



Research article

Correlates of the use of health services among elementary school teachers: A cross-sectional exploratory study

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Abstract: The aim of the present study was to analyze the use of health services and associated factors among elementary school teachers. This is a cross-sectional study conducted with 505 school teachers from Londrina-PR, Brazil. The outcomes were medical consultation, emergency service, hospitalization, other consultations and laboratory and imaging exam use. Work and health characteristics were the independent variables. All variables were assessed using a self-report questionnaire and negative binomial regression was adopted to estimate rate ratios (RR). Sedentary behavior, being overweight, physical activity, alcohol consumption, tobacco use, burnout and high stress were not associated with any outcome. The presence of chronic diseases (RR = 1.27 to 4.25) and disability due to musculoskeletal disorders (RR = 1.25 to 2.52) was positively associated with all outcomes. Higher other consultations (RR = 2.13 and 1.94), laboratory (RR = 1.36 and 1.31) and imaging tests (RR = 1.50 and 1.42) were found in teachers with musculoskeletal pain and health insurance. Those with common mental disorders presented higher use of medical (RR = 1.50) or other consultations (RR = 1.41), as well as the emergency service (RR = 1.43). Length of employment was positively associated with other consultations (RR = 1.56 to 3.50) and imaging tests (RR = 1.28 to 1.39). Inadequate school infrastructure and musculoskeletal pain were associated with higher medical consultations (RR = 1.46 and 1.51), while problems related to dust and voice disorders were associated with higher use of the emergency service (RR = 1.60 to 1.99). Although the associations varied according to the outcome, the main predictors of health services were the presence of disability, chronic disease, musculoskeletal pain and common mental disorders. These

variables should be considered to monitor and promote health care accessibility or reduce costs associated with health service use among elementary teachers.

Keywords: chronic disease; health care; mental disorders; musculoskeletal pain

1. Introduction

It is known that non-communicable chronic diseases are the main cause of morbidity, disability, and mortality [1,2]. Health risks for non-communicable chronic diseases are high blood pressure, tobacco or second-hand smoke, overweight, physical inactivity, alcohol use, diets low in fruits and vegetables, and high sodium and saturated fat intake [1,2]. In addition to the risks that affect the general population, work characteristics can lead to an increased risk for non-communicable diseases [3,4]. Specifically, teachers are at risk of developing a variety of health disorders related to physical, musculoskeletal, respiratory and mental health factors, as well as stress, hearing loss and dysphonia [5–9].

The presence of health disorders results in an increase in the utilization of health services [1], determined by various aspects such as societal, the health service system and individual determinants. Among individual determinants, perceived and evaluated symptoms and diagnosis are included, which represent the main cause of health service use [10]. When analyzing health service use through quantitative analysis, a dichotomy should be considered. A higher rate of utilization is considered an indicator of accessibility to the health service [11], however, it is also an indicator of health expenditure. Although universal accessibility is desirable, high health service utilization can result in impoverishment due to high costs of procedures, mainly in low and middle-income countries [12]. For this reason, programs to reduce health risks and, consequently, health related costs have been studied [13].

There is information available regarding health service utilization in the general population [14–16]. However, although health risks and work conditions among teachers have been extensively described, the profile and variables associated with health service utilization have not yet been described. There is a need to investigate characteristics associated with health service use, as a high ratio of sick leave has been described among Brazilian teachers [9,17] and absences from work are associated with medical care [18]. Moreover, the severity of symptoms presented by teachers requires higher health care attention [19]. The results of the present study can contribute to understanding of which health services are most needed among teachers, providing information to enhance health care accessibility. It can also guide programs aimed at preventing specific health disorders and consequently reduce sick leave or financial costs due to health services. Thus, the purpose of the present study was to analyze the use of health services and associated factors among elementary school teachers.

2. Materials and methods

2.1. Design and population

The population of the present study included elementary school teachers from the municipal public system of Londrina, Paraná, Brazil. Teachers enter the teaching career through a public examination, being required to have a degree in pedagogy or another specific educational area (i.e., physical education). In the first to fifth years of elementary education, a single teacher is responsible for a class, in addition to teachers of other disciplines (i.e., physical education, arts or non-mandatory components) who teach multiple classes. Teacher workload varies according to the number of classes attributed to them. Commonly the workload is 8 hours a day, but some teachers work more hours than this, and it is possible for some to work in three periods of the day and teaching students from different educational levels. There are a variety of barriers described in the literature that are commonly reported by Brazilian teachers, including social devaluation, inadequate working conditions, health-related problems, social devaluation, overload, violence, role ambiguity, a low level of social support, low perceived self-efficacy, pressure, poor infrastructure and environment, low creativity and autonomy, and insufficient time for planning [3].

