

## Job strain among teachers: associations with occupational factors according to social support

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**Abstract** *This study aimed to ascertain the occupational factors associated with job strain among elementary school teachers and whether the associations varied according to social support. This was a cross-sectional study with 842 teachers from the state school system of a municipality in southern Brazil. Occupational information was obtained by means of interviews. Sociodemographic data and the Demand Control Support Questionnaire were included in a self-reported questionnaire. Logistic regression analysis was performed with the calculation of odds ratios and 95% confidence intervals. The following were associated with job strain: > 40 working hours/week, having suffered violence at school, negative perceptions about the work-personal life balance, remuneration and number of students in the classroom. A stratified analysis revealed that workload and negative perceptions about the number of students per class were significant only in the lower social support group. Job strain is associated with specific teaching conditions, and social support can provide a moderating effect on some of these associations.*

**Key words** *Psychological stress, Social support, Teacher, Worker's health*

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## Introduction

The International Labor Organization (ILO) reports that approximately 160 million people across the world suffer from work-associated ailments. Workplace stress has repercussions, as it relates to a number of psychological, cardiovascular and gastrointestinal disorders<sup>1</sup>.

There are several theoretical models in the literature for analyzing stress, including the demand-control model, proposed by Robert Karasek<sup>2</sup>. In this model, individuals are classified into four quadrants to express the relationship between demands and control in the workplace. The coexistence of large psychological demands and low control over one's work process creates what is known as *job strain*, which has harmful effects on the worker's health<sup>2</sup>. A situation combining a low level of demand and low control (passive work) is also harmful, due to its ability to generate disinterest in the work. On the other hand, when high demands and high control coexist, individuals experience the working process actively, because although the demands are excessive, the worker is more able to plan what to prioritize during working hours. The situation that is considered least stressful is one that combines low demand and high control of the work process<sup>3</sup>.

A third dimension was added to the Karasek model by Johnson and Hall<sup>4</sup>, where the perception of social support from colleagues and managers (according to the level provided) acts as a buffer and can potentiate the effects on the person's health from the work demands and degree of control<sup>3</sup>. Social support at work can be defined as a helping function that is exercised by significant people by way of the material provision of information or emotional support in stressful situations<sup>5</sup>.

The instrument used for the evaluation of stress according to the demand-control model has been translated into several languages and has been used and reviewed by researchers from several countries, both in its original form, the *Job Content Questionnaire* (JCQ), with 49 questions and in its reduced version modified by Theorell, the *Demand Control Support Questionnaire* (DCSQ)<sup>2,6</sup>. The DCSQ covers 17 items distributed across three dimensions: psychological demands (five items), control over the work process (four items on the use of skills and two on decision-making autonomy) and social support

at work (six items). The Brazilian version of the DCSQ was adapted and validated by Alves et al.<sup>7</sup>.

Studies on teachers' job stress using the demand-control model have focused on negative health outcomes, especially mental disorders such as anxiety, depression and Burnout Syndrome<sup>8-10</sup>. However, evidence suggests that unfavorable physical health conditions are also associated with workplace stress<sup>11,12</sup>.

Precarious working conditions, the accumulation of tasks and the devaluation of elementary school teachers' careers mean that teaching is considered one of the most stressful professions in Brazil<sup>13</sup>. This scenario often results in low productivity, absenteeism, functional withdrawal, the occurrence of workplace accidents and even abandonment of the profession<sup>14</sup>.

According to one of the most important Brazilian studies on Burnout Syndrome conducted across 1,440 schools, 26.3% of teachers have high levels of emotional exhaustion, with 9.1% experiencing depersonalization and 30.6% being classified in a low personal involvement work group<sup>13</sup>. In other countries, such as Greece, it has been found that women who teach in public institutions have higher stress levels<sup>15</sup>. A similar result was found in a sample of Belgian teachers<sup>16</sup>.

