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Article

Back-Health-Related Physical Activity and Exercise Knowledge in Adolescents

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Abstract: The aim of this study was to analyze the level of specific back-health-related physical activity and exercise knowledge. This is a cross-sectional study. A representative sample of 1500 students were recruited with a confidence level of 95% and an accepted standard error of ±2.53%. Individuals were aged between 13 and 18 years old (mean age= 15.18; SD = ±1.446). Self-reported questionnaires were used to record back-health-related physical activity and exercise knowledge concerning back care in adolescents. The level of specific knowledge of back health education related to physical activity and exercise in adolescents was low (X = 2.05, SD = ±2.264). Only 10.9% of the students passed the specific knowledge test, achieving a grade equal or superior to 5. The boys average score was higher (X = 2.17, SD = ±2.312) than the girls (X = 1.94, SD = ±2.212) with statistically significant differences (p = .048). The level of specific knowledge increased with age (F = 11.531; p < .001). High school students have a low level of specific knowledge. Physical Education teachers should apply the conceptual content properly. Knowledge is the first step towards changing behavioral habits. Back care education in the school curriculum is recommended.

Keywords: Physical Education, knowledge, proper exercise, back care, adolescents

1. Introduction

Several studies have recognized the importance of improving the knowledge students have about fitness and health (1, 2). It is stated that better domain knowledge about fitness and health, such as the valuation of its physical form, training objectives, and the application of FITT (frequency, intensity, time and type of exercise) may improve physical activity, improving active lifestyles (3, 4) and therefore people's health and quality of life .

For Limon et al. (5) there is an urgent need for health promotion programs which seek to increase knowledge in the field of back health in the education system. These must involve teachers, parents and students themselves, so they can produce the necessary changes. Related to this, numerous studies involving the assessment of knowledge about back care in the school population concluded that back education programs in schools are an effective strategy for the conceptual development of the content of back health within the educational curriculum (6-30).

Ads back pain, one of the most important tools to prevent this, or to minimize the frequency and severity of the symptoms once produced, is the acquisition of knowledge on lower back health (31). Because we must not forget that the prevalence of LBP in schools is high (32, 33), and in Valencia, Spain, the level is 44.5%, according to Miñana-Signes and Monfort-Pañego (34). However, we know that knowledge per se is probably not enough to change habits and healthy behaviors of individuals (35-37). However, in order for habits to become the key element for the improvement of health care, and specifically the back health, access to knowledge and information should be the first step in the teaching-learning process, to establish healthy physical activity habits (38, 39). It is widely accepted that voluntary behaviors are influenced by the corresponding knowledge (40) and there are specific, validated and reliable instruments to assess postural habits at school age (41, 42). Related to this, education can contribute to the development of an improved lifestyle through improving physical fitness and the proper execution of daily activities (31).

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Therefore, a body of knowledge about the proper use of the back is necessary to prevent back injuries (Schwartz and Jacobs (8), and Vicas-Kunse (6). According to a recent article (43), it is important to determine the level of specific knowledge about back health related to activity and exercise in students. Moreover, it is also important to know if this level of knowledge could be considered as an indicator related to students with, or without, low back pain, and if it could be interpreted as a preventative factor or risk indicator. Therefore, this study aimed to analyze the level of specific knowledge of back health related to the practice of physical activity and exercise in a sample of adolescents.

2. Materials and Methods

2.1 Study design

A cross-sectional study design was performed.

2.2 Subject population

The study population consists of students in high school in the Valencian Community, Spain (N= 247714). The sample under study was selected based on convenience of a non-probabilistic sampling, and by quotas during the school years 2009-2013.

The study included healthy adolescents aged 12 to 18 years old, and students belonging to the eleven Secondary Schools selected from amongst public and private schools. Students with disabilities: lesions of the spinal cord (i.e. spina bifida, quadriplegia, etc.), Cerebral palsy, Down syndrome, autism, tumors, etc., and those who did not show up the day of the test, were excluded.

