

# Back Health in Adolescents between 12-18 Years of the Valencian Community, Spain: Prevalence and Consequences

Miñana-Signes V\* and Monfort-Pañego M

Body Languages Didactics Department, Academic Unit of Physical Education, University of Valencia, Av. dels Tarongers, 4, 46022, Valencia, Spain

## Abstract

**Purpose:** The aim of this study was to provide evidence of the prevalence and consequences of non-specific low back pain (LBP) in a sample of secondary school students from the Valencian Community, Spain.

**Methods:** This is a cross-sectional. The sample consisted of a total of 1500 adolescents aged between 12 to 18 years old (mean age=15.18, SD 1.446). Self-reported questionnaires were used to record LBP in health adolescents.

**Results:** The lifetime prevalence of LBP was 44.5% (n=664). The girls showed a higher percentage of lifetime prevalence of LBP (50.3%, n=362) than boys (38.9%, n=298), with statistically significant differences ( $\chi^2=19.863$ ;  $P=0.000$ ). Lifetime episodes of LBP showed a higher prevalence increasing age ( $\chi^2=32.458$ ;  $P=0.000$ ). Students smokers showed a significant association to suffer lifetime prevalence of LBP ( $\chi^2=11.461$ ;  $P=0.001$ ). The 12 months period prevalence of LBP was 76.1% (n=559). The one week period prevalence of LBP was 28.2% (n=205). The 14.2% (n=104) of students missed school one occasion because LBP. A 16.2% (n=117) of students suffer lower back problems caused by physical education classes.

**Conclusions:** There are a large number of adolescents suffering back problems. Health status in adolescents back can affect your quality of daily life. School-based longitudinal intervention programs are required on back care.

**Keywords:** Low back pain; Adolescents; Back health; Daily activities; Health promotion

## Introduction

The prevalence of LBP has been recognized very high during the course of life in children and adolescents. This problem increases steadily with age, appearing sooner and more frequently in girls than in boys [1,2]. For these reasons, several authors advocate developing intervention programs and back health care in school [3-12].

Currently, it is estimated that the lifetime prevalence of LBP in children and adolescents could vary between 7% and 72% [1], with an average of 39.9% [13]. The 12 months period prevalence of LBP recorded ranging from 7% to 50.8% [1] found a mean of 33.6% [13].

According to Walker [14] given the prevalence of back pain in adults, 80% of children will experience back pain at some point in life.

Further, the low back pain became one of the biggest problems for public health systems in the western world during the second half of the 20th century, and now seems to be extending worldwide [15].

Non-specific or common low back pain is defined as pain between the costal margins and the inferior gluteal folds, usually accompanied by painful limitation of movement, often influenced by physical activities and posture, and which may be associated with referred pain in the leg [16].

Traditionally, the low back pain (LBP) was attributed to underlying illness [17] as well as changes in the static or dynamic spine, like spondylosis, spondylolisthesis or scoliosis, or disc injuries or facet, as the disc or facet degeneration. However, these images are observed between healthy as frequently as among subjects with pain [18].

Presently, the LBP is understood as all that pain located in the reference area and implies that is not attributable to a recognisable and known specific pathology like infections, tumors, osteoporosis, fractures, structural deformation, inflammatory disorder, etc. [15].

According the back health and the restrictions in daily living, several studies have shown that back problems can also limit daily activities of children and adolescents as school attendance causing

school absenteeism. According to the literature, the prevalence of non-attendance at schools may vary between 4.6% and 21.3% [19-23].

Other European studies report that the prevalence of visits to health professionals because of back problems ranged from 15.6% to 37.6% [20,24,25].

For these reasons, the present study aims to provide evidence of the prevalence and consequences of non-specific low back pain (LBP) in a sample of adolescents from the Valencian Community, Spain. It will help to understand better our context to prepare future intervention programs to improve the back health of the population and to prevent these problems.

## Material and Methods

### Subject population

The study population consists of students in high school in the Valencian Community, Spain. The sample under study was selected through a convenience sample.

The study included healthy adolescents aged 12 to 18 years, and students belonging to the eleven Secondary Schools selected from 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.

\*Corresponding author: Miñana-Signes V, Teacher Training Faculty, Body Languages Didactics Department, Academic Unit of Physical Education, University of Valencia, Av. dels Tarongers, 4, 46022, Valencia, Spain, Tel: +34 963 86 41 00; E-mail: vicente.minana@uv.es

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## Data collection

The questionnaires were filled out during physical education classes through the google drive application in the computer rooms of the centres participating in the study. An experienced researcher presented the questionnaire to students, explained the procedure and rules for filling in the survey and personally attended to all doubts individuals had. The management of the centers, each group tutors and parents were informed of the study and expressed written consent.

