

## Multiple exposures to the risk of work absenteeism among Brazilian schoolteachers

Múltiplas exposições ao risco de faltar ao trabalho nas escolas da Educação Básica no Brasil

Múltiples exposiciones relacionadas con el riesgo de faltar al trabajo en escuelas de Educación Básica en Brasil

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### Abstract

The study aimed to identify multiple exposures to the risk of work absenteeism among Brazilian schoolteachers, independently of the reasons reported by teachers ( $n = 6,510$ ). The data came from a telephone survey on health, working conditions, and absenteeism among schoolteachers in Brazil (Educatel Study, 2015/2016). Exposures were identified and studied by principal components analysis and Poisson regression, with a focus on working conditions and quality of school administration. Three components of risk factors for work absenteeism were identified. Component 1 featured lack of opportunities for new learning experiences, insufficient time for performing tasks, constraints on teachers' autonomy, and little or no social support in the school environment; component 2 was characterized by the perception of heavy demand from tasks and an agitated classroom environment due to students' lack of discipline and intense noise; and component 3 by the experience of verbal or physical violence from students. All three components were specially associated with stress-related work absenteeism in relation to reported stress at school (aPR = 3.87; 95%CI: 2.93-5.10;  $p < 0.05$ /aPR = 3.18; 95%CI: 2.47-4.09;  $p < 0.05$ /aPR = 3.31; 95%CI: 2.58-4.25;  $p < 0.05$ ; respectively) and emotional problems (aPR = 2.28; 95%CI: 1.93-2.70;  $p < 0.05$ /aPR = 2.43; 95%CI: 2.05-2.87;  $p < 0.05$ /aPR = 2.09; 95%CI: 1.78-2.45;  $p < 0.05$ ; respectively). The identification of these risk components highlighted the need for systemic changes in Brazilian Basic Education schools.

Absenteeism; School Teachers; Risk Factors; Occupational Health

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## Introduction

Studies based on the classic Fordist model that target workers on jobs where they are exposed to measurable environmental risks have proven insufficient for addressing current relations between health, work, and employment <sup>1</sup>. In recent decades, progress in research and knowledge on workers' health indicate gaps in the Fordist paradigm. The field of workers' health is based on research concepts and methods that examine the links between the macro social structural level (income, schooling, and adults' position in the workforce) and the unique level of the health-disease process (physical and psychosocial working conditions, morbidity, mortality, and disability in adult workers) <sup>2</sup>.

Teachers in preschool, primary, and secondary schools (the stages comprising "Basic Education" in Brazil) are considered internationally as one of the professions most vulnerable to work-related illness <sup>3,4</sup>, including sick leave from work <sup>5</sup>. Although voice problems are highly prevalent in schoolteachers <sup>6</sup>, they are not covered by Brazil's specific social security or workers' compensation laws. Appalling situations such as aggression between members of the school community have come to dominate daily teaching work <sup>7</sup>. An extensive literature addresses the factors related to teachers' absence from schools when they should be expected to appear, a process known as absenteeism <sup>5</sup>. Work absenteeism for health reasons are an indicator not only of population groups' health <sup>8</sup>, but also of working conditions <sup>9</sup>, the sector's overall characteristics <sup>10</sup>, and the organizational culture <sup>11</sup>.

Although complex and multifactorial causality of this process is known to researchers, the vast majority of studies analyze risk factors separately <sup>12,13</sup>. In order to broaden the analytical perspective, some authors have suggested innovating the approaches to identify the dynamics by which the multicausal risks and outcome intertwine <sup>14</sup>. However, this strategy has apparently not been used in studies on factors related to work absenteeism, which still form the basis for the Fordist paradigm.

The current study's relevance consists of analyzing a nationwide database of Brazilian schoolteachers using a methodology that has rarely been explored in the field of workers' health. The proposal was developed to identify and link the multiple risks of work absenteeism in Brazilian schoolteachers in Basic Education.

The study aimed to identify the multiple exposures to the risk of work absenteeism, independently of the reasons reported by the teachers.

## Methods

This was a cross-sectional study using primary data from a probabilistic sample of schoolteachers (Educatel Study 2015/2016), a telephone survey on health, working conditions, and absenteeism among Brazilian schoolteachers.

