adverse life events focused on the preceding 12 months were stressful events (general health problems, serious financial problems, involuntary loss of residence relationship breakdown or death of a close relative), traumatic events (hospitalization for a serious health problem or accident, assault or physical attack) and social discrimination (gender, sexual orientation, disability, age or socioeconomic condition). The three dimensions were analyzed as ordinal variables, calculated as the number of events experienced.

The analyses were carried out using the Stata, version 11.0 program, in four stages: 1) descriptive, which included means and standard deviations for continuous and discrete variables, and percentages for ordinal and nominal variables; 2) univariate logistic regression; 3) multivariate logistic regression by blocks (sociodemographic, occupational, health and life events) including variables associated with the outcome ($p \leq 0.20$) in the univariate analyses; and 4) multivariate logistic regression including variables associated with smoking in the multivariate analyses by block ($p \leq 0.05$).

The project was approved by the *Corpo de Bombeiros de Minas Gerais* and by the Research Ethics Committee of the *Universidade Federal de Minas Gerais* (ETIC no. 0387.0.203.000-10). The participants signed a consent form after being informed of the objectives and confidential and voluntary nature of the research.

RESULTS

Of the 954 firefighters, 794 subjects were eligible. A response rate of 89.5% (n = 711) was obtained, satisfying the criteria established for quotas per battalion and subunit (80.0% to 96.6%). Comparison between the respondents and non-respondents indicated similarities with regards age (p = 0.106), schooling (p = 309), marital status (p = 0.677), position in the hierarchy (p = 0.113), unit worked in (p = 0.218) and length of time working at *Corpo de Bombeiros* (p = 0.117).

Table 1. Sociodemographic characteristics and life habits of firefighters in Belo Horizonte, MG, Southeastern Brazil, 2011.

Variables	Smokers		Non smokers		OR	95%CI
	n	%	n	%		
Age (years)						
18 to 29	32	6.3	479	93.7	–	–
30 to 50	22	11.1	176	89.9	1.87	1.06;3.31[b]
Schooling						
Primary education	10	18.5	44	81.5	–	–
High school education	28	6.0	440	94.0	0.28	0.13;0.61[b]
College/Post-graduate	15	8.0	172	92.0	0.38	0.16;0.91[b]
Marital status						
Married/Serious relationship	33	8.4	361	91.6	–	–
Single	20	7.0	264	93.0	0.83	0.47;1.48
Separate/Divorced	1	3.0	32	97.0	0.34	0.45;2.58
Children						
No	19	5.7	314	94.3	–	–
Yes	35	9.3	342	90.7	1.69	0.95;3.02[a]
Ethnicity/Skin color						
White	18	8.3	198	91.7	–	–
Mixed ethnicity	25	6.8	342	93.2	0.80	0.43;1.51
Black	9	9.3	88	90.7	1.13	0.49;2.60
Asiatic/Indian	2	7.1	26	92.9	0.85	0.19;3.86
Income (R$)						
≤ 2,500.00	15	8.8	155	91.2	–	–
2,501.00 to 4,000.00	22	7.4	274	92.6	0.83	0.42;1.64
4,001.00 to 5,500.00	4	3.0	128	97.0	0.32	0.10;0.90[b]
5,501.00 to 7,000.00	11	17.7	51	82.3	2.23	0.96;5.16[a]
> 7,000.00	2	3.9	49	96.1	0.42	0.09;1.91
Social activities						
Yes	51	7.9	597	92.1	–	–
No	2	5.3	36	94.7	0.65	0.15;2.78

[a] Variable associated with smoking in univariate analysis ($p \leq 0.20$)
[b] Variable associated with smoking in univariate analysis ($p \leq 0.05$)

The majority were aged under 30 years (72.1%), had high school education (66.0%), were married or in a serious relationship (55.4%), with children (53.1%), mixed ethnicity (51.8%) and a household income between R$ 2,501.00 and R$ 4,000.00 (41.6%); 5.4% of the participants did not report any social activities. The majority (64.7%) had spent three years working in the institution and almost half of the participants held the post of soldier (45.3%).

