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PREVALENCE OF NON-SPECIFIC SELF-REPORTED BACK PAIN AMONG ADOLESCENTS AT HAIL TERRITORY-KSA

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ABSTRACT

Objective: Back pain (BP) is a common complaint adolescent in many countries. Its prevalence is not yet verified in Saudi Arabia. The objectives of this study were to investigate prevalence of non-specific BP among adolescents in Hail territory; and to detect the potential risk factors implicated in its development. Method: A cross-sectional population of 1000 students aged 12 to 18 years were selected from junior and high schools in Hail territory. Data were collected through personal interviews using a structured questionnaire and analyzed using SPSS software. Results: Older adolescent females who practice physical activities outside school and spend a significant amount of time watching TV, and sitting on uncomfortable school furniture were found to be significantly more likely to have BP. Methods of carrying school materials were not significantly associated with BP. Low-back pain did not significantly affect the number of absent days from school. Conclusions: The study suggests that back pain in Hail territory schoolchildren and adolescents is associated with older age, female gender, increase in physical activity, uncomfortable school furniture, and time spent watching television. Greater attention should be directed toward ergonomic improvements of chair and desk design in the classroom to decrease incidence of LBP among adolescents.

Keywords: Back pain, Risk factors, Adolescents, Gender differences.

1. INTRODUCTION

Adolescence is a phase of life during which many health-damaging behaviors are adopted and considered as an origin for several chronic diseases (Mattila *et al.*, 2008). Low back pain in in children and adolescents is perceived to be uncommon in the clinic setting. However, some studies have suggested that it is a relatively common feature (Watson *et al.*, 2002) (Bejia *et al.*, 2006), demonstrated disability and interference with daily activities in this age group (Salminen *et al.*, 1992). Studies of LBP in this age group are of particular importance, as back pain that occurs

initially during this time may forerunner the onset of intermittent or chronic pain in adulthood (Olsen *et al.*, 1992; Harreby *et al.*, 1995).

Many studies investigated the risk factors associated with low-back pain in children and adolescents such as age, gender, positive parental history of treatment for low-back pain, psychosocial events, frequency of sports, and other factors (Dieck *et al.*, 1985; Kristjandottir, 1996; Feldman *et al.*, 1999; Halalsheh *et al.*, 2000). One study investigated the contribution of vitamin D deficiency as a cause for idiopathic chronic low back pain in Saudi Arabia (Al Faraj and Al Mutairi, 2003). To our knowledge, there are no reports about incidence of LBP among this group in Saudi Arabia. The objectives of this study were to investigate the prevalence of low back pain among adolescents in Hail territory at KSA and to investigate the potential risk factors implicated in its development.

2. MATERIALS AND METHODS

2.1. Study Design

This is a cross-sectional design study in Hail region, kingdom of Saudi Arabia. Arabic questionnaires were given to the participant in school. The study conducted over a period of 9 months from September 2011 until the end of May 2012.

2.2. Participants

One thousand students participate in this study. All students were recruited from Hail region's schools at the kingdom of Saudi Arabia. The sample included 1045 students aged 12 to 18 years, attending the 7th to 12th school grades, because these year levels cover the most important years of spinal maturation (Pheasant, 1995). The sampling method used was multistage stratified random sampling. In the first phase schools were stratified by the level of education as intermediate and high schools, and gender into male and female schools. In the second phase, two intermediate and two high schools were selected. In the third stage, classes were randomly selected equally from each level.

2.3. Procedures

A questionnaire consisting of closed and multi-choice questions was designed. The design of the questionnaire was inspired and derived from the questionnaires of Salminen *et al.* (1992); Troussier *et al.* (1999). The questionnaire provided reproducible information and can be used as a survey tool for the assessment of low back problems in adolescents (Bejia *et al.*, 2006). The translation was carried out to strive for idiomatic rather than word-for-word translation. An explanation of the definition in language that could be understood by the adolescents was given during the delivery of instructions before the completion of the questionnaire. The definition of back pain used was discomfort or pain in the back that is considered to be a local, uncomfortable feeling in a part of the back, with the possibility of radiation to other parts of the body or to the leg.

The questionnaire contains six domains and 28 items (Appendix). Domain A, with five items (questions 1–5), concerns personal and familial past medical history. Domain B, with 13 items (questions 6–18), deals with the risk factors. Domain C, with four items (questions 19–22),

concerns daily life consequences. Domain D is composed of three items (questions 23–25) asking for back pain severity to determine the LBP punctual prevalence (LBP occurring in the week preceding the questionnaires). Domain E is composed of one question (question 26) asking for LBP medical consequences, and domain F is composed of two questions (questions 27–28) asking for functional LBP consequences which are tested by school and sports absenteeism (Bejia *et al.*, 2006).

