


## RELATIONSHIP OF MUSCULOSKELETAL DISORDERS WITH THE HEALTH AND QUALITY OF LIFE OF TEACHERS IN THE MUNICIPAL AND STATE EDUCATION SYSTEM

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### SUMMARY

Objective: to analyze the relationship between musculoskeletal disorders (MSD) and the perception of health and quality of life of teachers in the municipal school system. Methods: A total of 126 kindergarten, elementary and high school teachers from 32 municipal and state schools in the municipality of Videira, located in the Midwest of Santa Catarina, participated in the study. MSDs were assessed with the Nordic Musculoskeletal Symptoms Questionnaire (NSQ), global health with the Global Teacher Health Assessment Questionnaire, and quality of life with the WHOQOL-bref questionnaire. Results: the frequency of MSD in the last 12 months and 7 days before the survey was 35.8% and 14.4%, respectively, and the most affected regions were the neck, shoulders, lower and upper back. Their perception of overall health was good and they were satisfied with their quality of life. The burnout domain and the environment domain had the worst scores compared to the other health and quality of life domains ( $p < 0.05$ ). MSDs were associated with teachers' perception of global health and quality of life ( $p < 0.01$ ). Conclusion: the perception of health and quality of life of teachers in the municipal and state education system are related to MSD.

**Keywords:** Teachers. Education. Welfare. Musculoskeletal symptoms.

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## INTRODUCTION

Teachers represent one of the most important categories for the development of future generations and society, however, the contemporary context of the teaching profession at the level of Brazilian basic education has shown that these professionals have a high risk of illness, observed by the large number of teachers who leave schools due to occupation-related diseases<sup>1</sup>.

Studies indicate that 40% to 56% of teachers were absent or absent from occupational activities in Brazilian schools due to illnesses<sup>2-5</sup>. Among the main diseases that affect basic education teachers are disorders of the musculoskeletal system (MSD), which are a set of inflammatory or degenerative injuries or dysfunctions, which affect tendons, ligaments, muscles and joints in different body segments<sup>6</sup>.

According to the Educatel study, which examined the health situation of teachers in basic education schools in Brazil, 14.7% of teachers were absent from work due to MSD, representing the second leading cause of absence from work and a serious public health condition in this sector<sup>7</sup>.

Teachers with MSD feel pain, fatigue and tiredness, negatively impacting health and quality of life, reducing their ability to work<sup>8</sup>. In addition, the quality of teaching is closely related to the well-being and motivation of teachers, as the difficulties faced by teachers have a direct impact on the teaching and learning process of students and, consequently, on the quality of education.

In the context of the occupational health of Brazilian basic education teachers, there was a significant increase in research carried out in some regions and states, however, in Santa Catarina, there is still a scarcity of data, especially in the region located in the Midwest. In the research we conducted in a municipality in the Midwest of Santa Catarina with teachers of kindergarten and elementary schools in municipal schools, the frequency of MSD was high and most were satisfied with their quality of life<sup>9</sup>. However, global health was not analyzed and it is not known whether basic education teachers from other cities in the same region will reproduce the same findings.

It is also noteworthy the search for more information on the health conditions of teachers in different locations in the country, to subsidize policies to promote health and quality of life at work, taking into account sociocultural and regional characteristics. Therefore, this study aimed to evaluate MSD, the perception of global health and the quality of life of teachers of kindergarten, elementary and high school in a municipality in

the Midwest of Santa Catarina. The hypothesis was developed that teachers would have high frequencies of MSD, and that the perception of global health and quality of life would be associated with MSD.

## **METHODS**

### **PARTICIPANTS**

In this descriptive research, with a cross-sectional design and a quantitative approach, 126 teachers who were in full teaching in basic education in the state and municipal school system of the city of Videira, located in the Midwest region of Santa Catarina, participated in the study. According to data provided by the Municipal Department of Education of Videira (SC), the number of teachers who worked in kindergarten, elementary and high school in the 32 schools of the municipality is 751, however, 126 teachers accepted to participate in the survey, corresponding to 16.7% of the total.