Some studies have also investigated workplace stress and the presence of social support in schools and have found a protective effect on stress levels in London-based<sup>17</sup>, Chinese<sup>18</sup> and Greek<sup>15</sup> teachers. In the latter study, higher levels of perceived social support from colleagues and supervisors were associated, respectively, with lower professional distress and lower levels of occupational stress<sup>15</sup>.

It is thus probable that the social support perceived by teachers in their working environment may result from their ability to share emotions and feelings with other individuals during the course of their work. However, although there are many studies in the literature that evaluate the relationship between stress and negative health outcomes<sup>8-12</sup>, we could not find any studies that analyzed the effect of occupational factors on the perception of job strain in elementary and high school teachers according to the provision of social support.

The aim of this study was, therefore, to analyze the occupational factors associated with job strain in elementary school teachers and to ascertain whether the associations vary according to the level of social support.

## Methods

This was a cross-sectional study linked to the “Health, lifestyle and work of teachers in the Paraná public network (Pro-Master)” project, developed in Londrina, Paraná. The municipality’s state education system comprises 73 schools (63 based in urban areas, seven in rural areas and three in indigenous villages), with over 1,500 groups and approximately 50,000 students enrolled in elementary and high school. The teaching staff is made up of approximately 3,000 teachers who work at the kindergarten, elementary and high school levels; in the education of young people and adults (educação de jovens e adultos - EJA) in professional and technical education; and in special education (a type of school education offered to students with disabilities, pervasive developmental disorders and high ability or giftedness)<sup>19</sup>.

In this study, teachers at regular elementary and high schools were selected from the 20 Londrina state (PR) schools with the highest number of teachers, representing approximately 75% of all teachers of such schools in the municipality. Teachers who worked exclusively in kindergarten education, those using only nonstandard teaching methods, those undergoing functional rehabilitation, those with less than a year’s experience in the profession and those who had been on leave for more than 30 days in the 12 months preceding the survey were excluded. Teachers who could not be contacted after the fifth attempt, who refused to participate in the survey or who were on leave during the stipulated data collection period in each school (total of 51 days) were considered lost.

The data collection was conducted between August 2012 and June 2013 by trained researchers. A pilot study was conducted in three schools (82 teachers) in a neighboring town. The interviews were conducted during the teachers’ activity hour (a period set aside for teachers to carry out extracurricular activities) in their own school or at another location defined by the teacher. The interviews lasted for approximately 40 minutes. At the end, a questionnaire was given out to be answered by the teacher (with an approximate completion duration of an additional 15-20 minutes) that contained sociodemographic data and some scales used in epidemiological studies (including DCSQ). These questionnaires contained a unique identifier for subsequent linking to the interview data.

The forms and questionnaires were duly checked and coded. Double entry and a comparison of the databases were performed using the

Epi Info® program version 3.5.4 to identify and correct typing errors.

The dependent variable in this study was job strain, which combines the situations of a high psychological demand and a low control over one’s work. Response options for both the psychological demands and control over work dimensions varied on a frequency scale ranging from one (never or almost never) to four points (often)<sup>7</sup>. In this study, the “repetitive work” item was excluded from the control dimension after DCSQ confirmatory factor analysis, which was performed based on the recommendations of other studies<sup>20,21</sup>. The score on each dimension was formed by the sum of points of each item making up the said dimension/sub-dimension (demand, use of skills and decision-making autonomy). As in most studies using the demand-control model<sup>22</sup>, we adopted the median as the cutoff point for the composition of groups of high and low exposure to demand and control, further categorized into job strain (high demand and low control) or not.

For the “social support” dimension, the possible answers ranged from “strongly agree” (four points) to “strongly disagree (one point).” The “social support” dimension score was obtained by summing the points obtained on each item. The median was also used to classify teachers according to a greater or lesser degree of support at work.

