



## **Musculoskeletal disorders in pre-school teachers in the municipality of Ecoporanga-ES**

### **Distúrbios osteomusculares em professores do ensino infantil no município de Ecoporanga-ES**

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#### **ABSTRACT**

**Introduction:** The work of teachers in early childhood education is crucial for children's development. Therefore, this demanding occupation can entail risks to the health of educators, especially about musculoskeletal disorders. **Objective:** The research aimed to investigate the prevalence and patterns of musculoskeletal disorders in kindergarten teachers, to develop measures that promote the occupational health of these educators. **Methodology:** This is a quantitative, exploratory, and descriptive research with 29 teachers of early childhood education level I and II, covering children from 6 months to 3 years. The research used two structured questionnaires adapted to the Portuguese language, including the Nordic Musculoskeletal Symptom Questionnaire (NMQ). **Results:** The results indicate that musculoskeletal disorders are prevalent among kindergarten teachers, affecting several regions of the body, such as neck, shoulders, arms, forearms, hands, dorsal region, lumbar region, and hip/lower limb. The cervical region and shoulders are particularly affected areas, with most teachers associating pain with work. The most used resources to deal with pain were medications, gel ointment, and massage. **Conclusion:** The discussion on musculoskeletal disorders in kindergarten teachers highlights the relevance of this issue and the need for preventive and therapeutic actions to promote the occupational health of these professionals. Policies that encourage the adoption of appropriate postures and the conscious use of therapeutic resources are essential to ensure a healthy and safe work environment for teachers.



**Keywords:** Musculoskeletal disorders, Kindergarten teachers, Nordic Musculoskeletal Symptom Questionnaire (NMQ), Improper postures.

## 1 INTRODUCTION

Teachers who work in early childhood education play a fundamental role in the formation and development of children, being responsible for guiding and stimulating learning at a crucial stage of educational development. However, this demanding occupation can entail health risks for educators, especially when it comes to musculoskeletal disorders, which are conditions related to bones, muscles, joints, and posture (SILVA, 2021).

In their day-to-day work in the classroom, kindergarten teachers often adopt attitudes that can be detrimental to their health in the long run. They may spend hours standing, constantly leaning over to help students, sitting in inappropriate chairs, and repeating specific movements such as lifting objects or writing on the board. These repetitive actions and inappropriate positions can overload the musculoskeletal system, leading to the development of pain and discomfort (FERNANDES, 2018).

Among the main pains reported by kindergarten teachers, those related to the lumbar region, wrists, knees, shoulders and neck stand out. Low back pain is a frequent complaint, often resulting from prolonged standing posture or lack of adequate support for the spine. Neck and shoulder pain, on the other hand, can be attributed to the position maintained during interaction with students, such as bending over to assist them during activities (SANTANA *et. al*, 2019

The relevance of the study on musculoskeletal disorders in kindergarten teachers is evident, as these professionals face a work environment with specific physical challenges. Understanding the incidence, nature, and contributing factors of these pains can provide valuable insights for the implementation of preventive and intervention strategies.

The objective of this research is, therefore, to investigate the prevalence and patterns of musculoskeletal disorders in early childhood teachers, in order to develop measures that promote the occupational health of these educators, improving their quality of life and, consequently, contributing to a healthier and more productive learning environment.

## 2 THEORETICAL BACKGROUND

Musculoskeletal disorders, also known as musculoskeletal disorders (MSD), are conditions that affect the muscles, bones, joints, tendons, ligaments, and other tissues related to the musculoskeletal system of the human body. These disorders can be caused by a variety of

factors, such as injury, overuse or incorrect use of muscles and joints, poor posture, physical or environmental stress, among others (LELIS *et. al*, 2012).

