Prevalence of Musculoskeletal Pain and BMI in Children and Adolescents

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Abstract

The changes felt in the physical structure of school children and adolescents, such as height and body weight, mainly because of individual experiences, directly interfere with the posture of the children. This study is the first part of a larger study that aims to analyze the postural intervention in the prevention of musculoskeletal pain and postural changes in children in the 2nd and 3rd cycle of primary education. Methods: The present study is an observational study on the musculoskeletal disorders of children from 10 to 18 years age in the district of Viseu, where we will use the sociodemo graphic questionnaire and a body discomfort questionnaire. Results: 96 students of both gender participated (mean age of 13.17±1.81). Concerning complaints of musculoskeletal pain, 72.9% of the participants presented pain, 52.9% with back pain and 41.4% indicated that this pain is chronic. Regarding chronic pain and Body Mass Index (BMI) in each school year, the results show that the mean time and BMI increase significantly according to the school years (P= 0.021 and P= 0.038, respectively), since the beginning of the 2nd cycle at the end of the 3rd cycle. Conclusions: This study was conclusive to analyze essentially the prevalence of pain in the different school years, because at these ages it is where the body, motor and postural development occurs. These data allow us to demonstrate the need to intervene early in the musculoskeletal changes in a school context, thus the awakening of this theme.

Keywords

Musculoskeletal Pain; Body Mass Index (BMI); School Age

Introduction

Sedentary lifestyle is also one of the main factors related to weight gain, since in the last decades it has been verified that children became less active due to technological advances [1-5].

Excess body mass in obese or overweight children may lead to a decrease in stability and the need to seek postural adjustment mechanisms. Thus, postural changes may occur due to the modification of the usual balance axis, resulting in lumbar lordosis increase, with protrusion of the abdomen and anterior slope of the pelvis (anteversion) and with the passage of time, excessive shortening and stretching appear, which In combination with the anterior slope of the pelvis lead to internal rotation of the hips and to the appearance of valgus knees and flat feet [6].

Therefore, obese or overweight children find it difficult to participate in physical activities, either because of the shame of exposing their body appearance or by the difficulty of performing the exercises, which induces them to choose activities with low caloric expenditure, thus reducing the level of physical activity. This may exacerbate postural changes, dyspraxia and lack of balance in these children [6, 7].

The changes felt in the physical structure of school children and adolescents, such as height and body weight, mainly because of individual experiences, directly interfere with the posture of the children [1, 2, 3]. A high prevalence of postural changes among children is observed, however, most of them are related to postural
behavior during the school phase. It is during this period these people remain seated for a long period of time, using school bags inadequately and transporting school supplies, which are often overloaded [2, 8].

There is a growing need to establish early preventive measures to avoid musculoskeletal disorders experienced in adulthood, which result from poor postural behavior as children, as they are considered to be one of the major risk factors contributing to these disorders [2, 9].

Burton et al. [10] state that to prevent musculoskeletal disorders preventive measures between adults and children, based on the risks of daily life of the user such as lifestyle (which may include nutrition, work, physical activity and obesity), physical factors (such as mobility, flexibility and muscular strength), factors related to the school environment (which includes backpack transport and school furniture) and finally psychologically related where, after being modified, they can reduce the occurrence of musculoskeletal problems in the general population.

It is increasingly necessary to conduct preventive behavioral guidelines for children and adolescents in order to minimize the occurrence of chronic musculoskeletal disorders in adult life, especially in the area of the spine [2, 11].

Methodology

Aim

This study is the first part of a larger study that aims to analyze the postural intervention in the prevention of musculoskeletal pain and postural changes in children in the 2nd and 3rd cycle of primary education and will then take place in two main subprojects. In a subproject we will proceed to validate the scale of evaluation of postural behavior according to the Back School program [2, 11, 12] and in the other subproject we intend to analyze the influence of a Postural intervention using videogame or postural education in the musculoskeletal back pain and postural habits.

