Prevalence of musculoskeletal pain among teachers

Prevalência de dor musculoesquelética em professores

Abstract

The article describes the prevalence of musculoskeletal pain according to socio-demographic and occupational variables among elementary school teachers. A cross-sectional study included all 4,496 school teachers of the municipal elementary education network of Salvador, Bahia, Brazil. There was a high prevalence of musculoskeletal pain in lower limbs (41.1%), upper limbs (23.7%) and back (41.1%). The overall prevalence of musculoskeletal pain related to any of the three body segments was 55%. Musculoskeletal pain was more prevalent in the three body segments investigated: among women, the elderly, those with high-level school education, married, with three or more children, and who had worked over fourteen years as teachers. The prevalence of musculoskeletal pain was associated with the following occupational variables: working over five years at the school, high level of physical exertion, not having a paid activity other than teaching, and reporting heat in the classroom. The findings draw attention toward the need to adopt public policies to improve the working conditions of teachers.

Keywords: teacher; occupational health; education; low back pain; back pain.

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Resumo

Este artigo descreve a prevalência de dor musculoesquelética segundo variáveis sociodemográficas e ocupacionais de professores do ensino básico. Um estudo epidemiológico de corte transversal, de caráter censitário, incluiu todos os 4.496 professores do ensino fundamental da rede municipal de Salvador, Bahia, Brasil. As prevalências de dor musculoesquelética em membros inferiores (41,1%), membros superiores (23,7%) e dorso (41,1%) foram elevadas. A prevalência global de dor musculoesquelética relacionada a qualquer um dos três segmentos corporais foi de 55%. A dor musculoesquelética foi mais prevalente, nos três segmentos investigados, entre as mulheres, os mais velhos, de nível educacional médio, casados, com três ou mais filhos e que trabalhavam mais de quatorze anos como docente. A prevalência de dor músculoesquelética associou-se às seguintes variáveis ocupacionais: tempo de trabalho superior a cinco anos na escola estudada, elevado esforço físico, outra atividade remunerada não docente e calor em sala de aula. Esses achados alertam para a necessidade de adoção de políticas públicas para melhoria das condições de trabalho do professor.

Palavras-chave: professor; saúde do trabalhador; educação; dor lombar; dor nas costas.

INTRODUCTION

Work is essential in the lives of men and women; nonetheless, it can become a health hazard when it is carried out in an inappropriate way. Some groups of workers, due to occupational characteristics, are more exposed to work related musculoskeletal pain[1]. Teachers stand out among these groups. Sometimes, teaching is carried out under unfavorable circumstances, in which teachers mobilize their physical, cognitive, and affective capacity to reach teaching production objectives, over demanding or generating over effort of their psycho-physiologic functions[2]. If there is not enough time for recovery, pain symptoms that account for the high levels of absenteeism due to health conditions in this group of workers are triggered or prompted. Thus, teaching leads to stress, with consequences to physical and mental health and with an impact on professional performance[1,3].

Social transformations, educational reforms and new teaching models have influenced current conditions of teaching, leading to changes in the profession. Therefore, teachers go from a stable and relatively safe status to a state of instability at work, subsequent to new, precarious and unregulated working modes[2].

In the past, the educational sector went through changes that led to the escalation of teachers' activities and to increasingly precarious conditions in work relations. Cuts in funding for education reflect the new social organization processes in the globalized age. In face of market demands in the economic globalization process, educational institutions have begun to face new obstacles, especially in relation to meeting their educational commitments appropriately and satisfactorily. The process generates intense conflict for teachers, which are also worsened by the social demands of teachers' role: on one hand the demands of quality teaching and positive results; on the other hand, in a scenario of mass production, scarcity of material and human resources. These opposite movements push toward a dilemma: the generation of positive

results without appropriate and necessary tools. This scenario tends to generate lack of prestige and underrating of teachers, already overloaded by the need to respond to the new demands of Education[4].

Growing responsibilities and demands on teachers are the consequence of a fast historical process in Brazilian society. One of the reflexes of these transformations was called teaching "malaise", represented by a set of health hazards due to, among many factors, not adapting to the new demands of the profession[2].

