

Full Length Research Paper

Low back pain among undergraduate students at Taif University - Saudi Arabia

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Low back pain is the most common orthopedic health problem affecting population globally including Saudi Arabia. The aim of this study was to determine the prevalence and risk factors of low back pain among university students. A cross sectional approach was conducted and 1000 male students were selected by multistage random sampling technique. A self administered structured questionnaire including socio-demographic data and questions on the risk factors was used to collect data. Out of 1000 male students selected, 872 (87.2%) responded. The overall prevalence of low back pain among students was 30%. However, significant associations were found between low back pain and older students, being medical student, higher academic grades, being married and large family size. Moreover, physically inactive, being smoker, consumption of more coffee, tea or soft drink, sitting on uncomfortable furniture, history of psychological problem, positive family history of musculoskeletal disorders, overweight and obesity were significantly associated with low back pain. In conclusion, high prevalence of low back pain was recorded among University students. Greater attention should be directed towards ergonomic improvement of chair and desk. In addition, health education program on low back pain is highly recommended to the students and their families.

Key words: Prevalence, low back pain, orthopedic, students, university, Saudi Arabia.

INTRODUCTION

Low back pain (LBP) is a social, economic and most common orthopedic health problem that affects population of all ages globally. It is one of the most common problems in adolescents and known to affect both older and younger adults (Kelsey and White, 1980; Coyte et al., 1998; Brennan et al., 2007).

According to some estimates approximately 60-80% of the general population will suffer from Low back pain at some point in their lifetime and 20-30% are suffering from

Low back pain at any given time (Cassidi and Wedge, 1988).

Low back pain is very common that almost half of the adult population suffered from low back pain which last for more than 24 hours at times during the year (Tessa, 2010).

Low back pain is a leading cause of medical consultation and interferes with the quality of life and work performance (Ehrlich, 2003).

It had been observed that individuals who suffered from low back pain problems might develop major physical, social and mental disruptions, which could affect their occupations (Tavafian et al., 2007). Physical impact includes the loss of physical function and deteriorated

general health, social impact includes decreased participation in social activities, while psychosocial impacts are manifested through insomnia, irritability, anxiety and depression (Clairborne et al., 2002).

Also, low back pain has a major economic impact on the healthcare system in many countries. In the United States, total costs related to this condition reportedly exceed \$100 billion per year (Crow and Willis, 2009).

Some studies demonstrate that initial onset of low back pain commonly occurs around the age of 30 and peaks in occurrence between the ages of 45 and 60 years (Bratton, 1999; Ehrlich, 2003). Low back pain is no longer the disease of the old, but, 39.8% of the adolescent population is also found to suffer from low back pain (Pellise et al., 2009).

Other studies have reported that approximately 12-80% of younger population mainly students experience low back pain (Burton et al., 1996; Jones and Macfarlane, 2005; Korovesis et al., 2010; Pellisé et al., 2009; Smith and Leggat, 2007).

Many studies identified risk factors affecting low back pain such as anthropometric data, physiological structure, psychosocial factors, general health status, genetic factors, age, gender, smoking, the duration of working with a computer, lumbar support usage, school furniture, sitting position, posture, physical activity, and socio-economic situations and history of prior low back pain experience (Punnett et al., 2005; Hestbaek et al., 2008; Smith and Leggat, 2007).

To our knowledge's, no much is known about the prevalence and determinants of low back pain among young adults especially undergraduate university students in Saudi Arabia. Identification and better understanding of the prevalence and risk factors of low back pain among university students are the essential steps to plan and implement prevention program for decreasing the prevalence of low back pain among university students and their community. Therefore, this study was conducted to determine the prevalence and risk factors of low back pain among undergraduate University students

MATERIALS AND METHODS

A cross sectional survey on low back pain was conducted on 1000 male students attending Taif University between September 2015 to April 2016. Taif University is a large sized and a public University located in Taif city in the Western region of Saudi Arabia and consists of thirteen colleges. Females were not being included in the study because they are not easily allowed to male investigators to access female students according to Saudi community traditions.

A multistage random sampling technique was used to recruit the participants of the study. At the first stage of selection, five colleges were selected by simple random sampling (Medicine, Pharmacy, Engineering, Science and Business

Administration). At the second stage of selection, one grade was randomly selected from first, second, third and fourth years in each college. At the third stage, all students in each selected grade were included in the study. Pilot study was done before beginning the work in order to test the questionnaire, detect any difficulties, and also to give an idea about the prevalence of the low back pain among University students. The selected grades were visited by research team to clarify the purposes of the study. A schedule for the next visit was given to the questionnaire. A total of 872 male students returned the questionnaire while 128 students were not responding. Thus, the response rate of respondents was 87.2% (872/1000). Statistical analysis was carried out on responses from 872 participants.

Data Collections and Tools

Low back pain in the current study was defined as pain and/or discomfort localized below the costal margin and above the inferior gluteal folds on the back of the trunk, with or without referred leg pain during the last 12 weeks (Airaksinen et al., 2006).

Exclusion criteria: participant was excluded if he had trauma to lumber area or vertebral fracture.