Oral instructions were given to and anonymity guaranteed. The researcher was available if any problems arose. Written informed consent was obtained from parents and verbal assent was given before taking part in the study. The study was approved by the Ethical Committee of Hail University.

2.4. Statistical Analysis

The Statistical Package for Social Sciences (SPSS) 20.0 package software (SPSS Inc., Chicago, IL, USA) was used for data processing. Statistical analysis was based on Pearson Chi-Square test for nominal qualitative variables to calculate the degree of association between two categorical variables. The nonparametric Mann-Whitney U test was used to assess the significance between two quantitative variables if the distributions of these variables were skewed. Logistic regression analysis was used to identify any predictive factors of LBP, linked to the dichotomized outcome. Statistical significance was set at $p < 0.05$.

3. RESULTS

From 1045 adolescent students included in the present study, 13 males and 32 females were excluded due to absenteeism in questionnaire day or refusing participation. The overall response rate of completed questionnaires was 95.7%. The return rate for males was 98.2% and for females was 90.2%. The questionnaires questions were fully completed by 1000 students on which the analysis was conducted. Males represented 70.4% of the sample (n=704) while females represented 29.6% (n = 296). The mean age was 15.77 (±1.75) years, for both males and females.

3.1. Gender and Back Pain

Nineteen percent reported having LBP (n = 192) and, of this number, 42.7% were females and 57.3% were males. The prevalence among females was 27.7% and among males 15.6%. It demonstrated that the prevalence of back pain among female students was much higher than that for males. The result of the Chi-square test demonstrated that there was a significant association between gender and back pain ($p = 0.000$).

3.2. Age and Back Pain

Among those with BP the prevalence was highest at age 17 years, for both males and females (Figure 1). The result of Chi-square demonstrated that there was a significant association between age and back pain ($p = 0.000$).

3.3. Physical Factors and Back Pain

Table 1 presents the risk factors associated with BP. As regards risk factors for back pain in the whole population, no significant associations were found between back pain and way of bag school carrying, smoking, and sports activities at school, whereas there were significant associations for the age, gender, satisfaction with school furniture, watch television, and physical activity outside school in females.

Of those adolescent reporting current back pain, cervicalgia, dorsalgia, low back pain (LBP) and sciatica were observed in 8.3% (n=16), 21.9% (n=42), 67.7% (n=130) and 60.4% (n=116) of the cases, respectively. In our results, we will concentrate on the lumbar region, as most back problems in adolescents occur in this area. The LBP punctual prevalence (LBP occurring in the week preceding the inquiry) was detected in 33.3% (n=64). Among those with back pain, Medical care requirements (medical consultation and physiotherapy) were observed in 32.3% (n=62) of the cases and school and sports absenteeism, which evaluated LBP functional consequences, was seen in 53.1% (n=102) and 55.2% (n=106) of the cases, respectively. Factors associated with LBP were still significant after taking into consideration possible covariates (age, gender, satisfaction with school furniture, watch television, and physical activity outside school in females) tested by multiple logistic regression (Table 2).

4. DISCUSSION

This population based cross-sectional study examining the occurrence and characteristics of back pain in adolescent in one part of Kingdom Saudi Arabia. It is only possible to show an association with several risk factors for back pain (BP), but not to demonstrate causality. The main aim of this study was to investigate the incidence of BP in a group of secondary school children. Our result support the evidence that nonspecific BP is relatively common in adolescence (19.2% of our sample) and is consistent with most previously reported prevalence rates for BP.

The incidence found in this study was lower than that of Balagué *et al.* (1988); Olsen *et al.* (1992). Balagué *et al.* (1988) reported an incidence of 27% among Swiss teenagers, Olsen *et al.* (1992) found an incidence of 30%, Watson *et al.* (2002) reported prevalence 23.9% and Shehab and Al-Jarallah (2005) reported an incidence of 57.8% Kuwaiti children and adolescents. However, a lower incidence of 17.6% was recorded by Fairbank *et al.* (1984).

The differences may be attributed to differences in methodology, population sample and size. The incidence variety may also be due to the definitions of LBP used, and the variability in the perception and effects of pain. It is difficult to standardize the definition of LBP due to the many factors involved and the variability in the perception and effects of pain. Therefore, a broad definition of LBP will consider subjects with minor symptoms and leading to the increased incidence.