About half of the firefighters (50.5%) reported exposure to two or more precarious situations. The descriptive analysis of the occupational stressors indicated: high demand (n = 135), low control (n = 148), poor social support (n = 184) and high exposure to occupational stressors (n = 161).

A quarter of the firefighters reported clinical diagnosis of at least one chronic disease, 16.0% reported psychiatric problems in the past and 9.6% indicated having problems with alcohol. The rate of absenteeism in the preceding 12 months was 44.1%. The majority reported doing physical activity one or two times a week (50.2%); 59.5%, 14.4% and 24.8% of the firefighters had been exposed to at least one stressful event, traumatic event and social discrimination, respectively.

The prevalence of smoking was 7.6%, and 9.8% were ex-smokers. Those who were older, with lower levels of schooling and with children had higher levels of current tobacco use. A non-linear relationship between income and the outcome was observed: a negative association between R$ 4,001.00 and R$ 5,000.00 and positive between R$ 5,501.00 and R$ 7,000.00 (Table 1).

The univariate analysis indicated positive associations between smoking and more frequent exposure to operational stressors and greater length of time working in the Institution. High demand at work was associated with the outcome, indicating a negative relationship with smoking (Table 2).

Problems with alcohol in the past year, psychiatric problems in the past, absenteeism and low frequency of or no physical activity were positively associated with smoking. Exposure to one or more stressful events, two or more traumatic events and one or more situations of social discrimination was positively associated with smoking in firefighters (Table 3).

In intermediary models (by blocks), formal schooling was negatively associated with the outcome; the relationship between monthly income (from R$ 5,501.00 to R$ 7,000.00) and smoking was positive. A positive association was found with high exposure to operational stressors; however, there was a significant inverse association with high demand at work. Low frequency of or no physical activity and psychiatric problems in the past were positively associated with current smoking. Adverse life events were positively associated with smoking in firefighters (exposure to one or more stressful events, two or more traumatic events and one or more situations of social discrimination).

The final multivariate model included sociodemographic and occupation variables, health status and exposure to adverse life events. Schooling was kept in the final model, indicating that a higher level of schooling is negatively associated with smoking. With regards to

Table 2. Information on employment and occupational stressors in firefighters in Belo Horizonte, MG, Southeastern Brazil, 2011.

Variable	Smokers		Non smokers		OR	95%CI
	n	%	n	%		
Job Content Questionnaire						
Low demand	48	8.5	519	91.5	–	–
High demand	6	4.4	129	95.6	0.88	0.43;1.79[a]
High control	42	7.6	509	92.4	–	–
Low control	10	6.8	138	93.2	0.88	0.43;1.79
High social support	43	8.2	479	91.8	–	–
Low social support	11	6.0	173	94.0	0.71	0.36;1.40
Operational stressors						
Low exposure	32	6.1	493	93.9	–	–
High exposure	20	12.4	141	87.6	2.18	1.21;3.94[b]
Time in service (years)						
1 to 2	13	5.2	238	94.8	–	–
3 to 15	15	7.8	178	92.2	1.54	0.72;3.32
16 to 30	26	9.7	241	90.3	1.98	0.99;3.94[a]
Poor working conditions						
0	8	9.9	73	90.1	–	–
1	20	7.4	249	92.6	0.73	0.31;1.73
2	18	6.6	256	93.4	0.64	0.27;1.54
3 or more	8	9.8	74	90.2	0.99	0.35;2.77

[a] Variable associated with smoking in univariate analysis ($p \leq 0.20$)
[b] Variable associated with smoking in univariate analysis ($p \leq 0.05$)

Table 3. Health status and exposure to adverse life events in firefighters in Belo Horizonte, MG, Southeastern Brazil, 2011.