All participants signed an Informed Consent Form, and the research was approved by the Research Ethics Committee of XXXXXX, protocol number XXXXXXXX.

### **RESEARCH DESIGN**

First, the municipality's Secretary of Education was asked for authorization to carry out the research. Then, a meeting was held with all the principals of the 32 schools, informing the research procedures and the scheduling of times for the researchers to travel to the data collection sites.

In schools, the evaluation of teachers was carried out in a reserved classroom, determined by the board. The teachers were informed about the research procedures, and only the teachers who signed the Informed Consent Form participated in the research, and those who did not participate returned to the classrooms. All evaluations took place in the 2nd academic semester of 2022, in October, November and the first week of December, both in the morning and afternoon, and class breaks.

The researchers were gathered in the evaluation room and received training to eliminate possible biases and confusion in the interpretation of the questions in the questionnaires, which were then applied. The questionnaires were presented in the following order: 1) Socioeconomic and occupational questionnaire; 2) Nordic Musculoskeletal Symptoms Questionnaire (NQ) 3) Global Teacher Health Assessment Questionnaire; and 4) Quality of Life Questionnaire (WHOQOL-bref).

## SOCIOECONOMIC AND OCCUPATIONAL ASSESSMENT

The socioeconomic and occupational assessment was carried out using a questionnaire consisting of nine questions regarding gender, marital status, education, monthly income range (in minimum wages), teaching time in basic education, weekly workload, number of students per class and places where they work, and work shift.

## EVALUATION OF MUSCULOSKELETAL DISORDERS (MD)

To assess MSDs, the Nordic Musculoskeletal Symptoms Questionnaire (NSOQ) was used, consisting of a human figure divided into nine anatomical regions, culturally adapted to the Portuguese language by Barros and Alexandre<sup>10</sup>. The respondent must report the occurrence of symptoms considering the twelve months and seven days prior to the interview, as well as the occurrence of absence from routine activities in the last year<sup>11</sup>.

## GLOBAL HEALTH ASSESSMENT

To assess global health, the Teacher Health Questionnaire (QOD) was used, validated for the Brazilian context by Sampaio et al.<sup>12</sup>. This questionnaire consists of 22 questions distributed in 6 dimensions, including two associated with well-being (Satisfaction and Self-efficacy) and four associated with malaise (Musculoskeletal Dysfunctions, Cognitive Dysfunctions, Exhaustion and Voice Dysfunctions). For each question, a scale from 1 to 5 will be demarcated, where the evaluated will answer one of them. These tags will be Total Disagreement up to Full Concordance. In some questions of the questionnaire, the demarcated values changed, these variations are: 1 is transformed into 5, the number 2 into 4 and vice versa. For the classification, the cut-off points of classification of the indices of the dimensions and global evaluation of teacher health will be used, which are as follows: excellent (1.00 to 1.50), good (1.51 to 2.50), regular (2.51 to 3.50), poor (3.51 to 4.50) and very poor (4.51 to 5.00).

## QUALITY OF LIFE ASSESSMENT

To assess quality of life, the WHOQOL-bref questionnaire of the World Health Organization Quality of Life Group, proposed by Fleck et al, was used.<sup>13</sup>, which consists of 26 questions, two general questions on satisfaction with health and quality of life and another 24 corresponding to four domains (Physical, Psychological, Social Relations and Environment). The physical domain refers to information about pain and discomfort, energy

and fatigue, mobility, need for medical assistance, etc.; the psychological concerns affection, memory, concentration, self-esteem, body image, and appearance; the social investigates interpersonal relationships and social support networks; and the environmental deals with issues related to physical security, protection, financial resources, transportation, housing, among others.

The results of the raw scores of each facet were transformed into a score ranging from 0 to 100 points. This transformation made it possible to express the score of the percentage scale between the lowest possible value (0) and the highest possible (100) of quality of life classification, according to the WHOQOL-bref manual. The values from 0 to 20 points were classified as very unsatisfactory; 21 to 40, unsatisfactory; 41 to 60, neither unsatisfactory nor satisfactory; 61 to 80, satisfactory; and 81 to 100, very satisfactory. In addition, on the scale used, the closer the teachers' average score is to 100 points, the more satisfied or positive the perception of general quality of life (general QoL).