The main independent variables were those relating to the teacher’s work: length of experience in teaching (1-5, 6-10 and > 10 years), type of relationship (statutory, nonstatutory), night work (yes or no), teaching in elementary school (yes or no), weekly working hours as a teacher ( $\leq 40$  or  $> 40$  hours), total working hours in the week including other occupations ( $\leq 40$  or  $> 40$  hours), perception of the relationship with students, remuneration, number of students per classroom, and personal and professional life balance (all either excellent/good or fair/poor) and reports of violence against the teacher (verbal aggression, humiliation, bullying, sexual harassment, physical assault or armed assault) in the 12 months preceding the interview. The following sociodemographic variables were also analyzed: gender, age, civil status, education level and family income.

The Statistical Package for the Social Science (SPSS) program version 19 was used for statistical analysis. Descriptive and associative analyses and/or bivariate correlations and crude and adjusted logistic regressions with odds ratio (OR)

and confidence interval (95% CI) calculations were performed. The backward method was used to select the variables in the multivariate analysis. Initially, all independent variables associated with job strain ( $p < 0.20$ ) in the bivariate analysis were incorporated into the multivariate analysis models. Age was analyzed as a continuous quantitative variable. Independent variables that maintained a significant association after adjustment ( $p < 0.05$ ), according to the Wald test, remained in the final model. To analyze the role of social support in the associations found, we repeated the analyses after adjusting by stratification into teachers with higher and lower levels of social support at work.

The project was approved by the Research Ethics Committee of UEL. All teachers in the study were informed about the research objectives and ethical aspects, and all participants signed terms of free and informed consent.

## Results

Of the 1,126 teachers eligible for further research (Pro-Master), 148 (13.1%) losses were registered: 65 (5.7%) were on leave and did not return to activities within 51 days of the start of data collection in the respective school, 63 (5.6%) declined to participate and 20 (1.8%) teachers could not be located after five attempts.

For this study, 98 (8.7%) other teachers were excluded – nine for having less than a year's experience in the role and 89 because they were on leave for 30 days or more in the 12 months preceding the interview. There was a further loss of 38 (3.4%) teachers due to incomplete filling in of the DCSQ. Thus, the final sample comprised 842 teachers.

There was a predominance of women and those over 40 years of age. The mean age  $\pm$  standard deviation (SD) was  $41.2 \pm 9.9$  years, ranging from 23 to 68 years, with a median of 41 years.

More than half of the respondents lived with a partner and had a mean monthly family income of up to R\$ 5,000.00. Regarding academic background, most had completed a specialization or a master's or doctorate degree (Table 1).

The mean length of teaching experience was 13.5 years, with a minimum of 12 months (inclusion criteria) and a maximum of 45 years. At least one stable (statutory) working relationship was reported by two-thirds of teachers. The mean weekly workload as a teacher was 35.3 hours (SD 10.7), with a median of 38 hours. A total of 44.3%

of the teachers studied reported working at night. The mean workload including all working activities was 38.1 hours, with a SD of 11.3 hours, and 29.5% worked over 40 hours per week (Table 1).

Most teachers perceived their relationship with students and the balance between personal and professional life as good or excellent. On the other hand, perceptions about remuneration and perceptions about the number of students per class had higher frequencies in the poor/fair categories—63.4% and 68.9%, respectively (data not shown in tables).

Job strain was observed in 40.3% of teachers and was more frequent ( $p < 0.20$ ) among women ( $p = 0.122$ ). A higher frequency of job strain was also observed among younger teachers ( $r = -0.20$ ,  $p = 0.005$ ) (data not shown in tables).

In the multivariate analysis, there was statistical association between job strain and more than 40 teaching hours per week, the perception of remuneration as poor/fair, the perception of the number of students per classroom, personal and professional life balance and reporting some type of violence in the school in the 12 months preceding the survey (Table 2).

However, a greater workload and a fair or poor perception of the number of students per classroom remained significant only in the lower social support group (Table 3).

On the other hand, the variables relating to negative perceptions of remuneration and personal and professional life balance, as well as having suffered violence at school in the 12 months preceding the survey, remained associated in both groups (Table 3).