There are several types of musculoskeletal disorders, including:

- a) **Muscle injuries:** these include strains, bruises and tears in the muscles. These injuries usually occur due to sudden movements, overexertion, or lack of adequate warm-up before physical activity (ASUNCION *et. al*, 2017);
- b) **Tendon and ligament injuries:** These involve the wear, inflammation, or rupture of tendons (which connect muscles to bones) or ligaments (which connect bones to each other). These injuries are commonly caused by repetitive movements or acute trauma (CARREGAO *et. al*, 2006);
- c) **Overuse syndromes:** occur when the muscles and structures of the musculoskeletal system are subjected to repetitive or prolonged stress, such as carpal tunnel syndrome, tendinitis and bursitis. These syndromes are common in people who perform repetitive movements at work or during sports practice (CARVALHO *et. al*, 2006);
- d) **Chronic inflammatory conditions:** These include conditions such as rheumatoid arthritis, osteoarthritis, and ankylosing spondylitis. These conditions result in persistent inflammation in the joints, causing pain and stiffness (FERNANDES *et. al*, 2009);
- e) **Joint injuries:** These affect the joints, such as sprains, dislocations, and ligament injuries. They occur when a joint is subjected to excessive force or movement beyond its normal range (MANGO *et. al*, 2012).

Musculoskeletal disorders can cause a variety of symptoms, including pain, swelling, stiffness, muscle weakness, restricted movement, and functional difficulty. Diagnosis is usually made through medical history, physical examination, and, in some cases, imaging tests such as x-rays, MRIs, or ultrasounds (LIMA, 2009).

## 2.1 MAJOR MUSCULOSKELETAL DISORDERS IN EARLY CHILDHOOD TEACHERS

Kindergarten teachers face a number of physical and postural challenges in the performance of their activities, which can result in musculoskeletal disorders. Among the main problems that can affect these professionals are back injuries, due to the need to lift and carry young children, which can lead to herniated discs, low back pain, and muscle spasms (NOGUEIRA *et. al*, 2018).



In addition, teachers are prone to developing shoulder injuries due to the constant lifting and holding of children on their arms. Repetitive movements, such as pushing chairs or performing reach gestures, can also cause tension and stress on the shoulders. The knees are also affected, since teachers often squat or kneel during activities with children, which can result in pain, inflammation of the tendons, or even injuries such as patellofemoral pain syndrome (SOUZA *et. al*, 2021).

Tendonitis is another common disorder among kindergarten teachers, due to the overuse of the hands and upper limbs in activities such as writing on the blackboard, holding educational materials, or performing repetitive motions when teaching. This inflammatory condition affects the tendons and can occur in the wrists, hands, shoulders, and elbows (TROCOLI *et. al*, 2018).

Another problem is carpal tunnel syndrome, which is caused by compression of the median nerve in the wrist due to inflammation and swelling. Teachers are particularly exposed to this condition due to the frequent use of electronic devices, such as computers and tablets, and repetitive manual activities (ROCHA *et. al*, 2021).

Lastly, poor posture is a significant factor in the development of musculoskeletal disorders. Teachers who do not adopt an appropriate posture when lifting children, bending over to interact with them, or remaining seated in ergonomically inadequate chairs and tables are more likely to suffer from these conditions (BRITO, 2020).

## 2.2 IMPACT OF MUSCULOSKELETAL DISORDERS ON TEACHERS' QUALITY OF LIFE

Musculoskeletal disorders have significant impacts on the quality of life of kindergarten teachers. Chronic pain is one of the main consequences of these conditions, and it can be constant or recurrent, affecting areas such as the back, shoulders, knees, hands, and wrists. This constant pain interferes with daily activities, making simple tasks such as sleeping, walking or lifting objects painful and difficult to perform (FERNANDES *et. al*, 2011).

In addition to pain, musculoskeletal disorders limit teachers' functionality. Movements that were once natural and unfettered become challenging and painful. These functional limitations directly impact interactions with children, proper posture during classes, and even leisure activities. As a result, teachers may experience constant fatigue, both physical and mental, as they have to make an additional effort to fulfill their tasks (ROCHA *et. al*, 2020).

