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Prevalence of osteomuscular disorders and postural alterations in nursery professionals

Prevalência de distúrbios osteomusculares e a alteração da postura em profissionais de berçário

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RESUMO | OBJETIVO: verificar a prevalência de distúrbios osteomusculares e alterações posturais nas profissionais de Berçários do município de Jaraguá do Sul/SC. **MÉTODOS:** Foi realizado um estudo transversal, participaram 92 mulheres, utilizou-se um questionário socioeconômico, seguido da aplicação do questionário Nórdico, para verificar os sintomas musculoesqueléticos. A análise postural foi realizada pelo *software* SAPO. **RESULTADOS:** constatou-se que 56,52% apresentaram dor, sendo o agachar o movimento mais citado, e a coluna lombar como a região mais afetada. Quanto ao questionário Nórdico, a coluna lombar teve a maior queixa, tanto nos últimos doze meses com uma média de 29,34%, e nos últimos sete dias, 46,73%. Todas as informações foram ao encontro com os resultados do *software* SAPO, que identificou uma elevada alteração postural na coluna lombar. **CONCLUSÃO:** A alta prevalência de distúrbios osteomusculares e alterações posturais nas profissionais de Berçários, chama a atenção principalmente em relação a sintomatologia. São necessários mais estudos deste tema, com o objetivo primordial de promoção e prevenção à saúde destas profissionais.

PALAVRAS-CHAVE: Distúrbios osteomusculares. Transtornos traumáticos cumulativos. Postura.

ABSTRACT | OBJECTIVE: to verify the prevalence of musculoskeletal disorders and postural alterations in the nursery professionals of the city of Jaraguá do Sul / SC. **METHODS:** A cross-sectional study was carried out, 92 women participated, and a socioeconomic questionnaire was used, followed by the Nordic questionnaire, to verify musculoskeletal symptoms. Postural analysis was performed by SAPO software. **RESULTS:** 56.52% presented pain, being the crouching the most cited movement, and the lumbar spine as the region most affected. Regarding the Nordic questionnaire, the lumbar spine had the biggest complaint, in the last twelve months with an average of 29.34%, and in the last seven days, 46.73%. All information was in agreement with the SAPO software results, which identified a high postural alteration in the lumbar spine. **CONCLUSION:** The high prevalence of musculoskeletal disorders and postural alterations in the nursery professionals, calls attention mainly in relation to the symptomatology. Further studies of this theme are required, with the primary objective of promoting and preventing these professionals' health.

KEYWORDS: Musculoskeletal Disorders. Cumulative trauma disorders. Posture.

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Introduction

The International Labor Organization defined working conditions for teachers by recognizing the central place they occupy in society, since they are responsible for preparing the citizen for life[1].

It is known that several factors related to the conditions and organization of teaching work contribute to the appearance of health problems and consequent impairment of the quality of life of these workers, such as social devaluation, low wages, hierarchization and bureaucratization of labor relations, besides the deficiencies of human and logistical resources[2].

The recent increase in the number of studies on the sickness of teachers shows that for a long time little attention has been paid to the health of workers who carry out the important task of teaching[3].

Regarding the involvement of musculoskeletal symptoms in the teacher population, some studies addressing this theme were carried out in Brazil, with prevalence varying from 40.9% to 90.4%[2], however, there is few studies investigating nursery professionals.

Considering the absence of proper preventative care, these conditions favor the emergence of occupational diseases, among which are the Work-Related Musculoskeletal Disorders (WMSDs). This condition, causes musculoskeletal inflammation to workers, sometimes incapacitating them, triggers psychophysical suffering, absenteeism and reduced quality of service provision[4].

The higher prevalence, which is referred to as the number of people in a given population that present a specific disease, in this case musculoskeletal symptoms, occurs among young and female workers, who perform activities characterized by great effort and repetitiveness[2]. Among nursery professionals are common repetitive moviments such as bending movements of the trunk, squatting, and holding children on their lap. Therefore, this study aimed to verify the prevalence of musculoskeletal disorders and postural alterations in the professionals of the city of Jaraguá do Sul / SC.

Methods

This research is characterized by an exploratory, transversal and descriptive character, verifying the postural alterations and musculoskeletal disorders present in nursery professionals.

After approval of the study by the Research Ethics Committee, data were collected at the outpatient clinic of each Municipal Child Education Center in August and September, during the office hours.. For this survey, a total of 132 employees working directly in the Nursery rooms of the Infantile Municipal Centers, with children aged 04 to 18 months old. Three pregnant women, one male, and 36 missing professionals were excluded from the study; totaling 92 participants. The participants of the research were clarified as to the purpose of the research and authorized their participation through the term of free and informed consent.