4.1. Gender and Back Pain

The findings of current study indicated that higher incidence of back pain among females compared to males that is in close agreement with the results of Grimmer and Williams (2000); Kovacs *et al.* (2003); Shehab and Al-Jarallah (2005); Masiero *et al.* (2008); Dianat *et al.* (2013).

This may be attributed to pubertal growth, as girls enter their growth phase before boys, which affect perception of pain. Also, the greater spinal flexibility in females compared to males, and the potential pain associated with the menstrual cycle, which might be confused with low back pain or exacerbate already existing pain (Kovacs *et al.*, 2003; Shehab and Al-Jarallah, 2005; Masiero *et al.*, 2008). This finding may reflect association between rapidly growing musculoskeletal structures and low back pain (Grimmer and Williams, 2000), with considering female gender a risk factor to LBP.

4.2. Age and Back Pain

Among those with BP the prevalence was highest at age 17 years, for both males and females (Figure 1). The result of Chi-square demonstrated that there was a significant association between age and back pain ($p = 0.000$). Agreement is observed in the literature with the reporting of BP increasing relative to age (Grimmer and Williams, 2000; Wedderkopp *et al.*, 2001; Watson *et al.*, 2002; Shehab and Al-Jarallah, 2005). Possibly due to exposure to high physical and environmental insults in old children with increasing stress and constrains on the back (Troussier *et al.*, 1994; Shehab and Al-Jarallah, 2005). Therefore, increasing age is strongly associated with increasing risk of LBP.

4.3. Physical Factors and Back Pain

Regarding physical and sports activities, there was no relationship between physical activity at school and BP, however, physical activity outside school was significantly associated with BP in females. These finding may be due to low frequency of physical and sport activities at school for males and absent of them for females. In accordance with other authors, Salminen's first study (Salminen, 1984) as well as in Brattberg (1994) the level of physical and sports activities were not associated with low back pain. However, the same author found a correlation between a low frequency of physical activity (≤ 2 days/week) and permanent or recurrent low back pain in a cross-sectional case-control study among 38 adolescents aged 15 years (Salminen *et al.*, 1993). The practice of sports two or more times per week was moderately, although significantly, associated with LBP (Kovacs *et al.*, 2003).

In accordance with other authors, (Balagué *et al.*, 1988; Balagué *et al.*, 1994; Troussier *et al.*, 1994), our study found that there was a significant correlation between time spent watching television and back pain. This proves that children and adolescents who spend more time watching TV and who are less active report more back pain especially females. The pain may be secondary to prolonged sitting, poor posture, and less activity, or perhaps the back pain may cause them to be less active. Also, this may be due to social factors in Arab countries where female adolescent spending more time watching television in their spare time with faulty posture and less participation in sports (Shehab and Al-Jarallah, 2005).

Our finding demonstrated no significant association between back pain and way of bag school carrying; this may be because the students traveled to and from school by car. Therefore, carrying the school bag in an asymmetric manner does not have play a role. This finding is in close agreement with the results of Shehab and Al-Jarallah (2005) who reported that no significant

association was found between back pain and the method of carrying school materials. The findings of the present study are in contrast with those of Negrini and Carabalona (2002); Skoffer (2007). Negrini and Carabalona (2002) found significant association between back pain and fatigue during, and time spent backpack carrying. Skoffer (2007) reported that LBP occurrence was positively associated with carrying the school bag on one shoulder. Finally, there is some evidence to suggest an association between LBP and smoking (Deyo and Bass, 1989; Troussier *et al.*, 1994), but we found no correlations in this study.

The findings of the present study are in contrast with those of (Watson *et al.*, 2002; Skoffer, 2007), who found no relationship between non-specific LBP and sitting at school, the types or dimensions of the school furniture or body dimensions. Our study, in line with Ramadan (2011), revealed too low or too high chair and table heights of Saudi school furniture relative to the students' body dimensions increased the stresses acting at L5/S1 as well as discomfort ratings. Our findings suggested increase in stress on the back with uncomfortable school furniture. Symptoms associated with stress to the structures of the back during sitting depend on the design features of the desk and chair which indicate mismatch between the dimensions of school furniture (chair/desk) and the anthropometric characteristics of school students. The design of many schools furniture was made to be durable rather than ergonomically sound.

A higher proportion of adolescent with BP reporting LBP, causing absenteeism (53.1%) from school and need medical care (32.3%). Shehab and Al-Jarallah (2005) who found that a few of students absent from school and need medical/instrumental assessment for their problem recorded a lower proportion.