In the past decade, different studies described the most prevalent health problems among teachers, in which musculoskeletal disorders, voice problems and psychiatric disorders stand out[1,5-10].

Musculoskeletal pain or painful feeling has been mentioned in several studies among teachers as a relevant health problem, and conditions due to musculoskeletal system disorders are the main causes of absenteeism and of professional diseases in this category[11]. Everyone, excluding individuals with congenital insensitivity, has already felt pain sometime in their lives. However, when symptoms continue, they become a problem, a reason for reducing work activity, work leaves and absence, in addition to the possibility of developing depression[12]. Several socio-demographic, psychosocial, physical, and organizational factors are related to triggering, developing, and maintaining musculoskeletal pain [13].

Medical and social costs due to these problems have grown incessantly in past years and currently reach figures of roughly billions of dollars in several countries, representing a significant impact on health and quality of life of workers[14]. Therefore, the analysis and appropriate determination of the problem, and the investigation of its associated factors, are relevant to design measures that may intervene on the problem.

This study aims to describe the prevalence of musculoskeletal pain according to socio-demographic and teaching characteristics among teachers of the municipal school network of Salvador, Bahia, Brazil.

METHODS

Cross sectional, descriptive, epidemiological study on the working conditions and health of teachers of the municipal teaching network of Salvador. The municipal teaching network encompasses pre-school, elementary school level I (1st to 5th grade) and elementary school level II (6th to 9th grade). A survey including all teachers of the municipal school network of Salvador was performed during a teacher registration recall, in 2006.

The data collecting tool used comprised blocks of questions related to socio-demographic information aimed at characterizing teachers; their work in the municipal network of Salvador; conditions in the school work environment; mental health; vocal health and main health problems reported by teachers. The questionnaire was given to teachers in a sealed and anonymous envelope. The envelope, in addition to the questionnaire, also had a letter from the Municipal Secretary of Education and Culture, asking teachers to participate in the survey and informing that it was a voluntary act in which teachers should not identify themselves.

The dependent variable, frequency of musculoskeletal pain, was investigated in three body regions: lower limbs: "leg pain"; upper limbs: "arm pain", and back: "back pain". The frequency of pain was measured on a Likert type scale: 0=never; 1=rarely; 2=not very frequently; 3=frequently and 4=very frequently. In the study, musculoskeletal pain was taken into account when the teacher reported pain as "frequently" or "very frequently", for each body region mentioned above.

The initial descriptive analysis considered socio-demographic variables, variables related to teaching, and variables related to work load.

The prevalence of musculoskeletal pain was estimated according to socio-demographic variables (age, sex, marital status, schooling, having children, and number of children), characteristics of teaching (time

working as a teacher, time working at school in which teacher answered questionnaire, work shift, number of classes, average number of pupils per class, weekly schedule, and other paid activity besides teaching), and work loads (physical loads: heat; ergonomic loads: furniture and size of classrooms). Prevalence ratios and respective 95% confidence intervals were calculated. Pearson's chi-square test was used to assess statistical significance, adopting α=5%. The prevalence of musculoskeletal complaints according to time working was adjusted by age group using the Mantel-Haenszel method.

The present study followed the recommendations of resolution 196/96 of the National Health Council. Teachers were assured confidentiality of data provided, and information was used exclusively to meet the objectives of the study. Under no circumstances were teachers identified, thus guaranteeing information confidentiality. The Project was approved by the Research Ethics Committee of *Maternidade Climério de Oliveira* of Universidade Federal da Bahia, report #83/2007.

RESULTS

Of the 4,697 teachers of the municipal school network, 4,496 were included (95.1% response rate). Women represented most of the population studied (92.0%); 47.9% were 40 years old or over, ranging from 18 to 69 years; the mean age was 40.0 ± 9.4 years. Time working as a teacher and at the school ranged, respectively, from 1 to 45 years (mean of 14.4 ± 8.4 years) and from 1 to 37 years (mean of 6.5 ± 6.3 years). There were 68.3% of teachers at Elementary Level I. Teachers had, on average, 2.1±1.7 classes and 31.2 ± 5.8 students per classroom. Approximately 14% of teachers worked at another municipal school and 31.9% at a school of another teaching network.