This is a cross-sectional study with a probabilistic sample of elementary school teachers from Londrina city, Paraná, Brazil, carried out from July to December 2014. In 2014 there were 74 municipal elementary schools distributed in five geographical regions of the city, with a total of 2500 teachers. All schools were invited to participate in the study and 63 accepted. Each school that agreed to participate in the study was visited to present the project to the teachers, invite them to participate and collect the consent form from those who agreed to participate. Data collection was scheduled in the school where the teachers were working. The study was approved by the State University of Londrina Ethics Committee for Research involving Human Beings (Protocol 331284.4.0000.5231), following the guidelines of the Brazilian National Health Council Resolution N° 466/2012. An informed written informed consent was obtained.

2.2. Sample

Sample selection was probabilistic and participants were stratified according to the region of the city. The eligibility criteria were: (a) having been a teacher at municipal schools for at least 1 year and be working in an elementary school; (b) not being retired or on medical leave during data collection; (c) not having been work relocated (i.e., teacher working as a secretary or in administration). The sample size calculation was performed using the following parameters: $N = 2500$, a 50% outcome prevalence, 5% sample error, confidence interval of 95% and design effect of 1.5, using the software OpenEpi 3.01. The proportion of teachers in each region of the city in the sample was similar to the teacher population in the municipal.

2.3. Variables and instruments

The outcomes analyzed were the following types of health service use: Medical consultations, emergency service, hospitalizations, other consultations (psychologist or physiotherapist), laboratory and imaging tests in the previous 12 months. Health service use was estimated by an open question:

“How many times in the last 12 months have you used the following health services?” and the list of services cited above was displayed. The outcomes were analyzed as discrete variables.

The exposure variables were health insurance, school infrastructure, length of employment, nutritional status, common mental disorders, musculoskeletal pain, tobacco and alcohol use, physical activity, sedentary behavior, voice disorders, problems related to dust or chalk powder, stress, job support, burnout, disability due to musculoskeletal disorders and chronic disease. Age, income and sex were covariates. All variables were assessed using a self-report questionnaire. Nutritional status was estimated by the body mass index and weight and height were self-reported. Income was estimated according to the values proposed by the Brazilian Association of Polling Companies [20]. Physical activity was assessed by the International Physical Activity Questionnaire [21] (the cut-off was 150 minutes of moderate to vigorous intensity per week). Common mental disorders were estimated using the Self Report Questionnaire [22] (cut-off adopted 7/8). Musculoskeletal disorders and disability were assessed by the Standardized Nordic Questionnaire [23]. To estimate work stress, the Job Stress Scale Questionnaire [24] was used, and two variables were considered: (1) High stress, teachers who were above percentile 50 for demand and below percentile 50 for control (high demand and low control); (2) low job support, those who were below percentile 50 for job support. The Maslach Burnout Inventory was used to assess burnout [25]. Sedentary behavior was assessed by the estimation of television viewing and computer use during leisure time as described previously [26].

Some questions were asked to assess other variables [7,9,26]: Health insurance, “How do you pay for health services?”, with response options “Private health insurance”, “Employer’s health insurance” or “I use the public health system”; school infrastructure: “Do you consider the infrastructure of your school appropriate?” (aspects that should be considered were listed: Noise, temperature, lighting, cleaning, ventilation, size, and furniture) with answer options “yes”, “no” and “partially”; alcohol consumption: “Usually, how many times in a normal month do you consume ≥ 5 doses of the drinks below (men) or ≥ 4 doses (women) in less than 2 hours?” (milliliters of beer, wine and distilled drink doses were displayed); tobacco use: “Have you smoked at least 100 cigarettes in your entire life?”, “yes” and “no”; “How often during a typical week do you smoke”, “none”, “1–2 days”, “3–4 days”, “5–6 days” and “daily”; chronic diseases: “Has a doctor or psychologist reported that you have any of the following chronic diseases?” with answer options “yes” and “no” for a list of categories of chronic diseases (cardiometabolic, psychological, orthopedic, respiratory, gastrointestinal, nervous system or cancer); voice disorders: “Do you have a frequent voice-related problem?” “yes” and “no”; problems related to chalk powder: “Do you have a frequent problem with dust or chalk powder?”, “yes”, “no” for each problem (nasal stuffiness, eye irritation, rhinitis, coryza, cough, skin problems). Length of employment was estimated by an open question. Some of the questions described above were elaborated to meet the aim of the study. To ensure the quality of information the following steps were conducted: (a) The researchers of the project proposed the questions; (b) the questions were evaluated by four specialists in health sciences areas (from three different universities, with a PhD degree, experience both in instrument validation and supervising research projects in post-graduate programs and with relevant publications); (c) pilot study with 50 elementary teachers to assess comprehension and the reproducibility of the questions within seven days test-retest. The variables included in this study presented acceptable reproducibility (intraclass coefficient >0.5 for continuous/discrete variables and kappa index >0.40 for categorical variables).