### **Study population, sampling, and data collection**

The minimum sample was set at 6,500 teachers, considering a 95% confidence interval (95%CI) and 0.99% of the maximum error predicted for the estimation of the prevalence of absenteeism for the entire population of teachers in Brazil. More detailed information has been published in a complementary methodological study <sup>15</sup>. Access to data from the 2014 *School Census* <sup>16</sup> allowed stratification of the total population of schoolteachers (2,229,269) in Basic Education in Brazil according to geographic location (geographic region and census area, i.e., urban versus rural), demographic variables (age brackets and gender), and position in the school system (school administrative affiliation, type of teaching contract, and grade level). Next, the teachers were selected to be interviewed by simple random sampling in each stratum. A total of 13,243 teachers were selected, thereby ensuring the minimum number of interviews. The inclusion of a large number of teachers in the initial selection round was necessary to offset the expected losses from refusal to participate (approximately 20%) and discrepancies between the administrative data (2014 *School Census*) and the reality in the field.

Considering the logistic complexity and high cost of conducting face-to-face interviews in such a large sample, the decision was made to use telephone interviews. Data were collected from October 2015 to March 2016. Schoolteachers were considered ineligible if they were not affiliated with the

school at the time, if they worked in schools without telephones, or if the telephone listed in the original data source was not working. There were two possible situations for eligible teachers: to interview the teacher during the first contact at the school itself or later, by appointment, if the teacher preferred. A maximum of 15 attempted contacts were made for each selected teacher (on different days and at different times, including night school and weekends). Teachers that had not been located after these 15 attempts were considered ineligible. The results were: 119,378 telephone calls, 7,642 eligible teachers (57.7% of the list of selected teachers), and 6,510 interviews (85.2% success rate).

The Educatel questionnaire was developed in keeping with the telephone survey's specificities and based on a review of Brazilian and international experiences in the health field and more specifically that of workers' health or teachers' health. The instrument was a multiple-theme questionnaire, the adequacy of which was confirmed by assessment of each question as to understanding of the statement and its objective. The terminology, internal organization of the questionnaire, production of the answers, duration of interview, format of the questions (open or closed), and possible answers were confirmed by applying a pilot test in a convenience sample ( $n = 15$ ). More details have been published in a complementary theoretical and methodological study <sup>17</sup>.

The interviews' results were associated with weighting factors to ensure that the weighted sampling totals coincided with the known population totals of Brazilian schoolteachers. These weighting factors took the study's sampling design into account, i.e., the inverse of the selection probabilities for each teacher (study unit), the influence of non-response cases on the Educatel estimates, and an additional factor to fit the sample to that recorded by the 2014 *School Census* according to the distribution of variables used in the survey's sampling plan (post-stratification) <sup>15</sup>.

### **Organization of the data**

Overall absenteeism was measured by the question "In the last 12 months, have you missed work on at least one day (for whatever the reason)? (no/yes)". An affirmative answer to this question triggered six questions on the reasons for work absenteeism, of which only three were included in the current study (referring to the most prevalent problems and the internal school environment): "Have you missed work for family reasons? (no/yes)", "Have you missed because you experienced something stressful in school? (no/yes)", "Have you missed because of problems with your own health? (no/yes)". Finally, teachers who answered the last question in the affirmative (related to absenteeism due to illness) were asked six more questions. Of these, only the questions related to the three most prevalent problems were included in the current study: "Emotional problems (e.g., depression, stress, anxiety)? (no/yes)", "Voice problems (e.g., hoarseness, loss of voice)? (no/yes)", "Respiratory problems (e.g., asthma, bronchitis, rhinitis, sinusitis)? (no/yes)". Seven dichotomous indicators on work absenteeism were elaborated on the basis of these questions.

Indicators related to the quality of school administration and working conditions in the schools were used. Quality of administration was measured with the following questions: "Does your work demand too much of you?", "Do you have the possibility of learning new things at your work?", "Do you have sufficient time to complete all the tasks in your work?", "Does the school give the teaching staff the opportunity to participate actively in decisions?", "Is there a calm and pleasant environment where you work?", "At work, does everyone get along well with each other?", "Can you count on support from your coworkers?", "If you're not having a good day, do your coworkers understand?", "At work, do you get along well with your superiors?", and "Do you enjoy working with the other teachers?". The possible answers to these questions were "often/sometimes/rarely/never or almost never". Five indicators on the quality of administration, with dichotomous answers, were elaborated: often, sometimes/rarely, never or almost never. The last six above-mentioned questions were used to build the indicator "social support at school" with a score based on the sum of the answers (1 point in the score for each answer "often", 2 for "sometimes", 3 for "rarely", and 4 for "never or almost never"). Teachers that scored more than 7 (50th percentile) were defined as not counting on social support at school <sup>18</sup>.