The prevalence of musculoskeletal pain (MSP) was 41.1% for lower limbs, 41.1% for back, and 23.7% for upper limbs (Table 1). The overall prevalence of MSP related to anyone of the three body segments was 55%: 19.7% reported pain only in one of the three body segments analyzed, 19.9% in two segments, and 15.4% in three segments.

The prevalence of MSP was higher among those who reported back and lower limb pain together (29.8%). Simultaneous back and upper limb MSP was reported by 18.5% of the sample, and upper limbs and lower limbs by 17.7% of the teachers.

The prevalence of musculoskeletal pain in the population studied was higher among women than among men for the three body segments: lower limbs, upper limbs and back (Table 2). Regarding age group, an increase in MSP with age was observed (Table 2). Teachers with high-school education had a higher prevalence of lower limb pain (46.4%) than those with college level schooling. Higher prevalence of upper limb and back pain were observed among widowed, separated, and divorced teachers. Having more than three children was positively associated with MSP (Table 2).

Teachers with fourteen or more years of profession had a higher prevalence of MSP at statistically significant levels in the segments analyzed (Table 2). When adjusted for age, the association between time working and MSP in the three segments studied remained positive (Table 3).

The identification of musculoskeletal pain in the body segments studied accor-

Table1 - *Prevalence (%) of musculoskeletal pain in teachers according to body region. Salvador, Bahia, 2006.*

Musculoskeletal Pain	N	n	%
Lower limbs	4298	1761	41.0
Upper limbs	4238	1005	23.7
Back	4306	1764	41.0

Table 2 - Prevalence (%) of musculoskeletal pain in lower limbs, upper limbs and back, according to socio-demographic variables of teachers of Salvador, Bahia, 2006.

	Lower Limbs		Upper Limbs		Back	
	%	PR (95% CI)	%	PR (95% CI)	%	PR (95% CI)
Sex						
Male	22.0	1.00	15.4	1.00	26.6	1.00
Female	42.6	1.98 (1.57- 2.38)***	24.6	1.59 (1.22 - 2.07)***	42.1	1.58 (1.31 - 1.90)***
Age Group						
Up to 29 years	37.5	1.00	21.1	1.00	37.2	1.00
30 to 39 years	39.8	1.12 (0.98 - 1.26)	20.6	0.98 (0.81 - 1.17)	37.9	1.02 (0.90 - 1.15)
≥ 40 years	43.8	1.28 (1.01 - 1.38)***	27.7	1.31 (1.10 - 1.56)**	44.6	1.20 (1.07 - 1.35)**
Schooling						
College	39.1	1.00	21.5	1.00	39.5	1.00
High School	46.4	1.18 (1.09 - 1.28)***	29.2	1.36 (1.21 - 1.52)***	45.1	1.14 (1.06 - 1.23)**
Marital Status						
Single	38.5	1.00	21.8	1.00	38.1	1.00
Married	42.7	1.11 (1.03 - 1.21)*	24.3	1.11 (0.98 - 1.26)	41.9	1.06 (0.97 - 1.15)*
Widow/Sep/Divorced	42.7	1.12 (0.99 - 1.25)	26.6	1.21 (1.03 - 1.43)*	45.6	1.20 (1.07 - 1.33)*
Children						
No	37.6	1.00	20.6	1.00	37.4	1.00
Yes	43.0	1.14 (1.06 - 1.23)**	25.6	1.24 (1.10 - 1.40)***	43.1	1.15 (1.06 - 1.24)***
Number of children						
1 child	40.6	1.00	23.0	1.00	40.5	1.00
2 children	42.3	1.04 (0.94 - 1.15)	25.7	1.12 (0.96 - 1.30)	42.6	1.05 (0.95 - 1.16)
≥ 3 children	48.5	1.19 (1.07 - 1.33)**	30.5	1.32 (1.12 - 1.56)**	49.0	1.21 (1.08 - 1.35)**
Time working as teacher						
≤ 14 years	38.3	1.00	19.9	1.00	37.2	1.00
> 14 years	44.8	1.17 (1.09 - 1.26)***	29.2	1.46 (1.31 - 1.64)***	46.2	1.24 (1.15 - 1.34)***