2.4. Potential sources of bias

Some procedures were performed to reduce potential sources of bias. Selection bias was reduced by probabilistic sampling stratified by region of the city, which ensured the opportunity for the entire teacher population to participate in the study, except those who were absent for any reason. To prevent information bias, most of the instruments adopted were previously validated and for those questions constructed specifically for the present study, procedures to measure the quality of information were adopted, as described in section 2.3. Confounding risk was attenuated by investigating exposure variables and covariates that can theoretically represent causal associations with the outcomes analyzed.

2.5. Statistical analysis

Descriptive analysis was performed by mean and standard deviation, minimum, maximum, sum and relative frequency for health service use variables. Due to the overdispersion presented by most of the outcomes analyzed, negative binomial regression was adopted to conduct the bivariate and multivariate analysis to estimate rate ratio (RR) and a confidence interval of 95% (CI 95%). Variables that were significantly associated with the outcomes in the bivariate analysis were inserted in the multivariate model into two hierarchical levels adjusted for age, income and sex: Work characteristics and health risks in level 1 and chronic diseases and disability due to musculoskeletal disorders in level 2. Participants with missing information were excluded from the analysis. The multivariate analysis also considered strata and sample weight using the command “survey” of STATA software version 13.0. In all cases the alpha level was set at $P < 0.05$.

3. Results

Of a total of 2500 teachers from 74 municipal schools, data collection was conducted with 595 teachers from 63 schools and the final sample was composed of 505 participants. The main reason for exclusion of participants was incomplete information on the questionnaire for the following variables: Body mass index ($n = 35$), income ($n = 19$), Maslach Burnout Inventory ($n = 10$), disability due to musculoskeletal disorder ($n = 11$), tobacco use ($n = 6$), school infrastructure ($n = 5$), voice disorder ($n = 3$) and physical activity ($n = 1$). Missing data did not change the sample characteristics significantly regarding sociodemographic, work-related and health characteristics.

The sample was composed of a higher proportion of female teachers (95.2%), >40 years of age (50.7%) with medium income (43.6%), with health insurance (82.0%), had a length of employment >20 years (40.0%), who reported adequate infrastructure of schools (78.5%), eutrophic (56.7%), were without mental disorders (68.6%), were physically inactive (77.9%) and had musculoskeletal pain in all regions of the body in the previous 12 months (39.0%). Furthermore, a higher prevalence of teachers did not report high stress (70.8%), low job support (57.7%), do not binge drink (66.9%), never used tobacco (87.2%), have \geq two problems related to dust (38.6%), did not present disability due to musculoskeletal pain (64.2%), have one or more diagnosed chronic disease (79.1%), voice disorders (64.6%) or any burnout dimension (71%). The characteristics regarding the outcomes studied are described in Table 1.

Table 1. Description of one-year health services use among sample (n = 505).

Health services use	Mean (SD)	Prevalence ≥ 1	Minimum	Maximum	Sum
Medical consultations	3.78 (5.19)	82.3	0	58	1877
Emergency service	1.14 (1.76)	48.7	0	15	566
Hospitalizations	0.18 (0.56)	13.5	0	7	89
Other consultations	9.25 (24.39)	83.3	0	98	4549
Laboratory tests	1.42 (1.13)	82.5	0	10	704
Imaging tests	1.37 (1.29)	78.9	0	10	682

Note: SD: Standard deviation; Sum: Sum of each medical service used on total sample.

The results of the exploratory bivariate analysis between the independent variables and the outcomes are displayed in Tables 2 and 3. The variables that presented a higher number of significant positive associations with the outcomes were, respectively, disability due to musculoskeletal disorders, chronic diseases, musculoskeletal pain, health insurance, length of employment, common mental disorders, inadequate infrastructure of schools, problems related to dust or chalk powder, high stress, tobacco use, low job support and emotional exhaustion.

Table 2. Bivariate analysis of the association between the independent variables and medical consultations, emergency service use and hospitalizations among elementary school teachers.

Variables	Medical consultations		Emergency service		Hospitalizations	
	Rate	RR (CI 95%)	Rate	RR (CI 95%)	Rate	RR (CI 95%)
Health insurance						
No	3.11	Reference	1.10	Reference	0.23	Reference
Yes	3.94	1.26 (1.11–1.44)	1.14	1.04 (0.73–1.48)	0.16	0.70 (0.37–1.31)
School infrastructure						
Not adequate	3.26	Reference	1.03	Reference	0.17	Reference
Adequate	5.71	1.75 (1.40–2.18)	1.50	1.45 (1.05–1.98)	0.19	1.12 (0.60–2.07)
Length of employment						
<9 years	3.20	Reference	1.34	Reference	0.22	Reference
10 to 19 years	3.54	1.10 (0.86–1.41)	1.15	0.85 (0.61–1.20)	0.10	0.45 (0.23–0.96)
>20 years	4.38	1.36 (1.07–1.73)	0.98	0.73 (0.52–1.01)	0.21	0.95 (0.52–1.72)
Overweight						
No	3.72	Reference	1.10	Reference	0.16	Reference
Yes	3.85	1.03 (0.85–1.25)	1.17	1.06 (0.80–1.38)	0.20	1.28 (0.76–2.14)
Common mental disorders						
No	3.12	Reference	0.88	Reference	0.17	Reference
Yes	5.21	3.12 (2.78–3.51)	1.69	1.91 (1.45–2.50)	0.17	1.00 (0.57–1.74)