Indicators related to working conditions were elaborated using the following questions: "How often is your workplace agitated because of students' lack of discipline? (often/sometimes/rarely/never or almost never)", "How often is noise at work so loud that you have to raise your voice to talk to

someone? (often/sometimes/rarely/never or almost never)”, “In the last 12 months, have you suffered verbal violence from students? (never/once/twice or more)”, “In the last 12 months, have you suffered physical violence from students? (never/once/twice or more)”. At the end, based on the frequency of these events, four indicators on working conditions, with dichotomous answers, were elaborated: often, sometimes/rarely, never or almost never; or never/once, twice or more.

The demographic, geographic, and school system characteristics were analyzed: gender (male/female), two brackets for teachers’ educational level (primary or secondary – complete or under way/university – complete or under way), four age brackets ( $\leq 34$  years/35-44 years/45-54 years/ $\geq 55$  years), five geographic regions (North/Northeast/Central/Southeast/South), census area (urban/rural), size of school ( $\leq 10$  teachers/11-20 teachers/21-30 teachers/ $> 30$  teachers), teaching level (preschool/primary/secondary/youth and adult education/vocational/two or more levels); and type of teaching contract (based on public admissions, tenured, stable/temporary/private system with contract covered by labor legislation/stable and private system).

### **Data analysis**

The demographic, geographic, and school system characteristics were described first. Next, the prevalence rates were estimated for the seven indicators on reasons for work absenteeism, as well as the prevalence of nine risk factors related to quality of the school administration or working conditions for teacher absenteeism in the Brazilian schools.

The dimensions in the exposure to work absenteeism were identified by principal components analysis (PCA), an exploratory analytical model that allows identifying study units based on similarities between individuals according to the study variables<sup>19</sup>. In this study, information on teachers’ working conditions and quality of the school administration were used (dichotomous variables). The definition of the number of components (or dimensions) to be extracted was defined in three stages: Kaiser criterion (eigenvalue  $> 1.0$ ), scree plot, and interpretation of the components’ composition<sup>19</sup>. The analysis was based on a polychoric correlation matrix, and promax oblique rotation was applied to achieve a simpler structure and facilitate interpretation of the results. The larger the variable’s load, the greater its contribution to the component, and only those greater than 0.30 (in module) were considered significant<sup>19</sup>. Negative loads indicate an inverse association with the component and positive loads a direct association. The three extracted components account for about 60% of the model’s total variability. The first component represents the largest share of variability in the set of variables (largest explanatory force in the model), the second component, independently of the first, explains the maximum possible remaining variability, and so on, with no correlation between the components<sup>19</sup>.

Each individual’s score for each component identified in the previous stage was analyzed as an independent variable, while the reasons for work absenteeism were dependent variables in the models. The variables containing the individuals’ score for each component (originally continuous variables) were transformed into dichotomous ones, considering the median of their distribution as the cutoff (dividing the score in “high” as above the median and “low” as below the median), in order to simplify the coefficient’s interpretation. The association between each of the components and the reasons for work absenteeism was studied with Poisson regression models, used to calculate crude (cPR) and adjusted prevalence ratios (aPR). Demographic, geographic, and school system characteristics were considered potential confounding variables in the adjusted models. Variables that were significant in the bivariate model ( $p < 0.20$ ) were kept in the analyses and included stepwise in the multivariate model according to level of significance ( $p$ -value). At the end, all the confounding variables showed  $p < 0.05$ . The available weighting in Educatel (corrected for non-response) was used for the all the analyses except PCA. Data processing and all the analyses used Stata version 13.1 (<http://www.stata.com>), taking the complex sample design in the Educatel Study into account.

The Educatel Study was approved by the Ethics Research Committee of the Federal University of Minas Gerais (CAAE: 48129115.0.0000.5149 and review n. 1.305.863).

## Results

The Educatel Study population consisted of 6,510 Brazilian schoolteachers, mostly women (80.28%) and with university education (90.56%). One out of three teachers were under 34 years of age (32.97%), and slightly more than one out of ten were 55 or older (10.55%). About two-thirds of the teachers worked in three regions of Brazil (Central 7.17%; Southeast 40.51%; and South 15.11%), and nearly one-sixth worked in rural areas (15.92%). As for school size, the majority worked in schools with more than 30 teachers (54.94%). Half (49.79%) were working in more than one level of Basic Education, and about two-thirds had formal employment contracts (39.56% based on public admission/tenured/stable and 26.27% stable and private system) (Table 1).