2.3 Data collection

The questionnaires were filled out during Physical Education (PE) classes using the Google Drive application in the computer rooms of the centers participating in the study. An experienced researcher presented the questionnaire to the students, explained the procedure and rules for filling in the survey, and personally dealt with all the queries that individuals had. The management of the centers, each group tutor and the parents were informed of the study and gave their written consent. Besides, we obtained institutional ethical approval by the Ethics Committee in experimental research from the University of Valencia.

2.4 Instrument

Measurement of specific knowledge related to physical activity practice and exercise. Individuals were required to complete a questionnaire to assess Back-hEalth-related pHysical actIvity and exercise kNowleDge (BEHIND) (44). The questionnaire was designed to identify knowledge about physical abilities such as strength, endurance, muscular flexibility, and proper exercise regarding posture and duration. The students were assessed using a 10-point scale. Students who achieved 5 points or higher passed the test.

This questionnaire was validated in a previous study among 230 Spanish students aged 13 to 18 years old, achieving good test- retest reliability, Cronbach's Alpha being .80 and the intraclass correlation coefficient being .80 ($p < .01$).

2.5 Data analysis

Descriptive statistics including means and standard deviations were performed to represent specific knowledge between gender and age groups. To assess the level of knowledge, we used a 10-point scale and percentiles for "global score", because this was not normally distributed. Student's t-test and analysis of variance (one-way ANOVA) was used at the significance level $p < .05$. Statistical analysis was conducted using SPPS v.18.

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3. Results

3.1 Translation and cross-cultural adaptation

During the first step (forward translation) analysis, the APSOM decided not do any change. Step 2 (backward translation) was identical to the original questionnaire in Portuguese (SL). In the third step no major problems were encountered during the forward translation and backward translation phases of the Brazilian version, and the APSOM did not suggest amendments to words or phrases. Step 4 (Expert Committee): The committee used three rounds to accomplish the objective of the study, the production of a prefinal version for field testing. Each expert scored 88 items in the respective rounds.

3.1 Descriptive analysis and univariate analysis.

A representative sample of 1500 students were recruited with a confidence level of 95% and an accepted standard error of ±2.53%. Individuals were aged between 13 and 18 years old (mean age = 15.18; SD = ±1.446). 51.6% were boys (n = 771; mean age = 15.25; SD = ±1.437) and 48.4% were girls (n = 723; mean age = 15.10; SD = ±1.452).

3.1.1 Specific level of knowledge

The sample of adolescents showed a low level of specific knowledge of health and back care education related to physical activity and exercise (X = 2.05, SD = ±2.264).

In general, only 10.9% of the students passed the specific knowledge test, achieving a score equal or superior to 5 points, while 89.1% students failed the test.

Based on the categorization of scores followed by the Spanish educational system, Table 1 shows the final grades. A total of 70 students completed the BEHIND, achieving a grade equal or superior to the classification, "good".

Table 1 Distribution of the students' scores.

	n	%
Very poor [≤ 2.9]	901	60.1
Poor [3-4.9]	435	29.0
Average [5-5.9]	92	6.1
Good [6-6.9]	38	2.5
Very good [7-8.9]	30	2.0
Excellent [≥9]	2	.1
Total	1500	100.0

Regarding the contents related to the specific muscles involved in strengthening the back and back health, only 40% (n = 584) answered the item correctly.

Almost half of the students (46.1%; n = 673) correctly answered the item concerning the proper implementation of exercise to strengthen the lower back muscles.

Only 40% (n = 582) of the students correctly answered the item concerning the correct performance of isometric exercises to strengthen the abdominal muscles.

A third of the students (33.3%; n = 485), correctly answered the item related to the proper execution of exercises to strengthen abdominal muscles, and in particular concerning the position of the legs to protect the health of the back.

Approximately 40% (n = 577) of the students correctly answered the item related to the correct execution of exercises to strengthen abdominal muscles, and in particular on the degree of trunk flexion for the healthy development of trunk muscles.