5. CONCLUSION

This study demonstrate that non-specific back pain does occur in adolescence and that it has an effect on their lives. It has shown an association of non-specific back pain with increasing age, female gender, time spent watching television, sports activity outside schools, and unsatisfaction with school furniture. Because of the nature of the design of the study (cross-sectional), no specific cause, effect, or inferences can be drawn. A prospective population-based longitudinal study is recommended to ascertain the cause-effect of these risk factors with BP and to recommend preventative strategies to decrease its incidence. We can conclude that, there is a need to tackle the problem earlier by introduce the back care advice into the primary and secondary school curricula, and greater attention needs to be given to ergonomic improvements of chair and desk design in the classroom to prevent the initial episode of LBP or at least delay it.

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Figure-1. Percentage of males and females reporting back pain per year level (n = 1000).

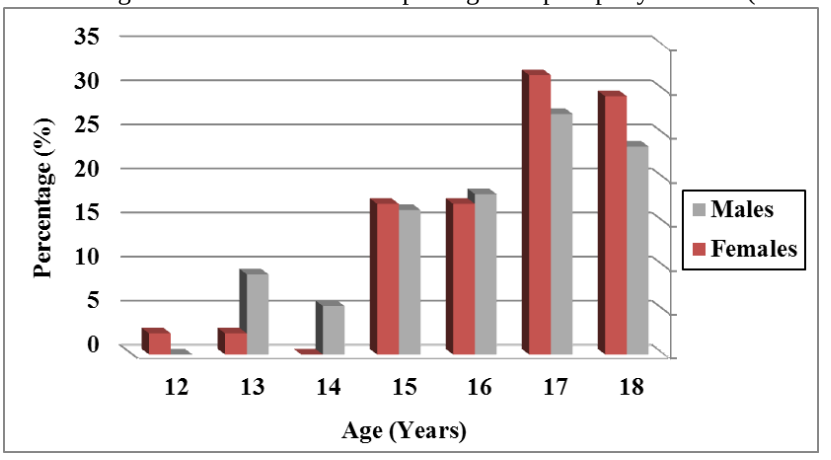

Table-1. Risk factors in adolescent with and without back pain

Variable	**Males**		**Chi-square test**	**Females**		**Chi-square test**
	With back pain (n = 110)	Without back pain (n = 594)	P value	With back pain (n = 82)	Without back pain (n = 214)	P value
Carrying school bag, n (%)			NS			NS
With hand	82 (74.5)	424 (71.4)		20 (24.4)	66 (30.8)	
On the shoulders	28 (25.5)	170 (28.6)		62 (75.6)	148 (69.2)	
Satisfaction and comfort with the school chair, n (%)			0.014			0.000
Yes	26 (23.6)	212 (35.7)		14 (17.1)	90 (42.1)	
No	84 (76.4)	382 (64.3)		68 (82.9)	124 (57.9)	
Cigarettes Smokers			NS			a
Yes	20 (18.2)	120 (20.2)		0 (0)	0 (0)	
No	90 (81.8)	474 (79.8)		82 (100)	214 (100)	
TV watching			0.002			0.000
Never	44 (40.0)	206 (34.7)		10 (12.2)	62 (29.0)	
Less than 2 h/day	20 (18.2)	206 (34.7)		30 (36.6)	124 (57.9)	
More than 2 h/day	46 (41.8)	182 (30.6)		42 (51.2)	28 (13.1)	
Sports activities at school, n (%)			NS			b
Yes	110 (100)	590 (99.3)		0 (0)	0 (0)	
No	0 (0)	4 (0.7)		82 (100)	214 (100)	
Sports activities out of school, n (%)			NS			0.000

Yes	74 (67.3)	422 (71.0)	64 (78.0)	104 (48.6)
No	36 (32.7)	172 (29.0)	18 (22.0)	110 (51.4)

a, b = No statistics are computed because variable is a constant.

NS = Not significant, p > 0.05.

Table-2. Significant (P < 0.05) Low back pain Risk Estimates (Odds Ratio, OR, with 95% Confidence Limits) of Low Back Pain (LBP)

Risk factors	**P**	**OR**	**95% CI**
Sex	.000	0.386	0.386-0.270
Age	.000	1.324	1.324-1.188
Satisfaction with school furniture	.000	0.431	0.431-0.291
Watch television	.018	1.634	1.634-1.088
Physical activity outside school in females	.005	1.705	1.705-1.176

CI = confidence interval; OR = odds ratio.