About 70% of the sample reported work absenteeism of at least one day in the year preceding the survey. Problems related to the teacher's own health were the most frequent cause of absenteeism, affecting more than half (53.34%) of the teachers (Table 2). Among the risk factors for work absenteeism, the perception of heavy demand from teaching tasks was the most prevalent (81.59%), followed by agitated classrooms due to students' lack of discipline (70.17%) and intense noise in the workplace (64.02%). Another frequently reported risk factor was the perception of low social support at school (40.63%) (Table 2).

PCA identified three significant components of risk factors. After rotation, the three components explained 23%, 23%, and 16% of the total variability, respectively. Component 1 was characterized as the lack of new learning opportunities, insufficient time to finish tasks, perception of constraints on teachers' autonomy, and little or no social support in the school environment; component 2 featured the perception of heavy demand from tasks and agitated classrooms due to students' lack of discipline and perception of intense noise; and component 3 featured the experience of verbal or physical violence from students (Table 3).

The three components showed a positive association with the different reasons for work absenteeism (Table 4). In general, components 1, 2, and 3 showed a stronger association with work absenteeism due to stressors at school (aPR = 3.87; 95%CI: 2.93-5.10;  $p < 0.05$ /aPR = 3.18; 95%CI: 2.47-4.09;  $p < 0.05$ /aPR = 3.31; 95%CI: 2.58-4.25;  $p < 0.05$ ; respectively) and emotional problems (aPR = 2.28; 95%CI: 1.93-2.70;  $p < 0.05$ /aPR = 2.43; 95%CI: 2.05-2.87;  $p < 0.05$ /aPR = 2.09; 95%CI: 1.78-2.45;  $p < 0.05$ ; respectively). Components 1 and 3 also showed a stronger association with work absenteeism due to respiratory problems (aPR = 1.59; 95%CI: 1.36-1.86;  $p < 0.05$ /aPR = 1.51; 95%CI: 1.29-1.76;  $p < 0.05$ ; respectively), and the component 2, due to voice problems (aPR = 2.14; 95%CI: 1.85-2.47;  $p < 0.05$ ) among Brazilian schoolteachers.

## Discussion

The unprecedented data on health, working conditions, and absenteeism allowed identifying risk factors for work absenteeism in a nationally representative sample of Brazilian schoolteachers. By assuming that teachers' absenteeism is a multifactorial event, the study identified a typology of factors (components 1, 2, and 3) associated with work absenteeism at school. The results highlight the coherence of each component's internal composition and the association with the different reasons for failing to appear for work at school.

Distress and illness are associated with insufficient time for rest and recovery. This is likely the case of schoolteachers whose formal workday is augmented by leadership duties, faculty meetings, and additional non-classroom demands. Teachers commonly prepare their teaching materials and grade the students' exercises and tests outside their formal working hours. Teaching tasks compete with the teachers' time for rest and recovery from physical and mental fatigue<sup>20,21</sup>. Insufficient time, constraints on autonomy, and little or no social support are psychosocial dimensions that remained in component 1, expressing increased risk of work absenteeism for health reasons (respiratory and emotional problem) and stressful experiences at school. One can conjecture on the manifestations of a situation that generally reflects a system with deteriorated working conditions where the physical environment, lack of discipline, and demands from tasks would have negative effects on health and wellbeing and likely jeopardize the capacity to perform functions<sup>22</sup>. Absenteeism under such condi-

**Table 1**Demographic, geographic, and workplace characteristics of Brazilian schoolteachers. *Educatel Study*, 2015/2016.

Characteristics	n	% *	95%CI
Gender			
Male	2,394	19.72	19.16-20.29
Female	4,116	80.28	79.71-80.84
Schooling **			
Elementary and High School	510	9.44	8.62-10.33
University	6,000	90.56	89.67-91.38
Age (years)			
≤ 34	2,218	32.97	31.63-34.34
35-44	1,944	30.13	28.78-31.50
45-54	1,604	26.35	25.06-27.69
≥ 55	744	10.55	9.68-11.48
Geographic region			
North	1,000	8.76	8.25-9.29
Northeast	1,150	28.45	27.66-29.25
Central	1,297	7.17	6.76-7.60
Southeast	1,671	40.51	39.77-41.26
South	1,392	15.11	14.73-15.50
Census area			
Urban	4,979	84.08	83.29-84.83
Rural	1,531	15.92	15.17-16.71
School size (number of teachers)			
≤ 10	552	8.65	7.89-9.47
11-20	1,174	17.89	16.80-19.04
21-30	1,240	18.52	17.40-19.70
> 30	3,544	54.94	53.56-56.31
Teaching level			
Preschool	569	10.02	9.63-10.42
Primary	1,256	20.22	19.72-20.72
Secondary	664	9.91	9.44-10.40
Youth and adult	346	5.41	5.01-5.84
Vocational	322	4.65	4.26-5.08
Two or more levels ***	3,353	49.79	49.01-50.58
Type of teaching contract			
Public admissions/Tenured/Stable	2,381	39.56	38.87-40.25
Temporary	1,180	17.69	17.15-18.25
Private system/Covered by labor legislation	985	16.48	16.01-16.95
Stable and private system	1,964	26.27	25.36-27.20
<b>Total</b>	<b>6,510</b>	<b>100.00</b>	