## Discussion

Even after the adjustments were made, job strain was associated with a higher weekly workload as a teacher and negative perceptions of remuneration, number of students per class and personal and professional life balance. Reports of violence suffered at school in the 12 months preceding the interview also remained independently associated with job strain. It was observed, however, that the results varied according to the level of social support that the teachers had, with the weekly workload and the perception of the number of students in the classroom variables losing statistical significance for the teachers in the greater social support group.

No studies were found in the literature review that evaluated the demand-control model

**Table 1.** Distribution of teachers in the Londrina (PR) state education network according to sociodemographic and work variables. 2012-2013.

Variable	No	%
Gender		
Female	568	67.5
Male	274	32.5
Age		
19 to 39 years	375	44.5
40 to 49 years	283	33.6
≥ 50 years	184	21.9
Marital status *		
With partner	482	57.2
No partner	356	42.3
Level of education *		
Bachelor / Graduate	112	13.3
Specialization	617	73.3
Master / Doctorate	111	13.2
Monthly family income *		
Up to R\$ 3,000.00	214	25.4
From R\$ 3,001.00 to R\$ 5,000.00	295	35.0
Over R\$ 5,000.00	328	39.0
Length of teaching experience		
Up to 5 years	205	24.3
6 to 10 years	205	24.3
Over 10 years	432	51.4
Type of association		
Statutory	559	66.4
Nonstatutory	283	33.6
Night work		
Yes	373	44.3
No	469	55.7
Teaches in elementary education		
Yes	608	72.2
No	234	27.8
Weekly workload as teacher		
≤ 40 hours	661	78.5
> 40 hours	181	21.5
Weekly workload - all work		
≤ 40 hours	594	70.5
> 40 hours	248	29.5
Violence in 12 months preceding interview		
Yes	599	71.1
No	243	28.9

\* The totals differ for these variables due to missing information on the questionnaires.

as an outcome, which makes comparisons with the results of this study difficult. In most studies, the Karasek model was used in association studies relating to various health outcomes, such as psychological distress<sup>23</sup>, depression and anxiety<sup>8</sup>, Burnout Syndrome and emotional exhaustion<sup>9</sup>,

endocrine responses<sup>11</sup>, vocal changes<sup>12</sup>, perceived health status<sup>24</sup> and blood pressure levels<sup>25</sup>.

The reporting of violence suffered at school was associated with job strain in the teacher groups with both more and less social support, indicating that this is a major stress factor at work. The Teaching and Learning International Survey (TALIS) found that of the 34 countries surveyed, Brazil had the highest percentage of intimidation or verbal abuse against teachers (12.5%) and the highest percentage of intimidation and verbal abuse among students (34.4%). In this same survey, the use or possession of drugs and alcohol in Brazilian school environments was 6.9%, which was higher than the mean of all other countries studied (3.5%). Furthermore, in relation to offenses such as vandalism and theft, the frequency in Brazil (11.8%) was second only to that in Mexico (13.2%)<sup>26</sup>. In a recent systematic review and meta-analysis of the relationship between bullying and mental health, significant associations were found between workplace bullying and depression and anxiety symptoms and stress-related psychological complaints<sup>27</sup>. These findings reveal the importance of combating violence at school and, more broadly, in society, to reduce the perception of workplace stress and illness in elementary school teachers.

A negative perception of the personal and professional life balance was significantly associated with job strain in teachers with both more and less social support at work. Referring to the work-family interface discussion, Seligmann-Silva<sup>28</sup> states that the complex relationship between this binomial suggests a two-way street in which there is a flow where subjectivity passes on family experiences to the working environment, as well as a current that passes determinations originating from the workplace on to family life. Although it is not possible to examine all aspects relating to this binomial in teaching work, it is possible that teachers who perceive a lack of balance between their personal and professional lives can experience overload and therefore be more likely to perceive their work as causing job strain.

The predominance of women in teaching is another factor that can affect the negative perception of the personal and professional life balance. Swedish researchers who evaluated the production of catecholamines among men and women at work and at home found that while working, norepinephrine levels were similar in both groups. However, when they returned home, the norepinephrine levels in women

**Table 2.** Occupational factors associated with job strain of teachers in the Londrina (PR) state education network, according to the model fitted by logistic regression, 2012-2013.