## Evaluation methods

**Prevalence of LBP:** Low back pain history was measured Standardised Nordic questionnaire [26]. The questionnaire included a drawing of the low back, and defined LBP as aching, pain or discomfort in the low back during the preceding year that was not related to trauma or menstrual pain. Lifetime prevalence was defined as the proportion of the population that had experienced an episode at some point in their lifetime. Point prevalence was defined as the proportion of the population that had been cases within the previous week. This is a solid instrument with extended use and high reliability and reproducibility and it has been validated in several languages, among which is Spanish [27].

## Data analysis

Descriptive statistics including means, standard deviations and 95% confidence intervals (CIs) were performed to represent low-back pain data between gender and age groups. Chi-square test was used at the significance level  $p < 0.05$ . Statistical analysis was conducted using SPSS v.18.

## Results

### Study group

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

### Lifetime prevalence of LBP

Six hundred and sixty four (298 boys and 362 girls) of 1492 students reported having already experienced LBP at least once in lifetime. The prevalence of LBP was 44.5% (95% CI=43.1- 46.0). The girls showed a higher percentage of LBP (50.3%; 95% CI=48.8- 51.8) than boys (38.9%; 95% CI=37.5- 40.3) with differences statistically significant ( $\chi^2=19.863$ ;  $P=0.000$ ).

Lifetime episodes of LBP showed a higher prevalence increasing age with statistically significant differences ( $\chi^2=32.458$ ;  $P=0.000$ ) (Figure 1).

In general, the lifetime prevalence of LBP gradually increased from 36.9% (95% CI=35.5- 38.4) in the 13 years old to 68.8% (95% CI=67.4- 70.3) in the 18 years old. The steepest increase was for the 16 and 17 to 18 year old group ratting from 47-48% to 69% respectively. The lifetime prevalence rates of LBP were at the maximum at age 18 years.

Students smokers showed a significant association to suffer lifetime prevalence of LBP compared with those who had never smoked ( $\chi^2=11.461$ ;  $P=0.001$ ).

Back problems in students increased in relation to the educational level of parents higher, without statistically significant differences.

### 12 months period prevalence of LBP

Five hundred and fifty nine (253 boys and 303 girls) of 735 students reported having already experienced LBP at least once in last year. The 12 months period prevalence of LBP was 76.1% (95% CI=74.0- 78.4.). The girls showed a slightly higher percentage of LBP (78.5%; 95% CI=76.3- 80.9.) than boys (76.1%; 95% CI=74.2- 78.3). The association LBP between genders were independent of each other.

In that case, the prevalence of LBP in last year showed an increased linear and constant from 58.2% (95% CI=56.1- 60.5) in the 13 years old to 89.5% (95% CI=83.4- 91.8) in the 18 years old (Figure 2).

No statistically significant differences between groups of smokers and non-smokers in relation to prevalence of LBP in last year were found.

Back problems in students increased in relation to the educational level of parents higher (none, elemental school, secondary school, bachelor, university), without statistically significant differences ( $\chi^2=10.404$ ;  $P=0.034$ ; and  $\chi^2=9.950$ ;  $P=0.041$ ; fathers and mothers respectively).

### One week period prevalence of LBP

Two hundred and five (83 boys and 120 girls) of 727 students reported LBP during the last seven days. The prevalence of LBP was 28.2% (95% CI=27.0- 29.5). The girls showed a higher percentage of LBP (31.6%; 95% CI=30.3- 33.0) than boys (24.2%; 95% CI=23.0- 25.5) with differences statistically significant ( $\chi^2=4.863$ ;  $P=0.027$ ).

The prevalence of LBP in the last seven days showed a higher rate increasing age with statistically significant differences ( $\chi^2=18.654$ ;  $P=0.002$ ) (Figure 3).

No statistically significant differences between groups of smokers and non-smokers in relation to prevalence of LBP in last seven days were found.

### School absenteeism

A hundred four (45 boys and 58 girls) of 731 adolescents missed school because LBP once in lifetime. A total of 14.2% (95% CI=13.1- 15.4), with no differences between genders.