Emotional stress is another impact of musculoskeletal disorders. Chronic pain and physical limitations lead to frustration, irritability, anxiety, and even depression. Dealing with these daily challenges affects the emotional well-being of teachers, reducing their motivation and energy to



fully perform their activities and enjoy socializing with students and colleagues (DOSEA *et al*, 2016).

These disorders also result in absenteeism from work, with frequent need to take time off to seek treatment, undergo medical tests, or simply rest and recover from pain. When present at work, pain and physical limitations reduce productivity, making it difficult to carry out responsibilities efficiently (SANTANA *et. al*, 2019).

To improve the quality of life of kindergarten teachers, it is essential to provide an ergonomic work environment, with appropriate furniture and equipment to prevent injuries and promote correct postures. It is also important to make teachers aware of the importance of correct lifting techniques and posture care. The implementation of rest and stretching breaks during the workday can help relieve fatigue and muscle tension (SANTOS *et. al*, 2021).

### **3 METHODOLOGICAL PROCEDURES**

This is a quantitative, exploratory and descriptive research that aimed to study the main musculoskeletal complaints and the perception of the quality of the work of public school teachers. For this, two structured questionnaires were used, validated and modified as research instruments.

The sample was composed of 29 teachers of kindergarten level I and II, covering children from 6 months to 3 years old, from the municipal network of Ecoporanga-ES. The research instrument used was the Nordic Musculoskeletal Questionnaire (NMQ), which was culturally adapted to the Portuguese language by Barros and Alexandre (BARROS *et al.*, 2003).

The NMQ questionnaire consists of two stages. The first step addresses general information about the respondent and contains 10 questions related to demographics and professional characteristics. The second stage consists of a human figure divided into nine anatomical regions, in which the participants report the occurrence of symptoms in the last 12 months and in the last 7 days prior to the research, answering 7 questions with alternatives.

All participants in the research filled out a Free and Informed Consent Form, which provides the necessary information about the research, its objectives, procedures and the guarantee of confidentiality and professional ethics required by COFFITO (Federal Council of Physical Therapy and Occupational Therapy).

This methodology allowed us to collect data on musculoskeletal complaints and the perception of the quality of the work of early childhood education teachers, providing important information to understand the prevalence and severity of these disorders, as well as their impacts on the health and well-being of these professionals. The treatment of the collected information was



carried out anonymously, ensuring the confidentiality of the participants and following the ethical principles of the research.

#### 4 RESULTS AND DISCUSSION

Table 1 presents data regarding the occurrence of pain in different regions of the body among the research participants. The answers were categorized into four options: "They don't feel pain", "Rarely", "Often" and "Always".

These data provide an overview of the prevalence of pain in different regions of the body among research participants, which may be relevant for identifying patterns and directing efforts to improve the occupational health and well-being of these individuals.

In the cervical region, 38.46% of the participants reported no pain, while 33.77% claimed to rarely feel pain, another 33.77% said they felt pain frequently, and none of them said they felt pain all the time.

In the case of the shoulders, half of the participants, 50%, reported no pain, 19.23% felt pain rarely, 26.92% felt it frequently, and 3.85% felt pain all the time.

With regard to the arms, the majority, 57.69%, did not feel pain, 15.38% rarely felt pain, 23.08% felt it frequently, and 3.85% felt pain all the time.

The elbows showed a different trend, with 69.23% of participants reporting that they felt no pain, 23.08% rarely felt pain, 7.69% felt it frequently, and none of them felt pain all the time.

For the forearms, the majority (69.23%) did not feel pain, 15.38% rarely felt pain, 11.55% felt it frequently, and 3.85% felt pain all the time.

In the wrist, hands and fingers, 61.54% did not feel pain, 15.38% rarely felt pain, 23.08% felt it frequently, and none felt pain all the time. In the dorsal part, 46.15% of the participants did not feel pain, 26.92% felt it rarely, 23.08% frequently, and 3.85% always.