95%CI: 95% confidence interval.

\* Percentage weighted to adjust the sociodemographic distribution of the *Educatel* sample to the population of schoolteachers in Basic Education according to the 2014 *School Census*;

\*\* Concluded or under way;

\*\*\* Includes schoolteachers that worked non-exclusively in preschool, primary, secondary, youth and adult, and vocational education.

tions feeds back into its determinants, increasing the workload for teachers substituting for those who have missed work or breaking the ties of solidarity towards the absent coworker. This means a cycle of deteriorating working conditions, jeopardizing teachers' health and students' learning <sup>23,24</sup>.

**Table 2**

Prevalence of work absenteeism and risk factors related to quality of school administration and working conditions among Brazilian schoolteachers. Educatel Study, 2015/2016.

Indicators	n	% *	95%CI
Types of absenteeism			
Absenteeism in general	4,322	69.15	67.77-70.49
Due to family reasons	2,050	33.16	31.75-34.60
Due to experience with stressful situation in school	449	7.76	6.98-8.61
Due to illness	3,258	53.34	51.85-54.81
Due to voice problems	1,029	17.71	16.59-18.90
Due to respiratory problems	845	14.56	13.51-15.68
Due to emotional problems	839	14.52	13.48-15.63
Risk factors for absenteeism			
Quality of administration			
Heavy work demands	5,273	81.59	80.45-82.74
No oportunities for new learning experiences	763	11.27	10.34-12.19
Insufficient time for teaching tasks	880	13.44	12.42-14.45
Limited teachers' autonomy	981	14.91	13.85-15.97
No social support in school	2,685	40.63	39.18-42.09
Working conditions			
Students' lack of discipline	4,488	70.17	68.83-71.51
Exposure to intense noise	4,091	64.02	62.62-65.43
Verbal violence from students	1,892	29.74	28.39-31.09
Physical violence from students	184	3.09	2.57-3.61

95%CI: 95% confidence interval.

\* Percentage weighted to adjust the sociodemographic distribution of the Educatel sample to the population of schoolteachers in Basic Education according to the 2014 *School Census*.

**Table 3**

Multiple exposures to risk of work absenteeism related to quality of school administration and working conditions among Brazilian schoolteachers. Educatel Study, 2015/2016.

Indicators	Component 1 (E = 0.23) *	Component 2 (E = 0.23) *	Component 3 (E = 0.16) *
Quality of administration			
Heavy work demands	-0.0277	<b>0.3751</b>	0.0775
No oportunities for new learning experiences	<b>0.5532</b>	-0.0790	0.0061
Insufficient time for teaching tasks	<b>0.4028</b>	0.1654	-0.0992
Limited teachers' autonomy	<b>0.5839</b>	-0.0931	-0.0230
No social support in school	<b>0.4327</b>	0.0689	0.0982
Working conditions			
Students' lack of discipline	-0.0708	<b>0.5972</b>	0.0040
Exposure to intense noise	-0.0103	<b>0.6469</b>	-0.1438
Verbal violence from students	0.0246	0.1699	<b>0.5420</b>
Physical violence from students	-0.0153	-0.1406	<b>0.8173</b>

Note: factors with a load magnitude greater than 0.30 (in modulus) were indicated in bold for being admitted as significant.

\* Proportion of variance explained by each component after promax oblique rotation.

**Table 4**

Crude \* and adjusted prevalence ratios \*\* involving multiple exposures to risk of work absenteeism, independently of reasons reported by Brazilian schoolteachers. Educatel Study, 2015/2016.