The data collection was done initially with the application of a socioeconomic interview, containing socioeconomic data (age, sex, marital status); occupational data (occupation, workload, length of service in the nursery, intervals during the working day, means of transportation and travel time to work); and health data, including issues of physical activity practice, pain to movement, installed musculoskeletal disease, withdrawal from work, and completion of work gymnastics at work. Afterwards, the Nordic Questionnaire was applied to evaluate musculoskeletal symptoms. Then, each participant was asked to remain only in shorts and top, where the anatomical points were marked with a self-adhesive white label according to the protocol of SAPO[5]. The anatomical points marked were: ear swab, acromion, spinous process C7, third vertebra thoracic, lower angle of the scapulae, anterior superior iliac spine, posterior superior iliac spine, major femoral trochanter, knee joint line, patella center, tibial tuberosity, lateral malleolus, medial point of the leg, intermaleolar line and calcaneus tendon , according to the software protocol for Postural Evaluation (SAPO® v. 0.68). A plumb line was fixed to the ceiling with two styrofoam balls one meter apart between them, for calibration of the images. When this was done, the participant was asked to position herself on a brown rubber mat,

to guarantee the same support during the removal of the photos in the anterior, posterior and lateral views, through a camera SAMSUNG J5 Dual phone Chip ® on a tripod of the SLIK AMT ® brand, one meter and twenty centimeters high, and two meters and fifty centimeters away from each participant, measured through a Tramontina® brand tramit with a maximum capacity of five meters in length. These images were then used for postural evaluation using the SAPO software, the quantification of the angles between the anatomical points according to the protocol was automatically generated and followed the conventions of program[5].

At the end of the data collection, guidance books were given to each participant, containing information and guidelines related to the prevention of poor posture, and stretching that can be performed before, during and after the procedure.

Data were analyzed by SAPO software and Microsoft Excel 2013, and descriptive statistics were used to present the results found in this study.

Results

Among the 92 participants, 46 were teachers (50%) with a workload of 40 hours a week, 29 were room assistants (31.52%) with a workload of 30 hours a week and 17 were nursery attendants (18.48%), with a workload of 40 hours per week, where all these professionals perform the same practical activities, the age ranged from 21 to 56 years, presenting an average of 37.58 years. Regarding marital status, 58.64% were married, 29.34% were single, 6.53% were divorced, 3.26% remained stable, and 2.18% were widows. The time worked in the Nursery ranged from 2 months to 26 years, presenting an average of 7 years and 3 months. The mean of driving to work was car (58.69%), walking (20.66%), motorcycle (8.69%), bicycle (7.6%) and buses (4.36%).

When questioned if they practiced some type of physical activity, 42.39% stated to do some physical activity and 57.61% did not perform any type of exercise. Regarding the type of exercise practiced, 25.64% were walking, 20.51% gym, 12.83% Pilates, 41.02% did other types of exercise, such as swimming, zumba and functional training. On average, they spend about an hour to perform physical activity and usually practice 2 to 3 times a week.

Among the professionals interviewed, 56.52% reported feeling pain when performing certain types of movements. Regarding the period of the day when the sensation of pain is stronger, 11% reported feeling more pain in the morning, 43% in the afternoon, and 46% have pain at night. The following table 1 shows data of the movements in which they feel the most pain and the part of the body with the most painful sensation.

Table 1. Movements of greater pain and location of pain

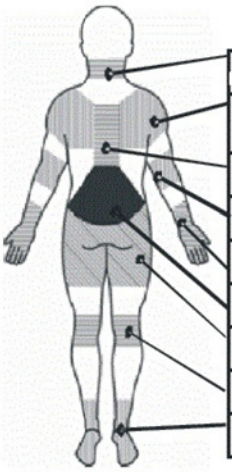
Movement of greater pain	Location of pain
Squat (58,84%)	Lumbar spine (75%)
Knead food (25%)	upper limbs (71,15%)
Holding children on their lap (21,15%)	lower members(23,07%)

Source: The authors (2018).

When questioned about the existence of any osteomuscular disease already installed, about 32.60% stated that they have some type of disease, being the most reported were the presence of marginal osteophytes, disc hernia, spondylolisthesis, bursitis, tendinitis and fibromyalgia. Regarding the treatment, only 36.6% of the professionals do it, 18,18% of them say they are doing drug treatment associated with physical therapy and 11.82% are only using medication treatment. Among those interviewed, 27.17% already had to stay away from their work activities due to the disease already installed. The period they were absent from work ranged from one day to 36 months.