Prevalence Ratio (PR), Confidence Interval (CI)
* p<0.05, ** p<0.01, *** p<0.001

Table 3 - Prevalence (%) of musculoskeletal pain according to time working, adjusted by age group, among teachers of Salvador, Bahia, 2006.

	Lower Limbs	Upper Limbs	Back
	PR (95%CI)		PR (95%CI)
Time working			
≤ 14 years	1.00	1.00	1.00
> 14 years	1.14 (1.04 – 1.24)**	1.39 (1.21 - 1.59)***	1.20 (1.09 – 1.31)***

Prevalence Ratio (PR), Confidence Interval (CI)
* p<0.05, ** p<0.01, *** p<0.001

ding to variables related to teaching and work loads is presented in table 4. More time working at the school in which the questionnaire was answered (> 5 years) associated positively with musculoskeletal pain, at statistically significant levels. After adjusting for age, time working at school remained significantly associated with MSP in upper limbs ($p < 0.001$) and back ($p < 0.01$), and had a limited significance level ($p < 0.06$) for lower limbs. The prevalence of MSP in lower limbs was associated in a statistically significant way ($p < 0.05$ or less) with working more than 5 years, a weekly schedule greater than 40 hours, having another paid activity in addition to teaching (as

Table 4 - Prevalence (%) of musculoskeletal pain according to teaching variables and work loads of teachers of Salvador, Bahia, 2006.

	Lower Limbs		Upper Limbs		Back	
	%	PR (95%CI)	%	PR (95%CI)	%	PR (95%CI)
Time working at school						
≤ 5 years	41.3	1.00	22.3	1.00	40.5	1.00
> 5 years	45.8	1.12 (1.03 – 1.19)**	30.0	1.34 (1.19 – 1.50)***	46.7	1.15 (1.07 – 1.24)***
PR adjusted by age		1.08 (1.00 – 1.18)		1.35 (1.14 – 1.45)***		1.15 (1.03 – 1.21)***
Work shift at school						
1 shift	39.7	1.00	22.7	1.00	39.8	1.00
≥ 2 shifts	42.3	1.06 (0.99 – 1.15)	24.9	1.09 (0.98 – 1.23)	42.4	1.06 (0.99 – 1.14)
Number of classes taught						
1 class	41.8	1.00	23.4	1.00	40.9	1.00
2 classes	40.4	0.98 (0.88 – 1.05)	24.1	1.03 (0.90 – 1.17)	40.3	0.98 (0.90 – 1.07)
≥ 3 classes	37.8	0.90 (0.80 – 1.02)	24.0	1.03 (0.86 – 1.22)	37.4	0.91 (0.81 – 1.03)
Number of students per class						
≤ 30 students	39.6	1.00	22.3	1.00	39.8	1.00
> 30 students	42.4	1.07 (0.99 – 1.15)	25.6	1.14 (1.02 – 1.28)*	41.7	1.05 (0.97 – 1.13)
Weekly schedule						
20 hours	39.1	1.00	22.4	1.00	39.8	1.00
40 hours	42.9	1.09 (1.01 – 1.18)*	25.2	1.12 (1.01 – 1.26)*	42.4	1.06 (0.99 – 1.15)
Work at other school						
No	41.1	1.00	23.3	1.00	40.7	1.00
Yes	39.7	0.96 (0.87 – 1.07)	25.6	1.10 (0.94 – 1.27)	41.8	1.03 (0.93 – 1.14)
Other paid activity						
No	41.8	1.00	24.2	1.00	41.4	1.00
Yes	36.2	0.86 (0.76 – 0.99)*	19.6	0.81 (0.66 – 0.99)*	37.6	0.91 (0.80 – 1.03)
Intense Physical Exertion						
No	34.7	1.00	20.1	1.00	36.4	1.00
Yes	49.3	1.42 (1.32 – 1.52)***	28.6	1.42 (1.27 – 1.59)***	47.0	1.29 (1.20 – 1.38)***
Heat						
No	35.5	1.00	19.3	1.00	36.4	1.00
Yes	42.2	1.19 (1.07 – 1.32)**	24.7	1.28 (1.10 – 1.50)**	42.2	1.16 (1.04 – 1.28)**
Furniture						
Appropriate	39.8	1.00	22.6	1.00	39.3	1.00
Inappropriate	42.2	1.05 (0.98-1.14)	25.2	1.11 (0.99 – 1.24)	43.5	1.11 (1.03 – 1.19)**