The present study is an observational study on the musculoskeletal disorders of children and adolescents from 10 to 16 years of age in the district of Viseu, where we will use the sociodemographic questionnaire and a body discomfort questionnaire [4].

Study Sample

Dating from March 2017 to June 2017, there were 1532 students enrolled in the school, 760 of which attending the 2nd and 3rd Basic Education Cycle and 96 students belong to the inclusion criteria of this study and agreed to participate in it with their permission by the parents.

This study population, as mentioned earlier, represent the beginning of the 2nd and 3rd Basic Education Cycle (5th and 7th grade) and the end of the 2nd and 3rd Basic Education Cycle (6th and 9th grade), which were chosen in order to establish if there were already back musculoskeletal related problems, by analyzing and comparing pain complaints in both school periods.

Our sample consisted of 46 male and 50 female subjects, divided in 18, 5th grade, 8 in the 6th grade, 27 in the 7th grade and 43 in the 9th grade students, with an average age of 13.17±1.81 years.

Approved by the international ethical committee from ANZCTR (ACTRN12618000720213), this study asked for informed consents for students’ parents and guardians. All of our procedures followed the Helsinki Declaration, to what human related studies should comply.

Procedures

This first step study has taken one month from participant selection process, personal identification questionnaire fill, musculoskeletal pain assessment according to Corporal Discomfort Scale [4] in order to verify and categorize the pain felt (where 0 corresponded to no pain and 5 to the full amount of pain felt by the subject), and its duration (acute pain – under one month, sub acute – from 1 to 3 months, and finally, chronic pain – over a 3 month period).

In order to assess postural changes, an informal questionnaire was conducted, based on the work made by Carmo and Ferreira [13], it pointed out pain body placement while in a seated, upstanding and backpack and weight carrying.

SPSS, 24.0 version was used in order to treat all the statistical data, for normality verification Kolmogorov-Smirnov test was applied before a descriptive analysis. This last, was calculated based upon standard methods. In order to analyze any characteristically difference between both groups, the t test was applied. The statistically level of significance was established in p ≤ 0.05.

Results and Discussion

Body Discomfort Scale allowed us to find that, between a 0 (no pain) and a 5 (maximum pain) episode among the 96 subjects, there was a mean of 2.57±0.86
that correspond to a moderate or severe episode. When it comes to pain episodes duration compared with their own intensity, our study allowed to find that with episodes duration increments comes intensity increments as well, as we may see by the 41.4% of the subjects that claim to suffer from chronic pain (2.72±0.80) and 2.64±0.87 and 2.08±0.86 corresponding to sub acute and acute episodes, respectively.

When it comes to musculoskeletal pain occurrence, 72.9% (70) of the subjects claim to have experienced some episode, in at least one body area. From these, 32.3% (31) claim to have experienced pain in two distinctive body areas while 11.5% (11) claim to have felt it in three or more of these regions.

Considering its placement, 52.9% (37) point out the spine region, 20% (14) the head, 24.3% (51) lower limbs, and finally, 2.8% (2) upper limbs as the main problematic areas of pain occurrence.

Considering the aim of this particular paper, musculoskeletal pain occurrence in the 2nd cycle, in the 5th school grade students was 77.8%, with an average intensity of 2.71±1.2 (as it may be seen in Table 1) and has mainly pain in the lower limbs with 50%, followed by back pain with 35.7% and headache with 14.3%. When it comes to its duration, 21.4% of the subjects claim to have experienced chronic episodes, 50% sub acute, while 28.6% acute episodes of pain occurrence. Regarding BMI, 55.6% had a BMI below weight, 38.9% had the ideal weight and 5.6% had obesity. Already in the 6th school grade students were 87.5%, with an average intensity of 1.71±0.49 (as it may be seen in Table 1) and has mainly pain in the back pain with 42.9%, followed lower limbs with 28.6% and headache with 28.6%. When it comes to its duration, 42.9% of the subjects claim to have experienced chronic episodes, 42.9% sub acute and 14.3% acute episodes of pain occurrence. Regarding BMI, 37.5% had a BMI below weight, 50% had the ideal weight and 12.5% had the overweight.