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Variables	Medical consultations		Emergency service		Hospitalizations	
	Rate	RR (CI 95%)	Rate	RR (CI 95%)	Rate	RR (CI 95%)
Physical activity						
No	3.78	Reference	1.18	Reference	0.18	Reference
Yes	3.78	0.99 (0.79–1.25)	0.96	0.81 (0.58–1.12)	0.14	0.77 (0.40–1.48)
Musculoskeletal pain						
No	2.30	Reference	0.63	Reference	0.09	Reference
≥ One region	4.07	1.76 (1.35–2.31)	1.23	1.95 (1.31–2.90)	0.19	2.00 (0.87–4.58)
Alcohol consumption						
No	3.66	Reference	1.15	Reference	0.18	Reference
Yes	3.65	0.99 (0.81–1.22)	1.17	1.02 (0.97–1.37)	0.16	0.89 (0.50–1.57)
Tobacco use						
Never	3.66	Reference	1.17	Reference	0.18	Reference
Not current smoker	5.13	1.40 (1.01–1.94)	0.66	0.56 (0.33–0.94)	0.17	0.95 (0.38–2.33)
Current smoker	3.55	0.97 (0.57–1.62)	1.55	1.32 (0.67–2.59)	0.17	0.29 (0.35–2.50)
TV viewing						
<2 h/day	3.86	Reference	1.10	Reference	0.19	Reference
≥2 h/day	3.71	0.96 (0.79–1.17)	1.19	1.07 (0.82–1.41)	0.16	0.82 (0.48–1.39)
Computer use						
<2 h/day	3.89	Reference	1.07	Reference	0.17	Reference
≥2 h/day	3.67	0.94 (0.77–1.14)	1.23	1.14 (0.87–1.50)	0.19	1.10 (0.65–1.85)
Voice disorders						
No	3.42	Reference	1.00	Reference	0.16	Reference
Yes	4.43	1.29 (1.06–1.57)	1.38	1.38 (1.05–1.81)	0.21	1.29 (0.76–2.19)
Problems related to dust or chalk powder						
No	3.31	Reference	0.59	Reference	0.15	Reference
One	3.76	1.13 (0.88–1.45)	1.03	1.75 (1.22–2.51)	0.20	1.30 (0.67–2.53)
≥ Two	4.14	1.25 (1.00–1.58)	1.63	1.96 (1.96–3.86)	0.17	1.14 (0.59–2.19)
High stress						
No	4.00	Reference	1.25	Reference	0.17	Reference
Yes	3.25	0.81 (0.65–1.00)	0.86	0.69 (0.51–0.94)	0.18	1.05 (0.60–1.85)
Low job support						
No	3.24	Reference	0.98	Reference	0.17	Reference
Yes	4.52	1.39 (1.15–1.68)	1.34	1.37 (1.04–1.78)	0.19	1.11 (0.66–1.87)
Emotional Exhaustion						
No	3.48	Reference	0.98	Reference	0.19	Reference
Yes	4.61	1.32 (1.07–1.63)	1.57	1.59 (1.19–2.13)	0.14	0.75 (0.41–1.39)

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Variables	Medical consultations		Emergency service		Hospitalizations	
	Rate	RR (CI 95%)	Rate	RR (CI 95%)	Rate	RR (CI 95%)
Depersonalization						
No	3.79	Reference	1.06	Reference	0.15	Reference
Yes	3.76	0.99 (0.80–1.22)	1.32	1.24 (0.92–1.66)	0.23	1.47 (0.85–2.53)
Professional accomplishment						
No	3.78	Reference	1.05	Reference	0.18	Reference
Yes	3.80	1.01 (0.81–1.24)	1.36	1.28 (0.95–1.72)	0.17	0.92 (0.51–1.65)
Disability due to musculoskeletal disorders						
No	2.93	Reference	0.89	Reference	0.13	Reference
Yes	5.30	1.81 (1.49–2.19)	1.56	1.74 (1.33–2.27)	0.25	1.91 (1.14–3.20)
Chronic disease						
None	1.93	Reference	0.74	Reference	0.07	Reference
One	2.54	1.34 (0.92–1.94)	0.92	1.32 (0.75–2.33)	0.08	1.30 (0.51–3.27)
Two	3.35	1.84 (1.32–2.57)	1.12	1.76 (1.05–2.95)	0.22	3.02 (1.17–7.87)
≥ Three	6.25	3.37 (2.40–4.72)	1.56	2.19 (1.31–3.68)	0.28	4.61 (1.87–11.3)

Note: RR (CI 95%): Crude rate ratio (confidence interval of 95%).