Variable	Smoker		Non smoker		OR	95%CI
	n	%	n	%		
Problems with alcohol (CAGE)[a]						
No	43	6.7	597	93.3	–	–
Yes	11	16.2	57	83.8	1.94	1.50;2.50[c]
Chronic disease (number)						
0	40	7.2	515	92.8	–	–
1 or more	14	9.7	131	90.3	1.38	0.73;2.60
Mental disorders in the past						
No	34	5.8	552	94.2	–	–
Yes	30	17.2	96	82.8	3.38	1.87;6.12[c]
Absenteeism						
No	23	5.9	367	94.1	–	–
Yes	31	10.1	276	89.9	1.79	1.02;3.14[c]
Physical activity (times/week)						
≥ 3	15	4.7	303	95.3	–	–
1 or 2	35	9.9	319	90.1	2.22	1.19;4.14[c]
None	4	12.1	29	87.9	2.79	0.87;8.95[b]
Adverse life events						
0	12	4.2	273	95.8	–	–
1	18	7.4	227	92.7	1.80	0.85;3.82[b]
2 or more	23	13.2	151	87.8	3.46	1.68;7.16[c]
Traumatic life events						
0	39	6.4	567	93.6	–	–
1	7	9.6	66	90.4	1.54	0.66;3.59
2 or more	8	27.6	21	72.4	5.54	2.31;13.31[c]
Social discrimination						
0	31	5.9	496	94.1	–	–
1	17	14.2	103	85.8	2.64	1.41;4.95[c]
2 or more	6	11.1	48	88.9	2.00	0.79;5.03[b]

CAGE: Cut Down, Annoyed, Guilty, and Eye-opener
[a] Questionnaire measured using CAGE scale[16]
[b] Variable associated with smoking in univariate analysis ($p \leq 0.20$)
[c] Variable associated with smoking in univariate analysis ($p \leq 0.05$)

monthly income, only the R$ 5,500.00 to R$ 7,000.00 band (equivalent to US$ 2,558.00 to US$ 3,256.00) was positively associated with the outcome. Two occupational variables remained in the model: a positive association with operational stressors and an inverse association with high demand at work. The presence of psychiatric problems in the past and exposure to two or more traumatic life events within the last year were positively associated with smoking. Exposure to situations of social discrimination had a non-linear relationship with the outcome: the intermediate band (exposure to a situation within the last year) was positively and significantly associated with smoking (Table 4).

DISCUSSION

The prevalence of smoking among firefighters (7.6%) was lower than that of the general population of males employed with no social security in Brazil in 2008 (26.4%)[9] and that obtained in a survey in Belo Horizonte in 2010 (15.0%).[b] Unemployment and precarious employment conditions are strongly associated with higher rates of morbidity.[12,13] Low salaries, insecure employment and weak interpersonal relationships are characteristics of casual, temporary employment[19] and are associated with greater vulnerability to harmful habits such as smoking.[10] It is probable that the occupational characteristics of the group analyzed (admission by public contest, job stability, guaranteed health insurance and health care, internal regulation of tobacco consumption and physical activity) explain the lower prevalence of smoking found here compared with general population surveys.

If, on the one hand, the military environment imposes healthy behavior and the nature of the professional activity requires physical willingness and performance (almost athletic), on the other, the firefighters are exposed to extreme situations. Studies have identified the burden

[b] Lima-Costa MF, Turci M, Macinko J. Saúde dos adultos em Belo Horizonte. Belo Horizonte: Núcleo de Estudos em Saúde Pública e Envelhecimento da Fiocruz, Universidade Federal de Minas Gerais; 2012.

of organizational and operational stressors in adherence to harmful habits.[2,5] The demand for emergency services in large urban centers is growing and calls need to be responded immediately, which produces an intense work pace and an high workload.