Prevalence Ratio (PR), Confidence Interval (CI)
* p<0.05, ** p<0.01, *** p<0.001

a protective factor), a lot of physical exertion and heat in the classroom. Complaints of MSP in upper limbs were significantly associated with working more than 5 years, more than 30 students per class, weekly schedule greater than 40, having another paid activity (as a protective factor), a lot of physical exertion and heat in the classroom. Back MSP was significantly associated with working more than 5 years, intense physical exertion, inappropriate furniture, and heat in the classroom.

DISCUSSION

In the population studied, there was a predominance of women with a mean age above 40 years, with complete college

education, married and with a child. Such findings are similar to those of other studies carried out with teachers[5,6,8,10]. The mean time working as a teacher was 14.4 years, relatively higher in comparison to the studies of Reis et al.[8] and Silvany Neto et al.[5], in which the mean time was 10.4 and 11 years, respectively. Gasparini et al.[10], in a study performed with teachers of the municipal network of Belo Horizonte, found a mean working time of 16.6 years, higher than the findings for teachers of Salvador.

The findings confirm the higher percentage of female teachers in the educational sector. The scenario reflects the growth of the sector that occurred as of the second half of the 20th century, when there was the inclusion of many workers in the educational area. The introduction of women in the working world, as teachers and nurses, was conceived as a "care" activity and continuity of domestic activities[6]. In this fashion, education is a professional field currently occupied predominantly by women. Women are the majority of the category. According to a study performed by UNESCO[15] on the profile of teachers in Brazil, 81.3% of teachers were women.

Differences between working conditions of men and women have been mentioned in different studies with teachers, in that women are less qualified, earn lower wages, and have lower levels of control over work in comparison to men, and higher levels of demands[9]. These characteristics have also been described, in turn, to be associated with acquiring more physical and psychological diseases. Even though women prevail in teaching activities, they still get less qualified working positions, with lower wages and low social status [5,9].

The prevalence of MSP was higher among women, in the three body segments studied. Other studies have found a lower prevalence of MSP in women than those found herein[16-18]. However, it should be pointed out that the higher prevalence of MSP in women in comparison to men remained the same in these studies. In a study performed with the inhabitants of the province of Quebec[16], 20.4% of women were observed to report musculoskeletal pain in lower limbs, 22.3% in upper limbs and 30.4% in back. In the study of Kjellberg and Wadman[18], performed in Sweden, only 19% of pain occurred in lower limbs. Social and economic differences between Brazil and the countries of the studies mentioned, the way in which work is organized, the demands faced by workers and the protective factors involved[2] contribute to the differences observed in comparison to the present study.

The association between MSP and age over 40 years, in the three segments analyzed, may be explained by the natural wear of the body. However, this process may be influenced by the work environment, by the kind of activity developed and by the organization of work[6]. In this way, age would be a factor associated with the occurrence of pain. Reis et al.[3] discussed that teachers with more professional experience are less susceptible to the negative effects of work on health; on the other hand, if the time in the profession was marked by restriction to gaining experience as a teacher, exposure may be associated with adverse health situations.