## STATISTICAL ANALYSIS

Initially, descriptive statistics were performed and the results were presented as absolute and relative frequency (%), minimum, median, maximum and confidence interval (95%CI). To compare the domains of teacher global health and the domains of quality of life, the Kolmogorov-Smirnov normality test was first performed to determine the parametric or non-parametric statistics. Due to the lack of normality of the variables, the Kruskal-Wallis test was performed for the comparison between the domains, and when a significant difference was found, Dunn's post hoc test was performed.

Pearson's Chi-square test was used to analyze the associations, and when a cell presented an expected value less than or equal to 5, Fisher's exact test was used. All analyses were performed using the SPSS 22.0 statistical program, and the level of significance adopted was  $p < 0.05$ .

## RESULTS

The sociodemographic profile of the teachers showed that most were female, with a partner, had a specialization in the area and earned more than 3 minimum wages. Regarding the occupational profile, there was a predominance of teachers with up to 10 years of experience in education, with a weekly workload of 21 to 40 hours, teaching

classes in a single school, during 2 daily shifts and for classes with more than 26 students (Table 1).

**Table 1.** Sociodemographic and occupational profile of Basic Education teachers.

Features	Teachers (n=126)	
	n	%
Sex		
Male	15	11,9
Female	111	88,1
Marital status		
Without a partner	58	46,0
With partner	68	54,0
Schooling		
Graduation	23	18,3
Specialization	98	77,8
Masters	05	4,0
Monthly income range		
1 to 2 minimum wages	08	6,3
3 or more minimum wages	118	93,7
Teaching time		
0 to 10 years	65	51,6
11 years or older	61	48,4
Total workload		
Up to 20 hours	05	4,0
From 21 to 40 hours	68	54,0
40 hours or more	53	42,0
Number of students per class		
1 to 25 students	50	39,7
26 students or more	76	60,3
Number of workplaces		
One location	95	75,2
Two locations	25	19,8
Three locations	06	4,0
Work shift		
One shift	09	7,1
Two shifts	100	79,4
Three shifts	17	13,5

Regarding the presence of musculoskeletal symptoms (Table 2) in the last 12 months before the survey, 35.8% of the teachers had symptoms, and the most frequent anatomical regions were the neck (50%), lower back (46%), shoulders (45.2%), upper back (42.9%) and wrists and hands (40.5%).

In the last 12 months, 8.5% of the teachers were prevented from performing work activities due to some musculoskeletal symptom, and the lower back, wrists/hands and hip/thigh region were the ones that most removed them from work (Table 2).

In the seven days prior to the survey, 14.4% of the teachers had musculoskeletal symptoms, predominantly in the lower back, shoulders, neck and wrists/hands (Table 2).

**Table 2.** Frequency of musculoskeletal symptoms and functional disability in basic education teachers.

Anatomical Region	Symptoms in the last 12 months (%)	Impediment to carry out activities in the last 12 months (%)	Symptoms in the last 7 days (%)
Neck	50,0	6,3	17,5
Shoulders	45,2	7,1	19,0
Upper back	42,9	8,7	15,1
Elbows	11,9	6,3	6,3
Wrists/hands	40,5	11,1	16,7
Lower back	46,0	11,1	21,4
Hip/Thighs	23,0	10,3	10,3
Knees	33,3	8,7	11,1
Ankle/feet	30,2	7,1	12,7
Average $\pm$ DP	35.8 $\pm$ 12.4	8.5 $\pm$ 1.95	14.4 $\pm$ 4.76

The results of the global perception of health in each domain of the teachers showed that the median of the self-efficacy and satisfaction domain were good, while the median in the domains musculoskeletal and cognitive dysfunctions, exhaustion and voice dysfunctions were poor to regulate. The teachers' overall perception of their health was good (Table 3).