Physical and psychosocial aspects of the work may influence whether and how much workers smoke, with emphasis on the psychosocial factors approached by the DCS model.[11,23] High demands at work was inversely associated with smoking. It is probable that the way in which the variable studied was measured influenced the results. The relationship between psychosocial demand and smoking is paradoxical.[1] The number of cigarettes smoked and lapsed attempts to quit, on the one hand, are positively associated with high demands at work; attempts to quit are, on the other hand, associated in the same direction. According to Albertsen et al[1] (2006), the relationship between smoking and work demands may not be linear. Individuals exposed to moderately work demands may be more enthusiastic to give up smoking; but, if exposed to the constraints of arduous tasks, they have the escape valve of resorting to substance use. Firefighters submitted to insignificant demands would be more vulnerable because less motivated and engaged. However, there are firefighters who are submitted to high demands at work. Such considerations are not allowed when the design of this occupational epidemiological study is taken into consideration.

Operational stressors predict different mental health outcomes, including symptoms of Post-Traumatic Stress Disorder (PTSD),[15] depression[6] and alcohol abuse.[5] However, there is no literature support to analyze the relationship with smoking in emergency sector. Exposure to traumatic events (victims of disasters, car accidents, combat and other) in non-occupational contexts is associated with smoking,[8] including current habit, quantity of tobacco consumed and nicotine dependency. The relationship is straightforward; however, it is also mediated by symptoms of PTSD.[8] Among adults exposed to traumatic events, the prevalence of smoking reaches 36.0%, a rate considerably higher than that found in the general population, including in Brazil.[9,17] The mechanisms that link smoking to trauma are not well understood, but two hypotheses are discussed: 1) smoking is a coping strategy to deal with negative effects resulting from exposure to traumatic events, and 2) remembering the trauma incentivizes the habit as it functions as a strategy for dealing with the symptoms of PTSD[8] or others disorders linked to trauma. These hypotheses are not exclusive and require elucidation.

Smoking may be a strategy for dealing with the negative effects of social discrimination and traumatic life events. Smoking may be a consequence of exposure to non-work related stressors.[11] In the past, mental disorders were associated with the outcome in question. This result is in agreement with the literature[8] and suggests that the relationship between mental health and smoking may be independent of exposure to adverse events (occupational or otherwise). Mood disorders and anxiety, both addressed in this survey, share symptoms of negative affect[18] that are aggravated when faced with traumatic or stressful life events and may sustain smoking in firefighters.

Schooling remained consistently within the final multivariate model,[19] indicating that higher levels of formal education are associated with lower rates of current smoking, The relationship between monthly income showed a non-linear pattern, with

Table 4. Multiple logistic regression for smoking as a dependent variable. Firefighters in Belo Horizonte, MG, Southeastern Brazil, 2011.

Variable	OR	95%CI
Sociodemographic		
Schooling		
Primary education	–	–
High school education	0.30	0.12;0.72[b]
Further/Post-graduate	0.36	0.13;0.99[a]
Income (R$)		
≤ 2,500.00	–	–
2,501.00 to 4,000.00	0.69	0.32;1.52
4,001.00 to 5,500.00	0.34	0.10;1.14
5,501.00 to 7,000.00	2.94	1.15;7.50[a]
> 7,000.00	0.62	0.12;3.09
Occupational stressors		
Operational stressors (PDS)		
Low exposure	–	–
High exposure	2.04	1.05;3.96[a]
Psychosocial factors (JCQ)		
Low demand	–	–
High demand	0.33	0.12;0.88[a]
Health		
Mental disorders in the past		
No	–	–
Yes	3.90	1.47;5.72[b]
Adverse life events		
0	–	–
1	1.16	0.46;2.97
2 or more	4.74	1.70;13.25[b]
Social discrimination		
0	–	–
1	2.87	1.42;5.81[b]
2 or more	1.33	0.41;4.34

[a] Variable associated with smoking in univariate analysis ($p \leq 0.05$)
[b] Variable associated with smoking in univariate analysis ($p \leq 0.01$)

significant, positive results for an intermediate band of the variable. This result is similar to that found in the Brazilian population[9] and indicates a complex relationship between schooling, income and the labor market.