Table 3. Bivariate analysis of the association between the independent variables and other consultations, laboratory and imaging tests among elementary school teachers.

Variables	Other consultations		Laboratory tests		Imaging tests	
	Rate	RR (CI 95%)	Rate	RR (CI 95%)	Rate	RR (CI 95%)
Health insurance						
No	3.76	Reference	1.11	Reference	0.82	Reference
Yes	10.48	2.92 (1.84–4.51)	1.48	1.33 (1.07–1.65)	1.49	1.81 (1.41–2.33)
School infrastructure						
Adequate	8.28	Reference	1.43	Reference	1.37	Reference
Not adequate	12.74	1.72 (1.05–2.84)	1.37	0.95(0.79–1.14)	1.36	0.99 (0.81–1.20)
Length of employment						
<9 years	4.29	Reference	1.28	Reference	1.07	Reference
10 to 19 years	6.67	1.57 (0.93–2.65)	1.41	1.09 (0.90–1.33)	1.40	1.30 (1.04–1.62)
>20 years	14.68	3.76 (2.48–5.71)	1.50	1.17 (0.97–1.41)	1.55	1.44 (1.17–1.77)
Overweight						
No	9.40	Reference	1.41	Reference	1.32	Reference
Yes	9.04	0.78 (0.48–1.26)	1.41	1.00 (0.86–1.16)	1.43	1.08 (0.92–1.27)
Common mental disorders						
No	7.87	Reference	1.37	Reference	1.27	Reference
Yes	12.33	1.67 (1.07–2.59)	1.50	1.08 (0.93–1.27)	1.57	1.23 (1.04–1.45)

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Variables	Other consultations		Laboratory tests		Imaging tests	
	Rate	RR (CI 95%)	Rate	RR (CI 95%)	Rate	RR (CI 95%)
Physical activity						
No	9.01	Reference	1.40	Reference	1.38	Reference
Yes	10.0	1.43 (0.83–2.46)	1.44	1.02 (0.86–1.22)	1.36	0.99 (0.81–1.20)
Musculoskeletal pain						
No	3.54	Reference	1.15	Reference	0.93	Reference
≥ One region	10.36	2.78 (1.29–6.00)	1.46	1.26 (1.02–1.57)	1.47	1.57 (1.22–2.01)
Alcohol consumption						
No	14.15	Reference	1.45	Reference	1.38	Reference
Yes	9.06	1.02 (0.60–1.74)	1.32	0.91 (0.77–1.07)	1.37	0.99 (0.83–1.18)
Tobacco use						
Never	9.37	Reference	1.39	Reference	1.37	Reference
Not current smoker	9.97	1.13 (0.60–2.12)	1.71	1.22 (0.96–1.55)	1.57	1.15 (0.88–1.50)
Current smoker	6.22	0.68 (0.25–1.82)	1.22	0.87 (0.57–1.34)	0.88	0.64 (0.38–1.08)
TV viewing						
<2 h/day	10.41	Reference	1.42	Reference	1.38	Reference
≥2 h/day	7.72	0.67 (0.42–1.06)	1.40	0.98 (0.84–1.14)	1.37	0.99 (0.84–1.17)
Computer use						
<2 h/day	9.10	Reference	1.38	Reference	1.34	Reference
≥2 h/day	9.53	0.76 (0.46–1.25)	1.45	1.04 (0.90–1.21)	1.40	1.04 (0.88–1.22)
Voice disorders						
No	9.19	Reference	1.37	Reference	1.26	Reference
Yes	9.33	1.24 (0.74–2.08)	1.49	1.08 (0.93–1.26)	1.56	1.23 (1.04–1.45)
Problems related to dust or chalk powder						
No	7.92	Reference	1.40	Reference	1.21	Reference
One	8.03	0.97 (0.51–1.84)	1.34	0.96 (0.79–1.16)	1.35	1.11 (0.90–1.38)
≥ Two	11.29	1.46 (0.78–2.73)	1.48	1.05 (0.88–1.26)	1.50	1.24 (1.01–1.51)
High stress						
No	9.91	Reference	1.41	Reference	1.44	Reference
Yes	7.62	0.78 (0.48–1.28)	1.42	1.01 (0.85–1.18)	1.20	0.83 (0.69–0.99)
Low job support						
No	8.23	Reference	1.37	Reference	1.29	Reference
Yes	10.65	1.51 (0.95–2.40)	1.48	1.08 (0.93–1.25)	1.48	1.14 (0.97–1.34)
Emotional Exhaustion						
No	9.06	Reference	1.40	Reference	1.32	Reference
Yes	9.75	1.11 (0.64–1.92)	1.46	1.04 (0.88–1.23)	1.50	1.13 (0.95–1.35)