Variable	No(%)	Job strain		p-value
		Crude OR (95% CI)	Adjusted OR* (95% CI)	
Weekly workload as teacher				
1 to 20 hours	44 (34.4)	1	1	
21 to 40 hours	208 (39.0)	1.22 (0.82-1.83)	1.20 (0.78-1.83)	0.406
> 40 hours	87 (48.1)	1.77 (1.11-2.82)	1.72 (1.05-2.82)	0.031
Remuneration				
Good/excellent	86 (27.9)	1	1	
Poor/fair	253 (47.4)	2.32 (1.72-3.14)	1.93 (1.41-2.65)	<0.001
No. Students per class				
Good/excellent	81 (30.9)	1	1	
Poor/fair	258 (44.5)	1.79 (1.32-2.44)	1.43 (1.03-1.99)	0.033
Personal and professional life balance				
Good/excellent	200 (33.0)	1	1	
Poor/fair	139 (58.9)	2.91 (2.13-3.97)	2.36 (1.71-3.26)	<0.001
Violence in 12 months preceding interview				
Yes	273 (45.6)	2.25 (1.62-3.11)	1.83 (1.31-2.58)	<0.001
No	66 (27.2)	1	1	

\* Multivariate model (backward method) adjusted for: gender, age (continuous variable), length of experience in profession, night work, weekly workload as teacher, perception of relationship with students, remuneration, number of students per class, and personal and professional life balance and violence suffered by the teacher in the 12 months preceding the interview.

**Table 3.** Occupational factors associated with job strain, stratified according to groups with more or less social support in the workplace of teachers in the Londrina (PR) state education network, according to the model fitted by logistic regression, 2012-2013.

Variable	Job strain			
	More support		Less support	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Weekly workload as teacher				
1 to 20 hours	1.00		1.00	
21 to 40 hours	0.86 (0.48-1.57)	0.634	1.48 (0.80-2.76)	0.207
> 40 hours	0.87 (0.42-1.80)	0.711	2.75 (1.36-5.58)	0.005
Remuneration				
Good/excellent	1.00		1.00	
Poor/fair	1.91 (1.18-3.07)	0.008	1.85 (1.20-2.87)	0.006
No. Students per class				
Good/excellent	1.00		1.00	
Poor/fair	1.04 (0.63-1.70)	0.887	1.76 (1.13-2.77)	0.013
Personal and professional life balance				
Good/excellent	1.00		1.00	
Poor/fair	2.58 (1.51-4.41)	0.001	2.07 (1.37-3.14)	0.001
Violence in 12 months preceding interview				
Yes	1.65 (1.01-2.69)	0.046	1.74 (1.07-2.86)	0.027
No	1.00		1.00	

Multivariate model (backward method) adjusted for: gender, age, length of experience in profession, night work, weekly workload as teacher, perceptions of relationship with students, remuneration, number of students per class, and personal and professional life balance and violence suffered by the teacher in the 12 months preceding the interview.

continued to increase, whereas in men the production of this neurotransmitter decreased<sup>29</sup>. In this sense, the association between a fair or poor perception of one's personal and professional life balance and job strain in a predominantly female population may be explained partly by the fact that, for women, returning home means starting a new day of work involving various household activities and other family requirements.

The perception of low remuneration remained associated with job strain in both groups (high and low social support). The search for better remuneration may be considered to be a driving force for the development of health problems among teachers in that, to increase income, they seek more intense working hours, take on more classes and often work in more than one school and in more than one daily period<sup>13</sup>. In studies that have evaluated the relationship between income and Burnout Syndrome among teachers, the authors have demonstrated that the standard of remuneration is proportional to burnout level, especially in relation to personal involvement with work and depersonalization<sup>13</sup>.