The frequency of doing physical activity did not remain in the final model, possibly due to the regulation of physical activity in the target group and subsequent decrease in sedentarism in this population.

The lack of association with chronic diseases can be explained by the study design. These morbidities were more prevalent in smokers, but the results were not significant, possibly due to the lack of statistic power (Table 4). The reverse causality effect is plausible: firefighters for whom the above mentioned diagnoses were confirmed would stop smoking to avoid complications and health problems. The healthy worker effect also contributes to this lack of statistical association, as those who are ill may have retired or are on sick leave for treatment.

Among the limitations of this study are the exclusive use of self-reporting instruments and the lack of complementary data on smoking, including the age at which the habit began, length (in years) of the habit, quantity of cigarettes consumed and attempts to quit. Future studies should seek to understand the relationships between occupational stressors and smoking in firefighters.

To conclude, the low prevalence of smoking among firefighters in Belo Horizonte, compared to rates in population studies, indicates the relevance of jobs with social protection in explaining unhealthy habits. Organizational and operational stressors contribute independently to explain the habit of smoking in the sample studied. Sociodemographic variables and adverse life events were relevant. Further studies could consider intensity of consumption and attempts to quit smoking.

REFERENCES

1. Albertsen K, Borg V, Oldenburg B. A systematic review of the impact of work environment on smoking cessation, relapse and amount smoked. *Prev Med*. 2006;43(4):291-305. DOI:10.1016/j.ypmed.2006.05.001
2. Allard KO, Thomsen JF, Mikkelsen S, Rugulies R, Mors O, Koergaard A, et al. Effects of psychosocial work factors on lifestyle changes – a cohort study. *J Occup Environ Med*. 2011;53(12):1364-71. DOI:10.1097/JOM.0b013e3182363bda
3. Alwan A, MacLean DR, Riley LM, d'Espaignet ET, Mathers CD, Stevens GA, et al. Monitoring and surveillance of chronic non-communicable diseases: progress and capacity in high-burden countries. *Lancet*. 2010;376(9755):1861-8. DOI:10.1016/S0140-6736(10)61853-3
4. Araújo TM, Karasek R. Validity and reliability of the job content questionnaire in formal and informal jobs in Brazil. *Scand J Work Environ Health Suppl*. 2008;6:52-9.
5. Bacharach SB, Bamberger PA, Doveh E. Firefighters, critical incidents, and drinking to cope: the adequacy of unit-level performance resources as a source of vulnerability and protection. *J Appl Psychol*. 2008;93(1):155-69. DOI:10.1037/0021-9010.93.1.155
6. Chen YS, Chen MC, Chou FHC, Sun FC, Chen PC, Tsai KY, et al. The relationship between quality of life and posttraumatic stress disorder or major depression for firefighters in Kaohsiung, Taiwan. *Qual Life Res*. 2007;16(8):1289-97. DOI:10.1007/s11136-007-9248-7
7. Danaei G, Hoom SV, Lopez AD, Murray CJL, Ezzati M, Comparative Risk Assessment Collaborating Group (Cancers). Causes of cancer in the world: comparative risk assessment of nine behavioural and environmental risk factors. *Lancet*. 2005;366(9499):1784-93. DOI:10.1016/S0140-6736(05)67725-2
8. Feldner MT, Babson KA, Zvolensky MJ. Smoking, traumatic event exposure and post-traumatic stress: a critical review of the empirical literature. *Clinical Psychol Rev*. 2007;27(1):14-45. DOI:10.1016/j.cpr.2006.08.004