Indicators	cPR	95%CI	aPR	95%CI
Component 1				
Absenteeism in general	1.12	1.08-1.17	1.11	1.07-1.15
Due to family reasons	1.20	1.10-1.30	1.19	1.09-1.30
Due to experience with stressful situation in school	4.11	3.11-5.43	3.87	2.93-5.10
Due to illness	1.22	1.15-1.29	1.20	1.13-1.27
Due to voice problems	1.60	1.40-1.84	1.53	1.33-1.76
Due to respiratory problems	1.65	1.41-1.93	1.59	1.36-1.86
Due to emotional problems	2.34	1.98-2.77	2.28	1.93-2.70
Component 2				
Absenteeism in general	1.17	1.12-1.22	1.15	1.10-1.20
Due to family reasons	1.26	1.15-1.37	1.23	1.13-1.34
Due to experience with stressful situation in school	3.57	2.77-4.59	3.18	2.47-4.09
Due to illness	1.34	1.26-1.41	1.30	1.23-1.38
Due to voice problems	2.24	1.94-2.59	2.14	1.85-2.47
Due to respiratory problems	1.58	1.35-1.84	1.49	1.28-1.74
Due to emotional problems	2.57	2.17-3.04	2.43	2.05-2.87
Component 3				
Absenteeism in general	1.13	1.08-1.17	1.11	1.06-1.15
Due to family reasons	1.20	1.10-1.30	1.17	1.07-1.28
Due to experience with stressful situation in school	3.57	2.78-4.58	3.31	2.58-4.25
Due to illness	1.22	1.16-1.29	1.18	1.12-1.25
Due to voice problems	1.74	1.52-1.99	1.63	1.42-1.87
Due to respiratory problems	1.57	1.35-1.83	1.51	1.29-1.76
Due to emotional problems	2.21	1.89-2.58	2.09	1.78-2.45

95% CI: 95% confidence interval; aPR: adjusted prevalence ratio; cPR: crude prevalence ratio.

Note: all the crude and adjusted prevalence ratios were significant ( $p < 0.001$ ).

\* Crude prevalence ratio obtained by Poisson regression;

\*\* Adjusted prevalence ratio (by gender, age, teaching level, type of contract, geographic region, census area, and number of teachers in the school) obtained by multivariate Poisson regression.

Heavy demand from tasks, the perception of low social support, exposure to the agitated classroom environment, and intense noise are factors associated with work absenteeism in school both in wealthier countries<sup>25,26</sup> and in Brazil<sup>12,13</sup>. Intense noise is the environmental risk most cited by the teachers and simultaneously results from multiple sources in the surroundings: recess on the schoolyard or games on the sports courts, heavy vehicle traffic on neighboring streets, machinery, and even classroom activities themselves<sup>27</sup>. The noise interferes in communication between teachers and students, hampers short-term memory, decreases motivation, compromises reading and language skills, and jeopardizes learning in general<sup>28</sup>. Tests of the noise intensity in Brazilian school have shown levels exceeding the recommended technical limits<sup>29</sup>. Noise and lack of classroom discipline are inter-related events, placing a heavy demand on teachers to recuperate the necessary tranquility to conduct their teaching activities. Consistently, the variables expressing these three situations remained in component 2, with increasing risk of work absenteeism due to health problems (especially voice and emotional problems). The physical, emotional, and cognitive responses required of teachers by this type of demand (teaching in an unruly, chaotic, and noisy environment) are associated with illnesses<sup>30</sup> and a probable break in their ability to appear for work.

The Educatel results are consistent in associating component 3, characterized by the teacher's exposure to episodes of verbal or physical violence from students, with work absenteeism due mainly

to contact with stressful events in the school and emotional and respiratory problems. Episodes of violence in school lead to teachers' demotivation and illness, sick leave, and abandonment of the profession. Fear, anxiety, and isolation are reactions identified in exposed groups<sup>31</sup>. Emotional symptoms were identified in 84% of a sample of Canadian teachers that reported experiencing violence at school<sup>31</sup>. Violence at work itself is considered an occupational stressor<sup>32</sup>. In Brazil, common mental disorders were significantly associated with reports of violence<sup>33</sup>. Importantly, emotional problems can harm teachers' health directly or indirectly, making them more vulnerable to psychosomatic diseases. Among these, respiratory illnesses like bronchial asthma and anxious dyspnea are highlighted<sup>34</sup>.