The lower back showed that 23.8% did not feel pain, 26.92% rarely felt pain, 42.31% felt it frequently, and 7.69% felt pain all the time. Finally, in the hip and lower limbs (LL), 53.85% did not feel pain, 15.38% rarely felt pain, 26.92% felt it frequently, and 3.85% felt pain all the time.

Table 1: Information on Pain Regions

Pain Regions Information	They don't feel pain	Rarely feel pain	Feel pain frequently	Always feel pain
Cervical	38,46%	33,77%	33,77%	0,0%
Shoulders	50,00%	19,23%	26,92%	3,85%
Arms	57,69%	15,38%	23,08%	3,85%
Elbows	69,23%	23,08%	7,69%	0,0%
Forearms	69,23%	15,38%	11,55%	3,85%
Fists/Hands/Fingers	61,54%	15,38%	23,08%	0,0%
Dorsal	46,15%	26,92%	23,08%	3,85%
Lumbar	23,8%	26,92%	42,31%	7,69%
Hip and lower limbs	53,85%	15,38%	26,92%	3,85%

Source: Survey data

The analysis of these data has significant implications for occupational health. If a particular region of the body, such as the shoulders or neck, has a high prevalence of pain, this may suggest that working conditions are contributing to individuals' physical discomfort. This information can inform the decisions of managers and employers about the need to improve work environments, provide adequate training in ergonomics, and implement regular breaks to minimize physical stress (FERNANDES *et. al*, 2018).

Understanding the areas of the body that frequently suffer from pain can also aid in promoting the overall well-being of research participants. Based on the data collected, personalized interventions can be designed to help individuals cope with pain more effectively. This can be specific wraps, relaxation therapies, targeted stretching, or other approaches that aim to relieve pain in the most affected regions (DOSEA *et. al*, 2016).

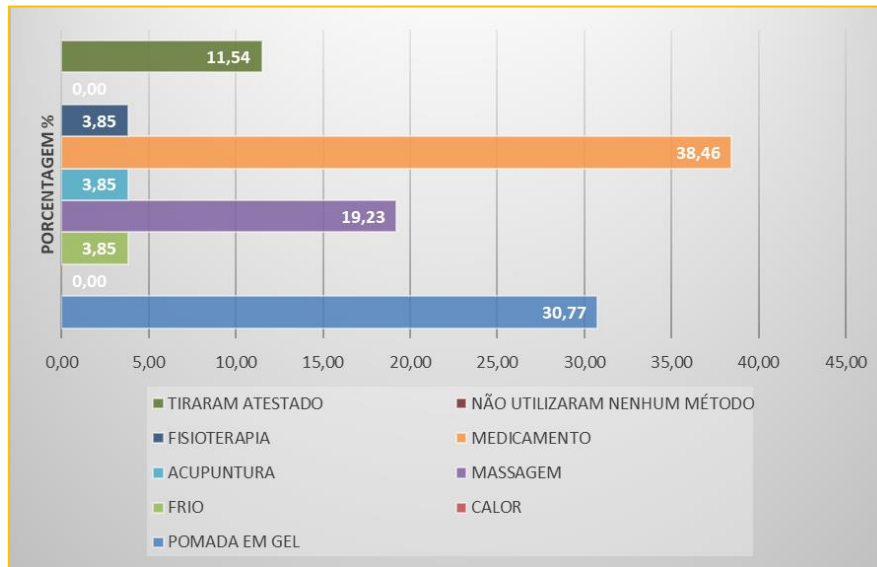
It is important to recognize that the chart only provides an overview of the prevalence of pain in different regions of the body. It does not take into account individual factors, such as age, gender, medical history, or daily activities, which can significantly influence a person's experience of pain. Therefore, future research can focus on collecting more detailed data to better understand the contexts behind the responses (CARREGAO *et. al*, 2006).