Another variable that was significantly associated with job strain was a negative perception of the number of students per class, but only in the group of teachers with less social support at work, indicating that social support can mitigate this relationship. In Brazil, 47.5% and 63.5% of teachers work in classes with over 30 students in middle and high schools, respectively. Serving a greater number of students places a greater demand on the teacher in relation to planning activities, marking homework and tests and resolving conflict situations in the classroom. These teachers are therefore more likely to develop stress in this environment<sup>30</sup>. A survey of private school teachers in the metropolitan region of Porto Alegre revealed that a high number of students and working hours are possible risk factors for the development of burnout<sup>31</sup>.

Individuals working more than 40 hours a week as a teacher had a higher chance of perceiving their work as more wearing, but social support played an attenuating role, and for this reason, the relationship was maintained only in the lower support group. The accumulation of teaching roles is seen by many authors as one of the predictors of the development of stress and Burnout Syndrome<sup>31</sup>. According to the 2013 TALIS survey<sup>26</sup>, Brazil is one of the countries in which teachers spend the most hours in the classroom. Additionally, Brazil has the highest mean percentage time spent on administrative tasks

in the classroom, for example, registering attendance, distributing information and completing school forms<sup>26</sup>.

The role of social support in regard to the relationship between occupational characteristics and job strain was confirmed in this study, because when stratifying job strain according to whether there was more or less social support, greater weekly working hours as a teacher and the perception of the number of students per class as poor/fair remained significant only in the lower support group. The positive effects of the presence or perception of social support at work in relation to health and well-being has been verified in studies on stress reduction<sup>10,32</sup>, increased job satisfaction<sup>33</sup> and increased use of coping strategies in adverse workplace situations<sup>34</sup>. Teaching is considered a highly stressful activity, given the specific characteristics of this occupation<sup>13</sup>. However, the change in significant associations after stratification into those with more or less social support shows the importance of having this support in teaching, either from colleagues or managers and supervisors.

This result is relevant to the discussion in a recent study that sought to present theoretical and institutional policy aspects that would contribute to the incorporation of mental health dimensions into worker health monitoring processes. According to Leão and Gomez<sup>35</sup>, suffering can be caused by interpersonal relationships established in the workplace, through abusive behavior, psychological and symbolic violence, and unequal power relations and disciplinary mechanisms, among other things. In this sense, social support among workers is extremely important in that it can facilitate a better performance of work tasks and contribute to building a healthy working environment<sup>35</sup>.

Some methodological aspects of this study should be noted. The cross-sectional design does not allow us to identify the temporal relationships of the studied variables, but it reveals the personal characteristics or work profiles associated with the perception of job strain among elementary school teachers. The selection of active workers may have led to an underestimation of the prevalence of some exposure to risk of the perception of job strain, as extremely adverse situations may have led to functional rehabilitation in school or even leaving the profession. In epidemiological studies, this is known as the "healthy worker effect"<sup>36</sup>. Although the sample was one of convenience, the selected schools were distributed across all regions of the municipality,

which contributes to the sample's heterogeneity. Furthermore, the included teachers accounted for approximately 75% of those operating in regular elementary education. In addition, although some studies have evaluated the effect of social support on job stress in teachers<sup>15,17,18</sup>, none have been conducted in Brazil and none have evaluated the perception of job strain according to social support, highlighting the unprecedented nature of our study.

The findings of this study show the importance of creating spaces in school that favor teacher exchange and support. On a broader level, it emphasizes the need for public policies that

improve teachers' working conditions (adequate remuneration, fewer students per class, reduction of temporary contracts and actions that prioritize increased safety in schools). In addition, the inclusion of questions about mental health when monitoring worker health and the establishment of partnerships between schools and occupational health referral centers would facilitate the identification of, and taking action on, phenomena related to the suffering caused by teaching and would support the development of proposals and actions that seek to promote the mental health of these professionals.

### **Collaborations**

MM Birolim, AE Mesas, AD González and SM Andrade participated in the study design, data analysis, writing and critical review of the manuscript. HG Santos and MCFL Haddad participated in the data analysis and critical review of the manuscript. All approved the final version of the manuscript.



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