Although the multifactorial nature of work absenteeism is known to researchers, the classic "one risk factor for each health outcome" analysis prevails in the specialized literature<sup>35,36</sup>. The approach adopted in the current study not only reflects trends in international studies to analyze known multi-causal outcomes<sup>37</sup>, but also favors the elaboration of strategies for workers' health promotion. However, since the approach is unprecedented in occupational studies, caution is recommended when interpreting the results, since it is not possible to draw comparisons.

Some study limitations deserve mentioning. Inconsistencies were found in the information from administrative data on the telephone numbers for contacting the selected teachers. But it should be noted that the school areas (the initial point of contact with teachers) have better telephone coverage than the corresponding residential areas. At any rate, post-stratification weighting was used to correct for gaps in coverage<sup>38</sup>. Self-reported information obtained by telephone interview are subject to biases. Note, however, that this strategy has been used in Brazil<sup>39</sup> and elsewhere<sup>40</sup>, due to the low cost, speed, and relative simplicity of data collection when the sample is distributed across a vast territory. From the instrument's construction to the statistical analyses, the procedures were elaborated so as to diminish the likelihood of possible biases. Tests with the instrument sought to guarantee the data's consistency<sup>17</sup>.

Various measures have been developed to improve Basic Education in Brazil<sup>41</sup>. The measures to value teachers feature the Brazilian National Plan for Education (PNE), which includes targets for structuring career plans and pay scales and support for democratic workplace relations. According to the PNE, effective measures are needed for health promotion, prevention, care, and treatment and to support schoolteachers' physical, mental, and emotional integrity in order guarantee improved quality of educational services<sup>42</sup>. By identifying the increase in teachers' work absenteeism when exposed to unfavorable conditions in the physical and organizational school environment, the results of the Educatel Study reinforce the PNE targets.

The results call attention to the seriousness of the problem, since the study detected the harmful effects of noise on the school community's health<sup>28</sup>. The main source of noise is activities involving the teachers and students themselves. Class size, students' age, and teacher's inexperience are significant determinants of exposure to noise, besides inadequate school acoustics<sup>43</sup>. Thus, in order to decrease noise pollution and other preventable risk factors, classroom walls and ceilings should be covered with acoustic insulation in order to reduce the effects of sound reverberation<sup>43</sup>.

Healthy hearing and violence in school are relevant themes for life in society that can be included in school texts. For hearing, it is possible to modify behaviors that signal tolerance to sound pollution inside and outside the school environment. Planning specific educational programs can be helpful for educating future teachers about the effects of environmental noise on individuals' physical and mental health<sup>28</sup>. Such measures expand the ways for continuous learning and improvement in the school community. In relation to violence, knowledge on human rights and peace should be incorporated into the class content. It is important to identify the school surroundings that are most vulnerable to violence in order to act on different fronts. Creating student clubs to promote peace in the school<sup>44</sup>, defining the concept of violence in schools, and drafting and publicizing overall guidelines on the promotion of more just environments are workable proposals<sup>45</sup>. When a violent event does occur, it is reasonable for school administrators, together with the school community, to guarantee the situation's confidentiality in order to avoid further exposing the victims and witnesses. Since violence is a problem with a national scope, teachers' health services should incorporate the guidelines issued by agencies and social organizations in order to be better prepared to support victims and promote their recovery under humane conditions. The prevention of violence helps increase autonomy and expand the support for teachers, since it relates to the way policies are developed for interpersonal

relations with dignity and mutual respect. A fundamental resource for teachers to cope with occupational stress is for them to feel supported to the extent that there is room in school to share concerns with coworkers and to rely on the administration's leadership in positive experiences vis-à-vis similar situations <sup>46</sup>.

Coping with the risks of work absenteeism at school is a way of observing and complying with workplace health and safety legislation as provided by the International Labor Organization <sup>45</sup>. Including information on violent incidents in the existing systems (the *School Census*, for example) will facilitate risk assessment aimed at implementing preventive measures. These forms of social support in the face of distress experienced by the school community expand the biological explanatory limits in order to establish a broader and more effective platform for teachers' health promotion <sup>47</sup>. Finally, teachers' time limitations have to do with planning and administration and multiple teaching jobs. To change this situation involves the school's own organization and the educational system as a whole, since official national school guidelines have set a nationwide minimum wage for teachers that has not been implemented in the entire country.

## Conclusion

The hypothesis of coexistence of multiple exposures to the risk of work absenteeism was proven, reinforcing the importance of goals for valuing Brazilian schoolteachers in Basic Education and the development of school resources. These feature the need to decrease noise pollution in schools, ensure discipline, and prevent violence. Encouragement is needed for multiple simultaneous changes in the quality of administration and working conditions, benefiting not only the teachers but the entire school community.