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Variables	Other consultations		Laboratory tests		Imaging tests	
	Rate	RR (CI 95%)	Rate	RR (CI 95%)	Rate	RR (CI 95%)
Depersonalization						
No	9.71	Reference	1.41	Reference	1.41	Reference
Yes	8.08	0.90 (0.55–1.48)	1.41	0.99 (0.84–1.17)	1.25	0.88 (0.73–1.05)
Professional accomplishment						
No	9.51	Reference	1.35	Reference	1.34	Reference
Yes	8.59	0.78 (0.51–1.19)	1.44	1.16 (0.99–1.36)	1.44	1.06 (0.89–1.27)
Disability due to musculoskeletal disorders						
No	4.08	Reference	1.28	Reference	1.13	Reference
Yes	18.43	4.41 (2.96–6.59)	1.65	1.29 (1.11–1.50)	1.79	1.54 (1.34–1.84)
Chronic disease						
None	3.06	Reference	1.24	Reference	1.05	Reference
One	5.16	1.78 (1.02–3.11)	1.27	1.02 (0.19–1.33)	1.17	1.09 (0.86–1.36)
Two	5.91	1.80 (1.02–3.37)	1.22	1.02 (0.78–1.32)	1.22	1.12 (0.88–1.44)
≥ Three	18.72	6.21 (4.11–9.39)	1.82	1.43 (1.15–1.78)	1.82	1.80 (1.41–2.31)

Note: RR (CI 95%): Crude rate ratio (confidence interval of 95%).

The multivariate analysis revealed that inadequate infrastructure of schools (RR = 1.46), common mental disorders (RR = 1.50), musculoskeletal pain (RR = 1.51) and ≥ 1 chronic disease (RR = 1.72 to 2.83) increased the rate ratio of medical consultation. The same was observed for the association between common mental disorders (RR = 1.43), problems related to dust or chalk powder (RR = 1.60 to 1.99) and ≥ 2 chronic diseases (RR = 1.66 to 1.68) with emergency service use. Teachers with disability due to musculoskeletal pain presented higher medical consultations (RR = 1.37), emergency service use (RR = 1.58) and hospitalizations (RR = 1.83). The presence of two or more chronic diseases increased the RR for hospitalization by three to four times (Table 4).

Table 4. Multivariate analysis of the association between the independent variables and medical consultations, emergency service use and hospitalizations among elementary school teachers.

Variables	Medical consultations Adjusted RR (CI 95%)	Emergency service Adjusted RR (CI 95%)	Hospitalizations Adjusted RR (CI 95%)
Level 1			
School infrastructure			
Adequate	Reference	-	-
Not adequate	1.46 (1.15–1.87)	-	-
Common mental disorders			
No	Reference	Reference	-
Yes	1.50 (1.09–2.06)	1.43 (1.02–2.00)	-

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Variables	Medical consultations Adjusted RR (CI 95%)	Emergency service Adjusted RR (CI 95%)	Hospitalizations Adjusted RR (CI 95%)
Level 1			
Musculoskeletal pain			
No	Reference		
≥ One region	1.51 (1.13–2.02)	-	-
Problems related to dust or chalk powder			
No		Reference	-
One	-	1.60 (1.11–2.31)	-
≥ Two	-	1.99 (1.40–2.82)	-
Level 2			
Disability due to musculoskeletal disorders			
No	Reference	Reference	Reference
Yes	1.37 (1.12–1.66)	1.58 (1.22–2.04)	1.83 (1.06–3.17)
Chronic disease			
None	Reference	Reference	Reference
One	1.18 (0.82–1.70)	1.20 (0.84–1.73)	1.51 (0.59–3.85)
Two	1.72 (1.23–2.40)	1.66 (1.17–2.36)	3.59 (1.23–10.44)
≥ Tree	2.83 (1.99–4.03)	1.68 (1.02–2.83)	4.25 (1.58–11.38)

Note: RR (CI 95%): Rate ratio (confidence interval of 95%). Final models were adjusted for variables that were significantly associated to the outcomes on bivariate analysis and for sex, age and income.

Table 5 describes the association between the independent variables with other consultations, and laboratory and imaging tests. The presence of health insurance (RR = 1.31 to 1.94), musculoskeletal pain (RR = 1.36 to 2.13), disability due to musculoskeletal pain (RR = 1.25 to 2.52), and chronic disease (RR = 1.27 to 3.96) increased the rate ratio of other consultations, laboratory and imaging tests utilization, respectively. Longer length of employment was positively associated with other consultations (RR = 1.56 to 3.50) and imaging test utilization (RR = 1.28 to 1.39). Similarly, teachers with common mental disorders (RR = 1.41) and voice disorders (RR = 1.18) presented higher other consultations and imaging test use, respectively.