9. Giatti L, Barreto SM. Tabagismo, situação no mercado de trabalho e gênero: análise da PNAD 2008. *Cad Saude Publica*. 2011;27(6):1132-42. DOI:10.1590/S0102-311X2011000600010
10. Ham DC, Przybeck T, Strickland JR, Luke DA, Bierut LJ, Evanoff BA. Occupational and workplace policies predict smoking behaviors – analysis of national data from the current population survey. *J Occup Environ Med*. 2011;53(11):1337-45. DOI:10.1097/JOM.0b013e3182337778
11. Heikkillä K, Nyberg ST, Fransson EI, Alfredsson L, De Bacquer D, Bjorner JB, et al. Job strain and tobacco smoking: an individual-participant data meta-analysis of 166 130 in 15 European studies. *PLoS ONE*. 2012;7(7):e35463. DOI:10.1371/journal.pone.0035463
12. Kim SS, Subramanian SV, Sorensen G, Perry MJ, Christiani DC. Association between change in employment status and new-onset depressive symptoms in South Korea – a gender analysis. *Scand J Work Health*. 2012;38(6):537-45. DOI:10.5271/sjweh.3286
13. Idris MA, Dollard MF, Winefield AH. The effect of globalization on employee psychological health and job satisfaction in malaysian workplaces. *J Occup Health*. 2011;53(6):447-54. DOI:10.1539/joh.11-0035-FS
14. De Lange AH, Taris TW, Kompier MAJ, Houtman ILD, Bongers PM. "The very best of the millennium": longitudinal research and the Demand-Control-(Support) Model. *J Occup Health Psychol*. 2003;8(4):282-305. DOI:10.1037/1076-8998.8.4.282
15. Laposa JM, Alden LE. Posttraumatic stress disorder in the emergency room: exploration of a cognitive model. *Behav Res Ther*. 2003;41(1):49-65. DOI:10.1016/S0005-7967(01)00123-1
16. Masur J, Monteiro MG. Validation of the "CAGE" alcoholism screening test in a Brazilian psychiatric inpatient hospital setting. *Braz J Med Biol Res*. 1983;16(3):215-8.
17. Schmidt MI, Duncan BB, Silva GA, Menezes AM, Monteiro CA, Barreto SM, et al. Chronic non-communicable diseases in Brazil: burden and current challenges. *Lancet*. 2011;377(9781):1949-61. DOI:10.1016/S0140-6736(11)60135-9
18. Simms LJ, Watson D, Doebbeling BN. Confirmatory factor analysis of posttraumatic stress symptoms in deployed and nondeployed veterans of the Gulf War. *J Abnorm Psychol*. 2002;111(4):637-47. DOI:10.1037/0021-843X.111.4.637
19. Strazdins L, D'Souza RM, Clements M, Broom DH, Rodgers B, Berry HL. Could better jobs improve mental health? A prospective study of change in work conditions and mental health in mid-aged adults. *J Epidemiol Community Health*. 2011;65(6):529-34. DOI:10.1136/jech.2009.093732
20. van der Velden PG, Kleber RJ, Grievink L, Yzermans JC. Confrontations with aggression and mental health problems in police officers: the role of organizational stressors, life-events and previous mental health problems. *Psychol Trauma (DNLM)*. 2010;2(2):135-44. DOI:10.1037/a0019158
21. World Health Organization. 2008-2013 Action plan for the global strategy for prevention and control of noncommunicable diseases. Geneva; 2008.
22. World Health Organization. Healthy workplaces: a model for action for employers, workers, policy-makers and practitioners. Geneva; 2010.
23. Yasin SM, Retneswari M, Moy FM, Darus A, Koh D. Job stressors and smoking cessation among Malaysian male employees. *Occup Med (Lond)*. 2012;62(3):174-81. DOI:10.1093/occmed/kqs005

This study was supported by the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq), PhD grant (Process no. 202176/2011-8) to Lima E.P.
Article based on the doctoral thesis of Lima E.P., entitled: "Transtorno de Estresse Pós-Traumático (TEPT) em bombeiros de Belo Horizonte", presented to the Post-Graduate Program Public Health of the Faculty of Medicine, *Universidade Federal de Minas Gerais*, in 2013.
The authors declare that there are no conflicts of interest.