Graph 1 shows the use of some resource in terms of pain in percentage:

In graph 1, each resource is indicated on the vertical axis (Y-axis), while the percentage of teachers who use it is shown on the horizontal axis (X-axis).

In this bar chart, the height of each bar represents the percentage of teachers who use the feature as a function of pain. It is possible to observe that the most used resources are medicines (38.46%), gel ointment (30.77%) and massage (19.23%). On the other hand, heat, acupuncture and physiotherapy have low percentages of use, with 0%, 3.85% and 3.85%, respectively.

Chart 1: Resources Used for Pain Relief



Source: Survey data

The analysis of the resources used as a function of pain among kindergarten teachers reveals a predominance of the use of medication as a common strategy to deal with discomfort. The preference for medication resources can be understood as a search for quick and immediate pain relief, however, this approach may not be the most appropriate in the long term, especially when it comes to chronic musculoskeletal disorders (FERNANDES *et. al*, 2018).

It is extremely important to highlight that the excessive use of medications can present risks, such as unwanted side effects, tolerance to the medication, and even dependence, if it is used continuously. In addition, medications may only treat the symptoms of pain temporarily, without addressing the underlying cause of the problem. This reinforces the need for a multidisciplinary approach to the treatment of musculoskeletal pain, aiming at a more comprehensive and effective intervention (SOUZA *et. al*, 2021).

Table 2 shows the distribution of responses related to the time in which people feel pain in different regions of the body. The data is divided into three time categories: "Days," "Months," and "Years," and indicates the percentage of people who reported experiencing pain for each period. In addition, the total number of people who experience pain in each specific region is presented.

In this table, it is possible to notice the variation in the time in which people feel pain in different regions of the body. For example, in the cervical region, the majority (68.75%) reported feeling pain for longer periods, i.e., for years. In the shoulders, there is a higher proportion (46.21%) of people who feel pain for months. On the other hand, in the elbows, the majority (50.00%) reported feeling pain for only a few days.



Table 2: Frequency of pain in days, months, and years

HOW LONG HAVE YOU BEEN IN PAIN?	DAYS	MONTHS	YEARS
Cervical Region	12,50%	18,75%	68,75%
Shoulders	23,08%	46,21%	30,70%
Arms	9,10%	45,45%	45,45%
Elbows	50%	37,50%	12,50%
Forearms	25%	50%	25%
Wrist/Hands/Fingers	30%	30%	40%
Dorsal Region	35,70%	35,70%	42,80%

Source: Survey data

These data are relevant because through them it is possible to identify pain patterns in different regions of the body and help in understanding the needs of treatment and pain management for each specific group. In addition, the information on the total number of people who feel pain in each region highlights the prevalence of pain complaints in each area, helping to prioritize health actions aimed at these most affected regions.

Most of the people who participated in the survey reported experiencing neck pain for longer periods, often in years. This suggests that pain in the cervical region is often a chronic condition for many individuals. This chronic pain in the cervical region can have a variety of causes, such as muscle tension, poor posture, injuries, or underlying medical conditions. The data indicate the need for long-term treatment approaches and management strategies to improve the quality of life of these patients (LELIS *et al.*, 2012).

On the other hand, regarding shoulder pain, a significant proportion of participants reported experiencing pain for shorter periods, often within months. This suggests that pain in this region is often acute or intermittent. Shoulder pain can be related to various causes, such as injury, overuse, muscle tension, or joint problems. Data suggest that short-term pain relief strategies and preventive measures may be effective in managing this condition (NOGUEIRA *et al.*, 2018).

This data is valuable because it helps to understand the nature and duration of pain in different regions of the body. This, in turn, can guide healthcare professionals in adapting pain treatment and management strategies to meet the specific needs of each patient group. Additionally, this understanding helps in the efficient allocation of healthcare resources, prioritizing areas of the body most affected and ensuring that care is targeted where it is most needed (SILVA, 2021).