Regarding the cool down exercise contents, it was found that nearly 17% (n = 243) of the students knew the specific muscle to stretch to improve the health and care of the back.

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Related to the concept of joint movements which are not recommended, such as hyperextension and hyperflexion of the spine, only 21.9% (n = 318) of the students were able to correctly answer the question.

With regard to gender, the boys (X = 2.17, SD = ±2.312) average score was higher than the girls (X = 1.94, SD = ±2.212), with statistically significant differences (p = .048).

The group of 17-year olds obtained the highest scores. Except for the group of 18-year olds, adolescents increased their knowledge on a regular basis based on their increasing age, with statistically significant differences (F = 11.531; p < .001) (Figure 1).

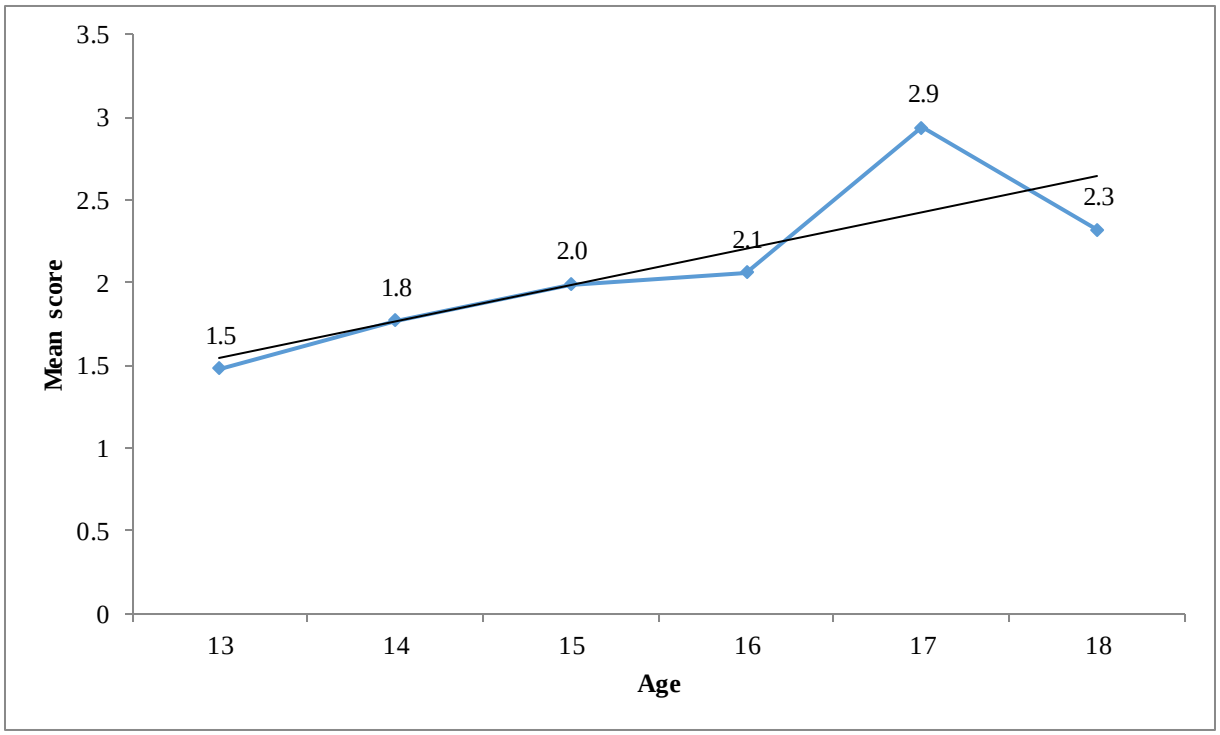

Figure 1 Mean scores by age groups

4. Discussion

This survey aimed to evaluate the level of specific knowledge concerning health and back care related to physical activity. A cross- sectional study was carried out, therefore it is only possible to show an association with variables, but not to demonstrate causality.