### Seek health care professional

Two hundred twelve (29.0%, 95% CI=27.7- 30.3) visited the health professional (doctor, physiotherapist, chiropractor or other) in the past 12 months because of suffering LBP. A total of 30.7% (95%

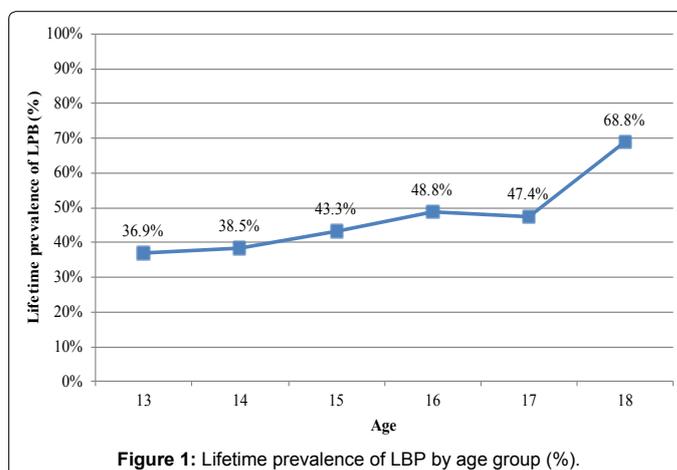
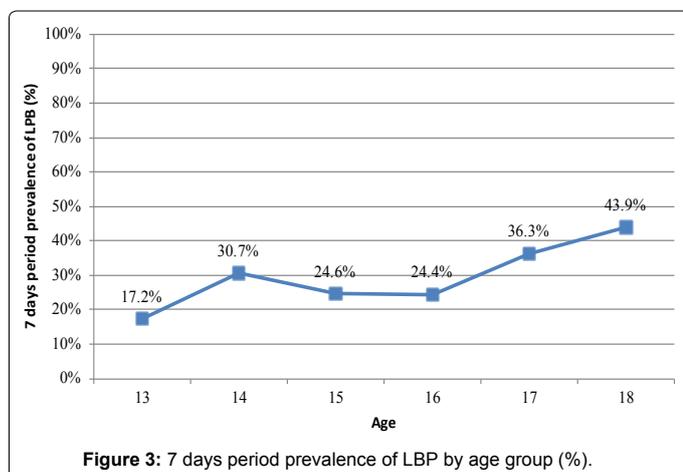
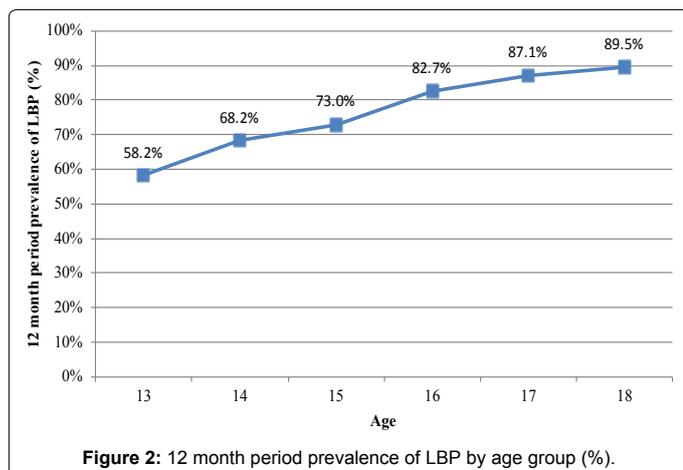


Figure 1: Lifetime prevalence of LBP by age group (%).



CI=29.4- 32.1) of girls sought health care professional while 27.2% (95% CI=26.0- 28.5) was registered by boys. Chi-square reported an independent relation.

### Sedentary activities

Almost 50% of teens in the Valencian Community have back problems due to the sitting posture (44.1%; 95% CI=42.7- 45.6). According to sex, the girls showed a higher percentage of back problems due to sitting posture in school than boys, finding statistically significant differences ( $\chi^2=15.398$ ;  $P=0.000$ ).

Sedentary activities such as watching television (TV) produce or increased back problems at 12.3% (95% CI=11.2- 13.5) students. The girls (14.1%; 95% CI=13.0- 15.3) showed a higher prevalence of back problems due to the action of watching TV than boys (10.6%; 95% CI=9.5- 11.7), with statistically significant differences ( $\chi^2=4.197$ ;  $P=0.041$ ).

### Physical activity

Physical activities at home, such as cleaning, washing, sorting room, etc., for at least 45 minutes, showed a high prevalence of back problems in adolescents (36.4%; 95% CI=35.1- 37.8). The girls (42.4%; 95% CI=41.0- 43.9) showed a higher prevalence of back problems due to physical activities at home than boys (29.8%; 95% CI=28.6- 31.2), with statistically significant differences ( $\chi^2=12.633$ ;  $P=0.000$ ).

Physical Education classes produced or increased the problems occurred in the lower back by 16.2% (95% CI=15.1- 17.4). The girls

(19.4%; 95% CI=18.3- 20.6) showed a higher prevalence of back problems due to Physical Education classes than boys (12.9%; 95% CI=11.8- 14.1), with statistically significant differences ( $\chi^2=5.400$ ;  $P=0.020$ ).