Table 3 shows the distribution of the participants' responses in relation to the perception that the pain symptoms are related to the work they perform. The data are divided into two categories: "NO" and "YES", representing whether or not the symptoms are perceived as work-

related. In addition, the total number of people who reported experiencing pain in each specific region is shown.

In the table, the "NO" column indicates the percentage of participants who do not believe that pain symptoms are related to the work they do, while the "YES" column shows the percentage of those who perceive this relationship.

For example, in the cervical region, most participants (68.75%) associate pain symptoms with the work they perform, while 31.25% do not believe in this relationship.

Table 3: Relationship of pain to the work performed

In what case do you think the symptoms are related to the work you do?	No	Yes
Cervical Region	31,25%	68,75%
Shoulder	23,10%	76,90%
Arms	27,30%	72,70%
Elbows	37,50%	62,50%
Forearm	12,50%	87,50%
Wrist/Hands/Fingers	20%	80%
Dorsal Region	18,75%	81,25%
Lumbar Region	10%	90%
Quadri/MMII	8,40%	91,60%

Source: Survey data

This highlights that the cervical region (neck) is one of the areas most affected by pain among teachers, with a prevalence of 16 people reporting pain in this region. The high percentage of teachers (68.75%) who relate neck pain to the work performed shows the importance of ergonomics in the work environment of these professionals. The overload in this region can be attributed to a number of factors, such as prolonged posture during interaction with students, frequent use of electronic devices, and improper positioning of furniture used in the classroom. These results suggest that preventive measures, such as the adaptation of furniture and equipment to favor a more ergonomic posture, as well as awareness of the importance of maintaining an adequate posture during the workday, are essential to mitigate the occurrence and worsening of neck pain among teachers (ASUNÇÃO *et. al*, 2017).

The shoulders are another region that has a high prevalence of pain among teachers, with 13 people reporting discomfort in this area. The fact that more than three-quarters of the teachers (76.90%) associated this pain with work reinforces the relevance of ergonomics and workload management as crucial aspects for the prevention of these complaints. The teacher's daily activities, such as moving their arms to write on the board or carry materials, can contribute to the onset of shoulder pain. In addition, the adoption of inappropriate postures during interaction with



students, such as leaning excessively to help them or correct their activities, can also be a triggering factor (FERNANDES *et. al*, 2011).

Table 4 highlights that the cervical (neck) region is one of the areas most affected by pain among teachers, with a prevalence of 16 people reporting pain in this region. The high percentage of teachers (68.75%) who relate neck pain to the work performed shows the importance of ergonomics in the work environment of these professionals. The overload in this region can be attributed to a number of factors, such as prolonged posture during interaction with students, frequent use of electronic devices, and improper positioning of furniture used in the classroom. These results suggest that preventive measures, such as the adaptation of furniture and equipment to favor a more ergonomic posture, as well as awareness of the importance of maintaining an adequate posture during the workday, are essential to mitigate the occurrence and worsening of neck pain among teachers (ASUNÇÃO *et. al*, 2017).

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Table 4 shows the distribution of responses in relation to the intensity of pain felt by the participants in different regions of the body. The data is divided into three intensity categories: "WEAK," "MEDIUM," and "STRONG," representing the proportion of people who reported experiencing pain at each intensity level. In addition, the total number of people who experience pain in each specific region is shown.

The "WEAK" column indicates the percentage of participants who reported experiencing pain at a weak level, the "AVERAGE" column represents the percentage of those who feel pain at an average level, and the "STRONG" column shows the percentage of those who feel pain at a strong level. For example, in the cervical region, most participants (62.50%) reported feeling pain at a medium level, while 18.75% felt pain at a weak level and another 18.75% at a strong level.