## Contributors

E. G. Maia and R. M. Claro participated in the study conception and design, data analysis and interpretation, and writing and revision of the article. A. A. Assunção participated in the study conception, data interpretation, and writing and revision of the article.

## Additional informations

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## Resumo

O objetivo do estudo foi identificar as múltiplas exposições ao risco de faltar ao trabalho, independentemente do motivo relatado pelos professores ( $n = 6.510$ ). Foram utilizados dados de um inquérito telefônico sobre a saúde, condições de trabalho e absenteísmo entre professores da Educação Básica no Brasil (Estudo Educatel, 2015/2016). As exposições foram identificadas e estudadas por meio da análise de componentes principais e regressão de Poisson, com foco nas condições de trabalho e na qualidade da gestão nas escolas. Três componentes de fatores de risco para faltar ao trabalho foram identificados. O componente 1 foi caracterizado pela falta de oportunidade para novos aprendizados, insuficiência de tempo para a realização das tarefas, percepção de cerceamento da autonomia e baixo ou nenhum apoio social no ambiente escolar; o componente 2 pela percepção de alta exigência das tarefas, ambiente agitado devido à indisciplina dos alunos e ruído intenso; e o componente 3 pela vivência de violência verbal ou física praticada pelos alunos. Os três componentes apresentaram maior magnitude de associação às faltas ao trabalho diante do relato de estresse na escola ( $RPa = 3,87$ ;  $IC95\%: 2,93-5,10$ ;  $p < 0,05/RPa = 3,18$ ;  $IC95\%: 2,47-4,09$ ;  $p < 0,05/RPa = 3,31$ ;  $IC95\%: 2,58-4,25$ ;  $p < 0,05$ , respectivamente) e por problemas emocionais ( $RPa = 2,28$ ;  $IC95\%: 1,93-2,70$ ;  $p < 0,05/RPa = 2,43$ ;  $IC95\%: 2,05-2,87$ ;  $p < 0,05/RPa = 2,09$ ;  $IC95\%: 1,78-2,45$ ;  $p < 0,05$ , respectivamente). A identificação desses componentes de risco evidenciou a necessidade de mudanças sistêmicas nas escolas da Educação Básica no país.

*Absenteísmo; Professores Escolares; Fatores de Risco; Saúde do Trabalhador*

## Resumen

El objetivo del estudio fue identificar las múltiples exposiciones referentes al riesgo de faltar al trabajo, independientemente del motivo informado por los profesores ( $n = 6.510$ ). Se utilizaron datos de una encuesta telefónica sobre salud, condiciones de trabajo y absentismo entre profesores de Educación Básica en Brasil (Estudio Educatel, 2015/2016). Las exposiciones se identificaron e estudiaron mediante un análisis de componentes principales y regresión de Poisson, centrándose en las condiciones de trabajo y calidad de la gestión en las escuelas. Se identificaron tres componentes como factores de riesgo para faltar al trabajo. El componente 1 se caracterizó por la falta de opciones relacionadas con la actualización en formación, insuficiencia de tiempo para la realización de tareas, percepción de recortes en su autonomía y el bajo o nulo apoyo social en el ambiente escolar; el componente 2 lo fue por la percepción de alta exigencia en las tareas, ambiente convulso, debido a la indisciplina de los alumnos y ruido intenso; y el componente 3 por la vivencia de violencia verbal o física ejecutada por alumnos. Los tres componentes presentaron mayor magnitud de asociación con las faltas de trabajo, ante el informe de estrés en la escuela ( $RPa = 3,87$ ;  $IC95\%: 2,93-5,10$ ;  $p < 0,05/RPa = 3,18$ ;  $IC95\%: 2,47-4,09$ ;  $p < 0,05/RPa = 3,31$ ;  $IC95\%: 2,58-4,25$ ;  $p < 0,05$ , respectivamente) y por problemas emocionales ( $RPa = 2,28$ ;  $IC95\%: 1,93-2,70$ ;  $p < 0,05/RPa = 2,43$ ;  $IC95\%: 2,05-2,87$ ;  $p < 0,05/RPa = 2,09$ ;  $IC95\%: 1,78-2,45$ ;  $p < 0,05$ , respectivamente). La identificación de estos componentes de riesgo evidenció la necesidad de cambios sistémicos en las escuelas de Educación Básica en el país.

*Absentismo; Maestros; Factores de Riesgo; Salud Laboral*

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