Findings strengthen the assumption that prolonged exposure to teaching is associated with a higher occurrence of MSP. The finding does not change when association estimates are adjusted by the effect of age. It is noteworthy to mention, however, that musculoskeletal pain was reported by 37.5% (lower limbs) to 37.2% (back) of teachers with up to 29 years of age. The fact is concerning, because younger teachers seem to be having pain early. A study showed that younger workers face greater work demands, being exposed to risk factors, as they take over more activities and tasks in the beginning of the career[19].

In the present study, teachers with high-school level reported more musculoskeletal pain in comparison to those with complete college level. Teachers with less schooling could be in different working conditions because most of them are still being trained

(attending college), which would add new demands to teaching activities.

The teachers of Salvador with three or more children reported more MSP than those with one or two children. These findings are consistent with findings in the literature, which mention that having more children corresponds to more time dedicated to taking care of children; possibility of more psychological stress; and need of a higher work load to increase family income[20].

Time working as a teacher and time teaching at the school where the interview was done showed association with MSP, in the three body segments investigated. The changes in the Brazilian educational system that occurred in past decades brought about new demands to the teachers' category and increasingly precarious working conditions. These unfavorable conditions may be factors influencing the occurrence of MSP, as Malchaire, Cock and Vergracht have appointed[13]. Therefore, the prolonged exposure to these unfavorable conditions becomes a health risk factor.

Musculoskeletal pain was more frequent in teachers with a 40-hour weekly schedule and who worked on two or more shifts, although not all differences observed were statistically significant. Such characteristics suggest that the long and, probably, intense workday could contribute to the occurrence of the event. Teachers' overworking has been mentioned in other studies, both for preschool and college teachers[5-8,10,21-23].

MSP was more prevalent in teachers with classes with more than 30 students, although, also for this variable, results were statistically significant only for upper limbs.

Findings related to the number of classes and of students, even if the differences observed did not reach statistical significance levels, suggest that the increase in the number of classes and of students leads to additional activities for the teacher (planning and correcting school activities; more attention), increasing the occurrence of MSP. UNESCO and ILO (International Labor Organization) recommend not surpassing 25 students per class[24]. This scenario directly influences the quality of teaching, leading to worse learning conditions for students and health hazards to teachers.

Teachers who also worked in another school had a higher prevalence in comparison to those who worked in only one school. However, those with another paid activity besides teaching had a significantly lower prevalence of MSP than those who did not. These findings strengthen the assumption that teachers are submitted to work conditions that favor the emergence or maintenance of musculoskeletal pain. The situation could be favored by the worker being engaged in an activity other than teaching, and therefore exposed to work conditions different than teaching, and which could be more favorable. Seen from this perspective, the association between having another activity and MSP protected some of the segments analyzed, reaching statistically significant levels for lower limbs and upper limbs.

High physical exertion showed to be an important factor associated with MSP. These findings are consistent with Malchaire, Cock and Vergrocht's study[13] that highlighted, among other factors studied, physical work loads as important factors that contribute to the occurrence of MSP. Barros et al.[25] reported that the work of teachers involves a considerable physical load, established by the educator remaining in the orthostatic position during up to 95% of activities, with varied levels of flexion of the backbone. In the study developed by Delcor et al.[6], among physical exertions during teaching, time standing up was relevant. Standing up is not the only factor contributing to MSP, but other situations such as carrying material to school or to the classroom, installation of equipment/teaching resources, walking inside and outside the school may be associated with the occurrence of MSP.

Among the work environment conditions analyzed, there was an association between heat and MSP in lower limbs, upper limbs and back. Studies have shown that there is a correlation between carrying out activities and the work environment. Adver-

se or uncomfortable conditions may lead to future harm to the health of teachers[26,27]. Excessive exposure to high temperature may lead to disorders such as heat exhaustion, thermoplegia, and cramps. The likelihood of developing these disorders increases with high humidity and high physical exertion. Even if immediate morbid states are not presented, the ongoing thermal overload, in the long term may have deleterious effects on health.