Students from the Valencian Community demonstrated that they have a very low level of specific back health related physical activity knowledge scoring a mean of 2 points in the questionnaire.

The levels were so low that only 10.9% of students passed the specific knowledge test, achieving a gradeequal or superior to 5, similar to another study (45). However, a total of 70 students filled in the test, achieving a grade equal or superior to "good". Among them, 30 students achieved a classification of "very good", and 2 people got the highest score. Therefore, we can say that it is possible to successfully pass the exam and be familiar with the content related to back health and physical exercise.

With regard to sexes, the boys scored significantly better than the girls. This could be because boys tend to play sports more often than girls (46-49). The boys could be more informed about issues related to the practice of physical activity and exercise. In addition, physically active children were associated with physically active parents and best friends, compared to inactive children (50). Specific knowledge significantly increased with age. This seems obvious, since over time adolescents accumulate new experiences and learning.

Concerning the items, we can say that students have sufficient knowledge related to contents concerning physical qualities, frequency of exercise per week, the proper execution of lumbar

strengthening exercises, and the proper development and duration of stretching exercises. In addition, gaps were observed related to the specific content and muscles involved in strengthening the back and back health, the proper execution of abdominal strengthening exercises (questioned in 3 items), and the specific muscles involved in the concept of joint movements which should be discouraged, such as hyperextension and hyperflexion of the spine.

Agreeing with our results, most of the assessments carried out on students concerning levels of knowledge about back health were found to be very low before the implementation of the intervention program (11-13, 15, 19, 21, 23, 28, 51, 52). Related to this, the results of studies that examined the level of knowledge in the field of physical education and health, also drew attention to the low level attained by students, not approaching the minimum level of proficiency in knowledge and understanding (45, 53). The results reinforce what Tellez stated (54) when he called attention to the fact that "students generally completely lack basic knowledge about the theory of the subject matter". For these reasons, it is important to consider whether the content related to postural education is well-framed in the official curriculum, if teachers present said content in their classroom programs, and whether they have sufficient and appropriate knowledge about the subject (14, 24, 55). On the other hand, and based on the experience in the professional field of physical education teaching, we know that the PE is considered a highly practical subject.

In assessment criteria, PE programming evaluates three aspects: concepts, procedures and attitude, with the conceptual area usually representing 20% of the mark. In order to take advantage of this low percentage, it requires a methodology that allows procedural contents to strengthen the conceptual contents and vice versa. To improve healthy habits in students, it is important for PE teachers to encourage the practice of physical activity and sport, but we must not forget the interdisciplinary and comprehensive character that the subject has.

4.1 Implications for Practice

From a welfare-oriented perspective, we want to know if the students' knowledge about back health-related physical activity is related to the existence or absence of pain. Also, we would like to know if it could be interpreted as a preventive factor or indicator of risk, or if the students' knowledge influences the acquisition of habits of active lifestyles, postural habits or engaging in regular organized physical activity.

Furthermore, from an educational point of view the assessment of the students' knowledge is organized by the education system and prescribed in the official curriculum. For this reason, it is important to check what the students know and can do after completing their compulsory education (37). Therefore, determining the actual knowledge possessed by students about health-related postural education at different levels of education directly involves more participation of professionals in PE, and as a result the use of measuring instruments to determine the degree of knowledge of students.

Meanwhile, to be able to assess what interventions of health education and back care are needed (what the students do not know about back care and health), and to also check the effectiveness of the implemented interventions, it would be desirable to administer a complementary knowledge questionnaire (56) in order to assess the knowledge that students have about this topic, related to health and taking care of one's back.

5. Conclusions

High school students have a low level of specific knowledge. Physical Education teachers should review the postural education contents in their teaching programs. Knowledge is the first step in order to change behavioral habits. Back health education in the school curriculum is recommended.

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