When comparing the domains with a good perception (self-efficacy vs satisfaction) there was no significant difference ( $p > 0.05$ ). On the other hand, when comparing the domains with poor to regular perception, the score of the burnout domain was significantly higher compared to the musculoskeletal dysfunctions ( $p < 0.0001$ ), voice dysfunctions ( $p < 0.0001$ ) and cognitive dysfunctions ( $p < 0.006$ ) domains. There was no difference between the other domains ( $p > 0.05$ ).

**Table 3.** Perception of health in each domain and of the overall health of basic education teachers.

Domains	Median	95%CI
Self-efficacy	1,60	1,40 – 1,60
Satisfaction	1,80	1,60 – 1,80
Musculoskeletal disorders	3,00*	2,67 – 3,33
Cognitive dysfunctions	3,00*	2,75 – 3,25
Exhaustion	3,67	3,33 – 4,00
Voice dysfunctions	3,00*	2,50 – 3,00
Global health	1,91	1,67 – 2,06

\* $P < 0.01$  compared to the burnout domain.

In the analysis of the perception of quality of life in each domain, the median of the social and physical relationships domain had the highest scores and satisfaction, while the environment and psychological domain had the lowest scores and satisfaction by teachers. The median score of 67.70 showed that teachers are satisfied with their general perception of quality of life (general QoL).



When comparing the medians of the domains, it was found that the score of the environment domain was significantly lower than the physical domain ( $p=0.023$ ). However, there was no difference between the other domains when compared ( $p>0.05$ ).

**Table 4.** Results of the scores of the domains of perceived quality of life and general quality of life (general QoL) of basic education teachers.

Domains	Minimum	Median	Maximum	95%CI
Physical	17,86	71,42	100	64,29 – 71,43
Psychological	25,00	66,66	100	62,50 – 70,83
Social Relations	25,00	75,00	100	66,67 – 75,00
Environment	28,13	62,50*	93,75	59,38 – 65,63
General QoL	27,08	67,70	94,79	63,98 – 70,04

\* $P<0.05$  compared to the physical domain and environment.

In the association analysis, it was observed that the presence of musculoskeletal symptoms is significantly associated with the perception of health and general quality of life of basic education teachers ( $p<0.01$ ).

**Table 5.** Results of the association between musculoskeletal symptoms and the perception of global health and general quality of life (general QoL) of Basic Education teachers.

Perception of global health	Musculoskeletal symptoms		X <sup>2</sup>	P
	Yes n (%)	No n (%)		
Bad	10 (7,9)	-	27,395*	0,0001
Regular	50 (39,7)	02 (1,6)		
Good	33 (26,2)	21 (16,7)		
Excellent	05 (4,0)	05 (4,0)		
Perception of general QoL	Yes n (%)	No n (%)	X <sup>2</sup>	P
	Yes n (%)	No n (%)		
Unsatisfied	07 (5,6)	-	11,099*	0,007
Neither dissatisfied/Nor satisfied	34 (27,0)	03 (2,4)		
Satisfied	48 (38,1)	18 (14,3)		
Very satisfied	09 (7,1)	07 (5,6)		

\*Value of the Fischer test.

## DISCUSSION

This research evaluated the frequency and body follow-ups of MSD, the perception of global health and quality of life of basic education teachers in a municipality in the midwest of Santa Catarina. In addition, it analyzed the association between MSDs and health and quality of life.

The findings showed that the frequency of MSD in the last 12 months and 7 days preceding the survey was 35.8% and 14.4%, respectively, (Table 2). These results corroborate national and international studies that have shown that the prevalence of MSD in the population of basic education teachers varies between 14.4% and 95%<sup>6-9, 14-18</sup>.



The four segments with the highest frequency of MSD in teachers were the neck, lower and upper back, and shoulders (Table 2). Most studies have also shown that these body regions are the most affected by the problem<sup>6-9, 14, 15, 17, 19-22</sup>.