In relation to ergonomic loads, teachers' mention of inappropriate furniture in the classroom was observed to have a positive association with MSP for back. In the study of Araújo et al.[7], 59.3% of university teachers reported working in an inappropriate body position. The adoption of inappropriate postures by teachers, influenced mainly by environment with inappropriate conditions, may contribute to the emergence of MSP. In the study by Chiu and Lam[29], carried out with high school teachers in Hong Kong, posture with flexion of the head was an important factor associated with MSP in the neck and upper limbs. The lack of chairs and tables in sizes and shapes appropriate for teachers obliges them to develop positions unfavorable to the musculoskeletal system. Inappropriate chairs make teachers sit without back support, with excessive flexion of knees and hips (in the case of low chairs), and flexion of the trunk to write and read texts on the table or even for student roll call, and without support for upper limbs [30].

Final Considerations

This paper addressed musculoskeletal pain in three different body regions. The findings of the study strengthen the assumption that characteristics of certain work activities have negative effects on the health of workers. The teachers herein reported a high prevalence of musculoskeletal pain in upper limbs, lower limbs, and back. The association between socio-demographic and occupational factors was also analyzed. The identification of these factors may contribute to the adoption of public policies aimed at preventing disease and promoting the well-being of this professional category.

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Referências

1. Gasparini SM, Barreto SM, Assunção AA. O professor, as condições de trabalho e os efeitos sobre sua saúde. *Educ Pesqui* 2005; 31(2): 189-99.
2. Zaragoza JME. *O mal-estar docente: a sala de aula e a saúde dos professores*. São Paulo: EDUSC; 1999.
3. Reis EJFB, Araújo TM, Carvalho FM, Barbalho L, Silva MO. Docência e exaustão emocional. *Educ Soc* 2006; 27(94): 229-53.
4. Gomes L. *Trabalho multifacetado de professores/as: a saúde entre limites.* [dissertação de mestrado]. Programa de Pós-Graduação em Saúde Pública da Fundação Oswaldo Cruz, Escola Nacional de Saúde Pública: Rio de janeiro; 2002.
5. Silvany-Neto MAS, Araújo TM, Dutra FRD, Azi GR, Alves RL. Condições de trabalho e saúde de professores da rede particular de ensino de Salvador, Bahia. *Rev Baiana Saúde Pública* 2000; 24(1/2): 45-56.
6. Delcor NS, Araújo TM, Reis EJFB, Porto LA, Carvalho FM, Silva MO, et al. Condições de trabalho e saúde dos professores da rede particular de ensino de Vitória da Conquista, Bahia, Brasil. *Cad Saude Publica* 2004; 20(1): 187-96.
7. Araújo TM, Sena IP, Viana MA, Araújo EM. Mal-estar docente: avaliação de condições de trabalho e saúde em uma instituição de ensino superior. *Rev Baiana Saúde Pública* 2005; 29(1): 6-21.
8. Reis EJFB, Carvalho FM, Araújo TM, Porto LA, Silvany Neto AM. Trabalho e distúrbios psíquicos em professores da rede municipal de Vitória da Conquista, Bahia, Brasil. *Cad Saúde Pública* 2005; 21(5): 1480-90.
9. Araújo TM, Godinho TM, Reis EJFB, Almeida MMG. Diferenciais de gênero no trabalho docente e repercussões sobre a saúde. *Cien Saude Colet* 2006; 11(4): 1117-29.

10. Gasparini SM, Barreto SM, Assunção AA. Prevalência de transtornos mentais comuns em professores da rede municipal de Belo Horizonte, Minas Gerais, Brasil. *Cad Saúde Pública* 2006; 22(12): 2679-91.

11. Porto LA, Reis IC, Andrade JM, Nascimento CR, Carvalho FM. Doenças ocupacionais em professores atendidos pelo Centro de Estudos da Saúde do Trabalhador (CESAT). *Rev Baiana Saúde Pública* 2004; 28(1): 33-49.

12. Soares JJF, Jablonska B. Psychosocial experiences among primary care patients with and without musculoskeletal pain. *Eur J Pain* 2004; 8: 79-89.