Table 4: Pain intensity

PAIN INTENSITY	WEAK	AVERAGE	STRONG
Cervical Region	18,75%	62,50%	18,75%
Shoulder	30,70%	54%	15,30%
Arms	18,20%	63,60%	18,20%
Elbows	25%	75%	0%
Forearms	62,50%	25%	12,50%
Wrist/Hands/Fingers	40%	50%	10%
Dorsal Region	28,50%	43%	28,50%
Lumbar Region	20%	60%	20%
Quadril/MMII	25%	50%	25%

Source: Survey data

In this context, it is essential to make teachers aware of the importance of considering therapeutic alternatives, such as physical therapy. Physical therapy is a non-drug approach that seeks to treat pain through manual techniques, therapeutic exercises, and other physical interventions. Physical therapy treatment can help improve mobility, strengthen musculature, and promote injury rehabilitation, contributing to pain relief in a more sustainable way (TROCOLI *et. al*, 2018).

Another therapeutic option that deserves to be highlighted is acupuncture. This ancient practice of traditional Chinese medicine has been shown to be effective in the treatment of musculoskeletal pain. Inserting needles into specific points on the body stimulates the nervous system and releases natural analgesic substances, providing pain relief. Acupuncture can be a safe and complementary alternative to traditional treatment, offering a less invasive and side-effect-free approach (FERNANDES *et. al*, 2009).

Therefore, it is essential to promote awareness among teachers about the importance of adopting a multidisciplinary approach to pain management, involving not only medications, but also non-medication techniques such as physical therapy, acupuncture, and massage. These complementary approaches can provide long-term benefits and contribute to the improvement of the quality of life and well-being of these professionals. In addition, it is essential to invest in occupational health policies and programs that offer access to these therapeutic alternatives, providing a comprehensive and effective approach to the management of musculoskeletal disorders, aiming at the health and quality of life of early childhood education teachers (SANTANA *et. al*, 2019).

## 5 CONCLUSION

Based on the results presented on musculoskeletal disorders among kindergarten teachers and the resources used to deal with pain, it is possible to conclude that this is an extremely relevant



issue that deserves special attention and care. The pains reported in various regions of the body, such as the cervical region, shoulders, arms, forearms, hands, dorsal region, lumbar region, and hip/lower limb, show the complexity and scope of these problems among these professionals.

The posture adopted in the day-to-day work, repetitive movement, physical overload and other work demands seem to be contributing factors to the development of musculoskeletal disorders among teachers. In this sense, ergonomics in the work environment, awareness of the importance of proper posture and workload management emerge as fundamental measures for the prevention and treatment of these pains.

The cervical region, represented by the neck, and the shoulders are areas particularly affected by pain, being associated with the work performed by most teachers who feel discomfort in these regions. The high prevalence of neck and shoulder pain highlights the need for preventive and intervention approaches that promote ergonomics in the work environment and the adoption of correct postures during daily activities.

Regarding the resources used as a function of pain, the predominance of the use of medications points to the importance of making teachers aware of the need for a multidisciplinary approach in pain treatment. Non-drug resources, such as physical therapy, acupuncture, and massage, can be effective and safe alternatives for pain relief and treatment of musculoskeletal disorders, providing long-term benefits and reducing the risks associated with medication overuse.

Therefore, the discussion about musculoskeletal disorders in kindergarten teachers highlights the relevance of this issue and the need for preventive and therapeutic actions to promote the occupational health of these professionals. Policies that encourage the adoption of appropriate postures, ergonomics in the work environment, and the conscious use of therapeutic resources are essential to ensure a healthy and safe work environment for teachers. Investment in awareness-raising programs, training, and access to non-drug resources, such as physiotherapy and acupuncture, can contribute significantly to the quality of life and well-being of educators, reflecting positively on their professional performance and the quality of education offered to students. The continuous search for research and the implementation of preventive measures are essential for the constant improvement of the occupational health of these professionals, who are so important to society.



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