Adolescents had 22.9% (95% CI=21.7- 24.2) of back problems when asked about the practice of physical and sports activities outside school hours. Boys and girls showed a similar rate of back problems after physical practice or sports activities outside school hours, no statistically significant differences were found.

Football (12.6%;  $n=31/246$ ) was more related to the LBP, followed by dance or sport dance (8.5%;  $n=21/246$ ) and abdominal execution (6.9%;  $n=19/246$ ).

In relation to other activities, play a musical instrument (19.1%;  $n=18/94$ ), carrying school backpack (17%;  $n=16/94$ ), standing a long time (10.6%;  $n=10/94$ ), and weight lifting and transport (7.4%;  $n=7/94$ ) reported the highest values of LBP.

### Discussion

This investigation aimed to provide evidence of the prevalence and consequences of non-specific low back pain (LBP) in a sample of adolescents from the Valencian Community. A cross-sectional study was carried out, therefore it is only possible to show association with several risk factors for LBP, but not to demonstrate causality.

In general, we can say that the Valencian Community (VC) has a high lifetime prevalence of LBP among teenagers reaching a 44.5% of incidence.

Our results exceeded the European average which amounts to a 39.0% prevalence and the international average that gets 33.6% according to the meta-analysis of Calvo-Muñoz et al. [13]. Following the results of this same author and collaborators the LBP prevalence among adolescents in the VC could be compared with North America that recorded a 45.5% incidence. These reports indicate that LBP is a serious health problem among secondary school and bachelor students from the Valencian Community [28].

Compared with Spanish studies, the prevalence obtained in the VC falls short of the population of Mallorca, Spain. Kovacs et al. (24) found that students from 13 to 15 years reported a prevalence of LBP of 50.9% for boys and 69.3% for girls.

In the same line, in Mallorca Vidal, Borràs, Ponseti, Gili, and Palou [29] with students between 10 and 12 years found a lifetime prevalence of 61.2% (45.7% in boys and 78.6% girls).

In contrast, in a study conducted in the city of Seville (Spain) the prevalence of LBP was similar to our study reaching the 41.8% [30].

According to the literature [1], the girls (50.3%) registered higher and significant percentage of lifetime prevalence of LBP than boys (38.9%).

In relation to age and in line with other studies [1,13,17,31], the lifetime prevalence of LBP increased significantly as age increased. In addition, it appears that at age of 13 years old the prevalence of LBP is already very high reaching 36.9% of incidence, and at age 18 the results are comparable to those of adulthood recording almost 70% [1].

Regarding the prevalence of LBP in the last 12 months we observed that higher rates were recorded than in the lifetime prevalence of LBP. The 76.1% of students said they had suffered during the last year back problems, similar to other studies data [32,33]. These results report again that the LBP is a serious health problem among the VC adolescents.

The prevalence of LBP in the last seven days also showed a high approaching the 30% incidence. Results bit higher than in the study of Kovacs et al [24].

Due to back problems lot of students suffer restrictions on the daily living. Nearly 30% of students had to visit the health professional, 14% of young missed school, 13% of students reduced their school activities at home and away from home, etc.

On the other hand, the sitting posture is one of the most significant factors to development LBP in school [31,34-36]. And the VC students reach almost the 50% of prevalence. Also, watching the TV was another problem to their backs.

For the 16% of the students of the VC, the Physical Education classes produced them or raised them the LBP. By contrast, according to the curriculum of the subject itself, the Physical Education must address health education, including knowledge, skills and attitudes to help prevent certain diseases by improving the acquisition of healthy habits. Thus, it is currently producing a paradox in which it is not understood how a subject aimed at improving the quality of life of people can increase these problems. At the same time, the practice of physical activity outside school hours must be controlled to avoid back problems.

#### Implications for Practice

Due the high prevalence of back problems, many students are limited and conditioned their daily activities. These data help us to demonstrate the need for intervention in schools to try to prevent these problems and specially to improve the health of our students [37].

For these reasons, the contents of the official curriculum related to postural education in the area of physical education should be addressed to the elementary school and in the first years of the secondary school in particular to prevent the high rates of prevalence of LPB. To increase the knowledge about back care is the first step to change the health habits [28].

## Conclusion

There are a large number of adolescents suffering back problems. Health status in adolescents back can affect your quality of daily life. Adolescents should pay attention to back care and school-based longitudinal intervention programs are required on back care.

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## Conflict of Interest Statement

Non declared

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