Regarding the participation of Gymnastics Labor during the working day, only 43.48% performed the GL, while 56.52% did not participate in GL because they did not have it in the workplace, or often because there was no possibility of replacement for these 15 minutes in the classroom. As for the frequency of work performed weekly, 50% performed 5 times a week, 17.5% carried out 3 to 4 times a week and 32.5% performed the activity 1 to 2 times a week.

Figure 1. Data from the Nordic Questionnaire



	symptoms in the last 12 months (%)	inability to perform normal activities because of this problem in the last 12 months (%)	consult a health care professional because of this condition in the last 12 months (%)	pain in the last 7 days (%)
neck	10,86	4,34	2,17	11,95
shoulders	19,56	8,69	5,43	27,17
upper back	2,17	2,17	0	3,26
elbows	8,69	4,34	2,17	10,86
wrists / hands	8,69	6,52	4,34	7,60
lower back	29,34	15,21	11,95	46,73
hips / thighs	5,43	2,17	1,08	7,60
knees	8,69	8,69	7,60	6,52
ankles / feet	2,17	2,17	1,08	2,17

Source: The authors (2018).

Discussion

Regarding the hours worked, it was verified that the employees, besides the interval between the eight hours worked, take breaks to rest at work. On the pauses, ergonomically, Santos et al6 suggest that the breaks should be performed every one or two hours, depending on the type of activity, aiming at minimizing the risks of the worker developing occupational diseases, improving their productivity with quality, without leading to physical and mental wear and tear.

However, the professionals do not perform the micropauses, this being a short-term but important measure for the reestablishment of the musculoskeletal system, if performed by the professionals, could help to prevent the appearance of injuries, because the time of pause during the workday also greatly influences the acquisition of some musculoskeletal disorder[4].

Regarding the means of transport used, about 58.69% use the car as a means of transportation to work, and on average spend approximately

thirteen minutes, and only use the walk (20.66%) or the bicycle (7.60%) as a means of conduction, taking an average of thirteen to sixteen minutes. This information meets the number of professionals that perform some type of physical activity, where only 42.39% practice some exercise. This shows a strong tendency towards sedentarism, since most of these professionals who use the automobile, live near their places of work, and in this way they do not exercise to move more. According to Thorbjornsson et al.[7], both sedentary lifestyle and work with large loads represent risk indicators for low back pain. The pauses or micro pauses[4], associated with workout gymnastics[5], may be favorable interventions for the prevention of WMSDs[4,8]. However, only 43.48% of the interviewed women practice GL. Most professionals who do not practice say they do not have a substitute in the classroom to participate in the exercises, or because they do not have activity in the workplace[5].

It can be seen that 46% of the participants report pain in the evening and 43% in the afternoon, with only 11% reporting pain in the morning. This finding may be related to the presence of pain and the work day. It was observed that 56.52% of the professionals reported feeling pain in some type of movement, being the crouching the biggest movement causing the complaint with 58.84%. This information matches the location of greatest pain, with the lumbar spine being the most affected site, accounting for a total of 75%. Relating the complaint to the movement, it was observed during the collection that most professionals do not flex their knees when squatting, but only perform the trunk flexion to lift a child. Another relevant aspect is the use of medication by the participants, finding values of 81.82% of the medication use, and only of these 18,18% use the physiotherapy associated with medication. The patients use medication usually prescribed by the doctor, however some have claimed self-medication, which users say is the most practical and quick way to relieve their pain.

According to the Nordic questionnaire answered, the lumbar spine remained the most painful place, both in the last twelve months with a total of 29.34% of the complaints, as well as in the last seven days, with a mean of 46.73 %. With the SAPO software, as a method of postural evaluation, it can be verified that the posture adopted by the professionals characterizes a lumbar spine pain. This is due to antepulsion of the hip angle, anterior trunk inclination and pelvic anteversion. If the pelvis is in anteversion, the lower lumbar spine is in hyperlordosis5. Lumbar hyperlordosis is characterized by an accentuation in the lumbosacral angle, caused by an increase in anterior pelvic tilt and hip flexion[9].

Another factor that may be predisposing to the appearance of low back pain and directly interfering with this region is the asymmetry of iliac spines and differentiation in the length of the lower limbs. Many postural deviations can progress to generate low back pain, which affects about 60 to 80% of Americans and Europeans, ranging from uncomfortable pain to intense and prolonged pain[9], already in Brazil, the annual prevalence of low back pain more than 50% of adults[10].