Table 5. Multivariate analysis of the association between the independent variables and other consultations, laboratory and imaging tests among elementary school teachers.

Variables	Other consultations Adjusted RR (CI 95%)	Laboratory tests Adjusted RR (CI 95%)	Imaging tests Adjusted RR (CI 95%)
Level 1			
Health insurance			
No	Reference	Reference	Reference
Yes	1.94 (1.31–2.87)	1.31 (1.13–1.51)	1.42 (1.15–1.77)
Length of employment			
<9 years	Reference		Reference
10 to 19 years	1.56 (1.00–2.46)		1.28 (1.01–1.63)
>20 years	3.50 (2.04–6.00)		1.39 (1.10–1.75)
Common mental disorders			
No	Reference		
Yes	1.41 (1.01–1.95)		
Musculoskeletal pain			
No	Reference	Reference	Reference
≥ One region	2.13 (1.05–4.29)	1.36 (1.18–1.57)	1.50 (1.18–1.90)
Voice disorders			
No			Reference
Yes			1.18 (1.02–1.35)
Level 2			
Disability due to musculoskeletal disorders			
No	Reference	Reference	Reference
Yes	2.52 (1.78–3.57)	1.25 (1.11–1.41)	1.34 (1.13–1.60)
Chronic disease			
None	Reference	Reference	Reference
One	1.88 (1.10–3.19)	0.94 (0.72–1.22)	0.98 (0.78–1.22)
Two	1.59 (1.01–2.52)	0.97 (0.76–1.24)	0.98 (0.81–1.20)
≥ tree	3.96 (2.55–6.16)	1.27 (1.02–1.58)	1.35 (1.11–1.64)

Note: RR (CI 95%): Rate ratio (confidence interval of 95%). Final models were adjusted for variables that were significantly associated to the outcomes on bivariate analysis and for sex, age and income.

4. Discussion

The novelty of this study was the description of the factors associated with the use of health services among elementary school teachers, a group of professionals that are among the most exposed to health risks [3]. To our knowledge, previous studies have only analyzed health service use among the general population. Variables that were most associated with health service use were chronic diseases, disability due to musculoskeletal disorders, musculoskeletal pain, common mental disorders, health insurance and length of employment.

It is widely known that physical activity, alcohol consumption, tobacco use and being overweight are determinants of chronic diseases [1,2]. However, none of these presented an association with any outcome analyzed. It is probable that one aspect that could explain these results is that some of these behaviors increase biological risk factors slowly, which implies that not necessarily all teachers with these health risks present impaired health yet. Thus, it is likely health risks impact health service use only when they have a clinical effect or become a chronic disease, which can be suggested due to the associations found between chronic diseases and all outcomes studied. Although no association was found, it is important to state that these variables are the target for reducing the main chronic diseases and, consequently, the costs associated with them [13].

The presence of chronic disease was associated with all outcomes analyzed and for some outcomes the association was linear according to a number of diseases diagnosed. This finding was expected as chronic diseases result in several clinical conditions that require health care. This result is in accordance with previous data that demonstrated a reduction in health care costs due to investment in disease prevention [14]. These findings suggest that there is a need for prevention among teachers, since the prevalence of one or more chronic diseases in the sample studied was 79.1%.

As occurred for chronic diseases, disability due to musculoskeletal disorders was associated with all outcomes. Similarly, musculoskeletal pain was associated with four outcomes. Musculoskeletal disorders, disability and musculoskeletal diseases are common among teachers [26] and are the result of inadequate infrastructure of schools, awkward posture and length of employment [8,9,27]. The prevention of musculoskeletal pain and disability is necessary since these outcomes represent a negative impact on the quality of life [28], high health expenditure [29] and are the second most common cause of sickness absence among public workers [30]. Furthermore, musculoskeletal disorders require high health service use to clinically diagnose and monitor as described in the present study.

Mental health disorders have a high prevalence, and for this reason they are widely studied in teachers [3,9]. The current study presents controversial results between the variables of mental health regarding health service use. The presence of common mental disorders was significantly associated with three outcomes. Conversely, the variables stress, low job support and all dimensions of job burnout were not associated with any health service use variable analyzed. An aspect that could explain these results is that both the Job Stress Scale [24] and Maslach Burnout Inventory [25] assess indirect variables of job stress and job burnout, while the Self Report Questionnaire (SRQ-20) evaluates psychosomatic symptoms of common mental disorders [22], which already implies the presence of clinical conditions and probably their treatment. Since some symptoms manifest themselves both physically and psychologically, teachers with common mental disorders have a high likelihood of using health services such as medical consultations, hospitalizations and other consultations, which includes psychological consultations. Furthermore, the similarity of the clinical symptoms of these mental disorders may also explain the results, since these variables were entered at the same level in the multiple analysis. Although job stress and burnout were not associated with any outcome, these variables should also be prevented among teachers since they are associated with each other [31].