On the other hand, when it comes to 3rd cycle, in the 7th grade school age children (beginning of 3rd Basic Education Cycle) the amount that claim to have experienced some kind of pain occurrence decreased (55.6%), but the average pain intensity (2.40±0.83) and duration (53.3% chronic, 33.3 sub acute and 13.3 acute episodes) increased and has mainly pain in the back pain with 40%, followed by lower limbs and headache with the same value (26.7%) and upper limbs with 6.7%. Regarding BMI, 29.6% had a BMI below weight, 51.9% had the ideal weight, 11.1% had the overweight and 7.4% had the obesity. Concerning 9th grade school age children (3rd Basic Education Cycle ending) the amount that claim to have experienced some kind of pain occurrence (79.1%), the average pain intensity (2.76±0.65) and duration (58.4% chronic, 29.4 sub acute and 11.8 acute episodes) increased again and has mainly pain in the back pain with 70.5%, followed by headache with 17.6% and lower limbs with 8.8%. Regarding BMI, 18.6% had a BMI below weight, 69.8% had the ideal weight, 7% had the overweight and 4.7% had the obesity.

Figure 1: 2nd and 3rd cycle episodes duration of pain comparison
Gender analysis showed a mean experienced pain value higher in females (3.00±0.59) and it is in the end of 3rd cycle, when compared to male subjects that presented a higher mean experienced pain value of 2.86±1.54, where the beginning of 2nd cycle Table 1.

Regarding the time that the said pain occurs, if we verify in each school year, the results show that the mean of time increases significantly according to the school years, with 1.93 in the 5th grade, 2.29 in the 6th grade, 2.40 in the 7th grade and 2.47 in the 9th grade (being 1 - acute pain, 2 - sub acute pain and 3 - chronic pain), with p= 0.021 from the beginning of the 2nd cycle to the end of the 3rd cycle.

Regarding BMI, 57.3% of the participants had the ideal weight, followed by BMI below weight with 30.2%, by overweight with 7.3% and by obesity with 5.2%. If we verify the mean BMI in each school year, the results also showed a significant increase according to the school years, with 1.56 in the 5th grade, 1.75 in the 6th grade, 1.96 in the 7th grade and 1.98 in the 9th grade (being 1 - underweight, 2 - ideal weight, 3 - overweight and 4 - obesity), with p= 0.038 from the beginning of the 2nd cycle to the end of the 3rd cycle.

Conclusion
This paper, besides serving as a theoretical foundation for postural education matter regarding school context, sought to present the first stage of a study developed in school environment with students from 2nd and 3rd Basic Education Cycle in Portugal, in order to raise the awareness around postural behaviors especially in school age children.

Its intent, for considering postural education as a fundamental part of Physical Education curricula, may lead to well informed children regarding ideal postural habits, that my prepare them better for their life ahead. School age children postural education should be seen as a priority fact in Physical Education classes, since it tremendously contributes for their students’ life quality.

Results here demonstrated are in line with the purpose of this study, since it was capable to show musculoskeletal pain and BMI correlation when it comes to school age children attending the 2nd and 3rd Basic Education Cycle in Portugal.

The main results point to a prevalence of moderate to severe pain, where the older the students, the greater their BMI and the greater the chronicity of musculoskeletal pain. With the exception of the 5th grade, where the average pain is high, but it has a higher prevalence of acute pain, the level of pain increases with the passing of the years, having the 9th grade with the highest mean of pain and indicating the highest chronicity of the same.

This study highlighted a few musculoskeletal pain causes, while raising the awareness for this theme in future studies to come.

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Trial Registration
The present study has been submitted and approved by the international ethics committee with registration ACTRN12616001365459 and all procedures are in accordance with the Declaration of Helsinki with respect to the study with humans.

References