The other complaints related to the movement that caused the most pain were kneading food (25%), and holding children in the lap (21.15%). This information may be associated with the second major complaint of localized pain, which are the upper limbs. Analyzing the Nordic Questionnaire answered, many of the professionals report pain in the region of the shoulders, elbow, wrists and hands. When related to the movement performed when kneading food, the elbow remains flexed, the wrist in ulnar deviation, associating force with the internal rotation of the shoulder. Or even during the practice of holding the child in the lap, the elbow also remains in flexion and the shoulder makes a small elevation, since in most cases, the child ends up being held predominantly by only one arm, which ends overloading also the upper back, referred to in the Nordic Questionnaire as one of the complaints.

Ribeiro et al.[11] state that musculoskeletal pain in the upper limbs is reported in many studies with teachers. In their review of the literature on shoulder pain and occupational factors, they reveal that weight transport, the presence of physical exertion at work, elevations of the upper limbs above shoulder level were associated with these symptoms. The neck was also referred to in the Nordic Questionnaire as one of the most painful places. Many of the professionals reported pains that began in the neck and extended to the ipsilateral upper limb, while others reported feeling tired at the end of the day, generating a great tension in both the neck and upper back. According to the results of the postural evaluation performed with SAPO software, the extension and anteriorization of the head, lateral tilt of the head and shoulder asymmetry were observed, and these postural deviations could be the origin of the pain in the sites referred to in the cervical, as on the shoulders.

Other sites referred to, but with a lower number of pain complaints, were the lower limbs, which may be related to the crouching movement, not only at the time of raising the child, but also at the time of sitting and lifting from the floor, or simply by the they spend a great deal of their time standing. Relating to the Nordic questionnaire, the sites evidenced with painful complaint were ankles and feet, knees, hips and thighs. The predominance of standing posture during the workday corroborates data from other authors[12,13] which can be attributed to the fact that standing posture can justify a considerable incidence of symptoms in the lower limbs. Taking into account the sedentary lifestyle and lack of stretching and strengthening of these professionals, these may, rather, be predisposing factors to pain in these places. Postural deviation can also be the cause of this pain, since, according to SAPO software, most participants present valgus in the knees and ankles. That is, during the crouching the knee will increase if angle valgus, increasing its deviation to medial, generating the pain or could lead to an injury over time. The presence of valgus, according to Pereira Júnior and Lima[14], is a common finding in females, due to the fact that they usually have a larger pelvis and internal rotation of the femur, which causes knee valgus, these biomechanical changes lead to lower limb misalignment and joint pain.

The presence of pain and changes in posture are related, however, pain may or may not alter a given posture, depending on the severity of the symptom and the magnitude or intensity of the stress imposed by the posture[7,8,10]. However, it was observed in this study, that the posture adopted by the professionals both static during the postural evaluation, and dynamic, during the movements performed frequently in the routine of the Nursery room, directly influences the body[15].

Professionals in the long term can lead to several musculoskeletal disorders, often related to intense pain conditions, which may lead to absenteeism[2]. Among the participants, a total of 32.60% reported having an already installed musculoskeletal disease, of which only 27.17% required removal because of the disease. This finding can be related to the time in nursery rooms, ranging from 2 months to 26 years, with a total average of seven years and three months. Many of these professionals may be going through a phase of adaptation to work, may cause only sporadic pain, and still have not developed any type of injury.

It was observed during the interview that most of the professionals who reported frequent pain or had some type of illness installed were working for ten years or more in this same room, and the age factor may be increasing the degree of pain. In addition, in the age group of these professionals, an average of 37.58 years was observed. Age may also be associated with musculoskeletal symptoms, since with aging there is a natural wear and tear on body systems11, since age is usually a risk factor for the development of musculoskeletal disorders[16].

Some limitations of this study are related to the absence of research already done with nursery attendants, for purposes of comparison and discussion. The absence of a control group to compare the results obtained and the non-application of statistical tests.

Conclusion

The present study presented a high prevalence of musculoskeletal symptoms, mainly of the lumbar spine, upper and lower limbs. The SAPO software enabled a quantitative analysis of the postural alignment of these professionals, allowing the visualization of these postural changes and the sites of symptomatology obtained by the Nordic Questionnaire, as well as the movements and postures of greater pain reported by them in the socioeconomic questionnaire. However, it was noticed that there is not only a risk factor that leads to such changes, but a set of factors, such as sex, age, years worked, intensity of movements and sedentary lifestyle, which contribute to the presence of WMSDs and changes of the posture present in the nursery attendants.