Length of employment was associated with other consultations, which include physiotherapists and psychologists, as well as imaging tests. Similarly, voice disorders were also associated with imaging tests. Higher health service use of these services by teachers with a longer length of

employment and those with voice disorders could be a consequence of the health risks that teachers are exposed to. It has been described that Brazilian teachers have a negative perception about their environment and work conditions such as noise, temperature, physical and mental exhaustion, musculoskeletal pain, voice problems, negative influence of work on quality of life, low social relevance and personal accomplishment, complaints related to the didactic conditions of work, and violence [32]. Long-term exposure to these work conditions negatively impacts the health of teachers with a longer length of employment, as described previously in Brazilian teachers for quality of life and musculoskeletal and voice disorders [26,32]. Therefore, affected teachers can require higher health service use for these clinical conditions.

The results regarding health service use and health insurance were heterogeneous in the present study. Teachers with health insurance have a higher likelihood of using other consultations and laboratory and imaging tests, while no associations were found for medical consultations, the emergency service and hospitalization. The results described in the literature are also controversial. Some previous studies indicate higher health service use among adults with health insurance [16], while others demonstrate similar use [15]. The absence of an association between health insurance and medical consultation, the emergency service or hospitalization reflects an increase in the unique health system coverage in Brazil [33]. Furthermore, even with higher medical service use by those with health insurance, there was an increase in public health service medical consultations from 1998 to 2013 from those who do not have health insurance [16]. However, there are still barriers related to availability for medium and high complexity exams [34]. The same can occur with other consultations, since the waiting times between scheduling and the medical consultation is a barrier related to public health services use [35]. This situation can result in higher use of laboratory and imaging tests and other consultations by those with health insurance, as described in the present study.

Problems related to dust or chalk powder were associated with emergency service use. Dust is a common problem related to work among teachers and is associated with a variety of disorders such as colds, nasal congestion, sore throat and voice disorders [5]. Curiously, the association was significant only for the emergency service and not for other health service use. The probable reason for this is that some respiratory disorders present acute symptoms and can require immediate care. The environment and conditions of work, such as eliminating the presence of dust or chalk powder, should be improved to prevent respiratory health disorders and emergency service use among elementary school teachers.

The limitations should be considered when interpreting the results of the present study. The results emerged from cross-sectional associations and prevented inferring causality. The results were influenced by the healthy worker effect, since one inclusion criteria was that the teachers could not be retired or on medical leave during data collection. It is probable that had retired teachers been included, the magnitude of associations could be higher. Work seasonality was also not considered, since data collection occurred from July to December and teachers commonly have higher workloads at the end of each semester. To minimize this limitation, the order of data collection in each school was randomized. Finally, both health characteristics and health service use were self-reported, which presents an inherent limitation related to recall bias. However, in the present study this was reduced due to the schooling level of the participants.

Despite the limitations mentioned above, one of the strengths of the study is the representative sample from the city analyzed. Although this is not a nationwide study, the sample characteristics

composed mainly of women, which is a common characteristic of elementary school teachers in Brazil [36,37], the majority of teachers being more than 40 years old [36,37], most reporting a medium income [36] and a high length of employment [38] were similar to samples of studies conducted in different regions of Brazil, indicating the potential generalization of the results. However, the presence of differences in some variables can be attributed to regional characteristics, heterogeneity in sample procedures and the instruments used among studies. Other strengths of this study include the use of multivariate analysis adjusted for potential confounders considering the main health disorders related to the teaching profession and the major outcomes regarding the use of health services.

5. Conclusions

The presence of chronic disease and disability due to musculoskeletal disorders was associated with all variables related to health service use. The predictors varied according to the outcomes. However, the variables associated with at least one health service use included the presence of musculoskeletal symptoms, common mental disorders, length of employment, health insurance and problems related to dust or chalk powder. These variables should be considered to monitor and promote health care accessibility or to reduce costs associated with health service use among elementary school teachers.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Acknowledgments

The authors would like to thank the Municipal Department of Education of Londrina, Paraná, Brazil, as well as the principals and teachers who agreed to participate in this study. No funding was obtained for this study.

Authors' contributions

D.H.C. Coledam contributed to the study conception and design, acquisition, analysis and interpretation of data, drafting, critical review and final approval of the manuscript. P.F. Ferraiol contributed to acquisition of data, drafting, critical review and final approval of the manuscript. G.A. Arruda participated in drafting, critical review and final approval of the manuscript. A.R. Oliveira contributed to the study conception and design, critical review and final approval of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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