Neck and back pain can be explained by incorrect posture performed during the work period. Teachers spend a lot of time in a sitting position and with their heads tilted forward to carry out their activities, overloading the passive elements of the spine and causing excessive tension in the neck muscles <sup>(23)</sup>. Shoulder pain may be related to the several hours that teachers have to spend writing on the blackboard, increasing muscle tension in the shoulders<sup>15</sup>. It is important to highlight that the causes of pain in different body segments are complex and depend on several factors that may be associated with individual and occupational characteristics.

In the evaluation of the domains that make up teachers' global health, satisfaction and self-efficacy, which are related to the perception of well-being at work, teachers considered them good (Table 3). This finding indicates that the teachers analyzed have a good state of mind and positive attitudes both at work and in their personal lives, in addition to demonstrating competence to perform their tasks and achieve their goals<sup>24</sup>.

Regarding the domains of malaise at work, musculoskeletal dysfunctions, cognitive dysfunctions, voice dysfunctions and exhaustion were poorly and regularly perceived by teachers (Table 3). The high frequency of pain found in the neck, shoulders, and upper and lower back regions in this study (Table 2) may explain the negative perception of musculoskeletal dysfunctions. Cognitive dysfunctions may be linked to the high levels of teacher burnout observed in this study, causing loss of concentration, memory, and often obsessive thoughts<sup>25</sup>. While voice dysfunction is one of the main problems found in teachers, studies show that indiscipline, violence, noise and the high number of students in classrooms increase vocal demand and the risks of dysphonia<sup>26, 27</sup>.

It is important to highlight that the burnout domain was the one that presented the worst score by the teachers compared to the other domains (Table 3). The time when the data collection of the present study (October, November and December) is a time of overload resulting from previous accumulations, aspects that may explain this result. In addition, the precariousness of working conditions, added to the long hours to be able to handle all school activities, leads to an increase in physical and mental exhaustion, leading to the exhaustion of these professionals<sup>28</sup>.

In general, the perception of their health was good by the teachers (Table 3). These results are similar to Brazilian studies that analyzed the health perception of basic education teachers. For example, in a study that analyzed the self-reported health of Brazilian basic education teachers, between 2015 and 2016, the majority (49.5%) evaluated it as good<sup>29</sup>. In another study with basic education teachers in the state of Minas Gerais, 70.3% self-rated their health as excellent or good<sup>30</sup>. In a study with basic education teachers in the municipality of Bagé, Rio Grande do Sul, the majority (38.5%) classified their health as good<sup>31</sup>.

Satisfaction with quality of life predominated among teachers, however, the environment domain obtained the lowest satisfaction compared to the other domains (Table 4). Similar results were found in studies carried out in different Brazilian cities and states that evaluated quality of life with the WHOQOL-bref. Most studies have shown that teachers were satisfied with their quality of life and that issues related to physical safety and protection, financial resources, health and social care, transportation, housing, among others, are the ones that most negatively impact the perception of general quality of life<sup>16, 32-37</sup>.

The presence of musculoskeletal symptoms was associated with the teachers' global perception of health and quality of life (Table 5). Research indicates that MSDs are inversely related to health and quality of life<sup>7, 19, 32, 38</sup>. Continuous pain can cause increased stress, decreased motivation and self-esteem, compromising the perception of health and quality of life both at work and in personal life, in addition to interfering with the functional capacity to perform work activities and daily living<sup>8</sup>.

Although teachers from the 32 state and municipal schools in the city of Videira were evaluated, many teachers did not accept to participate in the research and did not answer the questionnaires, limiting the inference of the results.

## CONCLUSION

In summary, the frequency of MSD in teachers is high, mainly affecting the regions of the neck, shoulders, and the lower and upper back. Global health and quality of life are good, but burnout, the environment, and the presence of MSDs are the factors that most influence teachers' well-being.

Given this, we suggest that strategic actions to improve the work environment and define efficient health promotion policies for basic education teachers be urgently put into practice to alleviate the physical, mental and emotional suffering of these professionals.

We believe that more investigations in different cities and regions of Brazil should be carried out on the health of basic education teachers, to add to other studies to have an overview of this situation.

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