At the end of each collection, a guideline booklet with stretching exercises and postural tips was given to each participant in order to encourage these women to practice some physical activity. Despite this attempt, preventive measures are necessary and are really effective as the Labor Gymnastics Program itself, since the proposal of this program should go beyond stretching, but rather help in improving the quality of life of these professionals.

Authors contributions

Pereira Júnior AA supervised the study, participated in the interpretation of the data and in the writing of the paper. Rosá AP and Fiamoncini BM participated in the study conception and design, data collection and statistical analysis of the research data, interpretation of the results and writing of the scientific article.

Competing interests

No financial, legal or political competing interests with third parties (government, commercial, private foundation, etc.) were disclosed for any aspect of the submitted work (including but not limited to grants, data monitoring board, study design, manuscript preparation, statistical analysis, etc.).

References

1. Gasparini SM, Barreto, SM, Assunção AA. O professor, as condições de trabalho e os efeitos sobre sua saúde. Educação e Pesquisa. 2005;31(2):189-199. doi: 10.1590/S1517-97022005000200003

2. Fernandes MH, Rocha VM, Costa-Oliveira AGR. Fatores associados à prevalência de sintomas osteomusculares em professores. Rev Salud Pública. 2009;11(2):256-67.

3. Freitas CR, Cruz RM. Saúde e trabalho docente. In: XXVIII Encontro Nacional de Engenharia de Produção, 2008; Rio de Janeiro. p. 1-15.

4. Scopel J. Dor Osteomuscular em Membros Superiores e Casos Sugestivos de Ler/Dort entre Trabalhadores Bancários [dissertação] Porto Alegre: Universidade Federal do Rio Grande do Sul; 2010.

5. Souza JÁ, Pasinato F, Basso D, Corrêa ECR, Silva AMT. Biofotogrametria confiabilidade das medidas do protocolo do software para avaliação postural (SAPO). Rev Bras Cineantropom Desempenho Hum. 2011;13(4):299-305. doi: 10.5007/1980-0037.2011v13n4p299

6. Santos AF, Oda JY, Nunes APM, Gonçalves L, Garnés FLS. Benefícios da ginástica laboral na prevenção dos distúrbios osteomusculares relacionados ao trabalho. Arq Ciênc Saúde UNIPAR. 2007;11(2):107-113. doi: 10.25110/arqsaude.v11i2.2007.1520

7. Thorbjörnsson CB, Alfredsson L, Fredriksson K, Michélsen H, Punnett L, Vingård E et al. Physical and psychosocial factors related to low back pain during a 24-year period. A nested case-control analysis. Spine. 2000;25(3):369-74.

8. Santos A. Diagnóstico Clínico Postural – Um guia prático. São Paulo: Summus; 2001.

9. Graup S. Desvios posturais na coluna lombar e a relação com dor, mobilidade articular e atividade física em adolescentes [dissertação]. Florianópolis: Universidade Federal de Santa Catarina; 2008.

10. Nascimento PRC, Costa LOP. Prevalência da dor lombar no Brasil: uma revisão sistemática. Cad Saúde Pública. 2015;31(6):1141-1155. doi: 10.1590/0102-311X00046114

11. Ribeiro IQB, Araújo TM, Carvalho FM, Porto LA, Reis EJB. Fatores ocupacionais associados à dor musculoesquelética em professores [dissertação]. Salvador: Universidade Federal da Bahia; 2009.

12. Militão AG. A influência da ginástica laboral para a saúde dos trabalhadores e sua relação com os profissionais que a orientam [dissertação]. Florianópolis: Universidade Federal de Santa Catarina; 2011.

13. Melo EMN, Caixeta GF, Caixeta A. Prevalência de lesões osteomusculares em professores de ensino fundamental. Revista Eletrônica Saúde CESUC; 2010;1(1):1-13.

14. Pereira Júnior AA, Lima WC. Avaliação da síndrome da dor patelofemoral em mulheres. Revista Brasileira de Promoção da Saúde. 2011;24(1):5-9. doi: 10.5020/18061230.2011.p5

15. Falcão FRC, Marinho APS, Sá KN. Correlação dos desvios posturais com dores musculoesqueléticas. R Ci Méd Biol. 2007;6(1):54-62. doi: 10.9771/cmbio.v6i1.4150

16. Carvalho AJFP, Alexandre NMC. Sintomas osteomusculares em professor do ensino fundamental. Rev Bras Fisioter. 2006;10(1):35-41. doi: 10.1590/S1413-35552006000100005