13. Malchaire J, Cock N, Vergracht S. Review of the factors associated with musculoskeletal problems in epidemiological studies. *Int Arch Occup Environ Health* 2001; 74(2): 79-90.

14. Leão ER, Silva MGP. Música e dor crônica músculoesquelética: o potencial evocativo de imagens mentais. *Rev Latinoam Enferm* 2004; 12(2): 235-41.

15. Organização das Nações Unidas para a educação, a ciência e a cultura - UNESCO. *Perfil dos Professores do Brasil – O que fazem, o que pensam, o que almejam*. UNESCO; 2004.

16. Leroux I, Dionne CE, Bourbonnais R, Brisson C. Prevalence of musculoskeletal pain and associated factors in the Quebec working population. *Int Arch Occup Environ Health* 2005; 78: 379–86.

17. Smith DR, Wei N, Zhang Y-J, Wang R-S. Musculoskeletal complaints and psychosocial risk factors among physicians in mainland China. *Int J Ind Ergon* 2006; 36: 599–603.

18. Kjellberg A, Wadman C. The role of the affective stress response as a mediator of the effect of psychosocial risk factors on musculoskeletal complaints—Part 1: Assembly workers. *Int J Ind Ergon* 2007; 37: 367–74.

19. Facchini LA. Uma contribuição da epidemiologia: o modelo de determinação social aplicado à saúde do trabalhador. In: Buschinelli JTP, Rocha LE, Rogotto RM (org.). *Isto é trabalho de gente? Vida, doença e trabalho no Brasil*. São Paulo: Vozes; 1993.

20. de Zwart BC, Broersen JP, Frings-Dresen MH, van Dijk FJ. Repeated survey on changes in musculoskeletal complaints relative to age and work demands. *Occup Environ Med* 1997 Nov; 54(11): 793-9.

21. Araujo TM, Pinho PS, Almeida MMG. Prevalência de transtornos mentais comuns em mulheres e sua relação com as características sociodemográficas e o trabalho doméstico. *Rev Bras Saude Mater Infant* 2005; 5(3): 337-48.

22. Carvalho AJFP, Alexandre NMC. Sintomas osteomusculares em professores do Ensino Fundamental. *Rev Bras Fisioter* 2006; 10(1): 35-41.

23. Porto LA, Carvalho FM, Oliveira NF, Silvany Neto AM, Araújo TM, Reis EJFB, et al. Associação entre distúrbios psíquicos e aspectos psicossociais do trabalho de professores. *Rev Saúde Pública* 2006; 40(5): 818-26.

24. Jardim R, Barreto SM, Assunção AA. Condições de trabalho, qualidade de vida e disfonia entre docentes. *Cad Saúde Pública* 2007; 23(10): 2439-61.

25. Sampaio MMF, MARIN AJ. A precarização do trabalho docente e seus efeitos sobre as práticas curriculares. *Educ Soc* 2004; 25(89): 1203-25.

26. Barros ME, Zorzal DC, Almeida FS, Iglesias RZ, Abreu VGV. Saúde e trabalho docente: a escola como produtora de novas formas de vida. *Trab educ saúde* 2007; 5(1): 103-23.

27. Chen ML, Chen CJ, Yeh WY, Huang JW, Mao IF. Heat stress evaluation and worker fatigue in a steel plant. *AIHA J* (Fairfax, Va) 2003; 64(3): 352-9.

28. Talaia MAR, Rodrigues FAG. *O organismo humano num ambiente de stress térmico – caso de uma área com fornos*. XXIX Jornadas Científicas de la AME. Asociación Meteorológica Española: Pamplona; 2006.

29. Gomes J, Lloyd O, Norman N. The health of the workers in a rapidly developing country: effects of occupational exposure to noise and heat. *Occup Med* (Lond) 2002; 52(3): 121-8.

30. Chiu TT, Lam PK. The prevalence of and risk factors for neck pain and upper limb pain among secondary school teachers in Hong Kong. *J Occup Rehabil* 2007; 17(1): 19-32.

31. Oliver J. *Cuidado com as costas: um guia para terapeutas*. São Paulo: Manole; 1999.