All students included in the study were interviewed personally and asked to:

1- Fill the self-administered structured questionnaire after initial training in the presence of research team. The self-administered structured questionnaire was developed, pretested, and validated in a pilot study. The questionnaire included the following sections:

Section A: included questions on socio-demographic data such as: age, residence, colleges, academic grades, marital status, number of family members and family monthly income in Saudi Riyal.

Section B: included questions on the risk factors such as smoking habits (was categorized as smoker and non smoker), physical exercise, caffeine consumption, psychological problems (as depression, anxiety,), studying period sitting straight (television, computer, lab top, seminar,), studying period bending at a table (reading, writing, ...), sitting on uncomfortable furniture, using lumber support while sitting, hours of study per day and family history of musculoskeletal disorders.

2- Anthropometric measurements: Each studied student was subjected to:

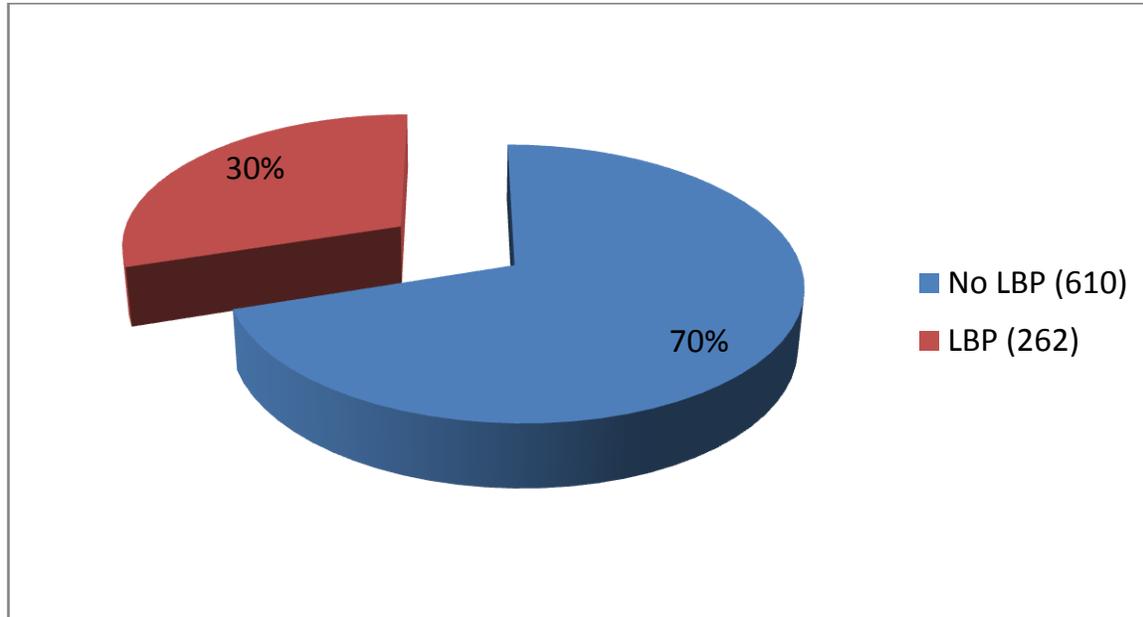
- Height: was being measured to the nearest 0.5 cm without shoes.

- Weight: was being measured to the nearest 0.1Kg without shoes and with light clothes.

- Body mass index (Kg\ m²): was being calculated as weight in kilogram (Kg) divided by the square of the height (m²) and classified based on (WHO, 1998).

Ethical Consideration

Official approvals were obtained from the ethics committee of scientific research of Taif University.

Figure 1. Prevalence of low back pain among the studied sample.

Approval by the deanship of student affairs was taken before starting the work. Also, approval by the deanship of each college included in the study was taken before starting the work. During the research activities, each studied student was informed about the study objectives stressing on confidentiality of collected data and getting a verbal consent of the subject to share in the study.

Statistical Analysis

Data entry and statistical analysis were performed using Statistical Package for the Social Science (SPSS) program for windows version 16. Frequency and range checks were performed. Descriptive statistics such as means, standard deviation were used for the quantitative variables. Percentage was used to determine the prevalence rates of low back pain among University students. Proportion and percentage were used for category variables. Chi square test examined the relationship between low back pain and risk factors and to obtain the crude odds ratio and 95% CI. Logistic regression analysis was conducted for the variables with more than two categories. The p -values < 0.05 was considered for statistical significance.

RESULTS

A total study sample was 1000 students, 872 (87.2%) responded and all of them were males. The age of study samples ranged between 19 – 25 years old. The mean age of study sample was 20.9 ± 1.3 years old. The results of the studied sample revealed that 262 (30%) of University students suffered from low back pain, as shown in Figure (1). Low back pain was significantly

associated with the age of students where the probability of low back pain increased with older age compared to younger age students (OR = 1.62, 95% C.I (1.19- 2.20) Table (1).

Also, low back pain was higher among married students compared to single one (OR = 2.32, 95% C.I (1.23-4.35) Table (1).

Moreover, the risk of low back pain was higher among those who had large family members compared to those with small family members (OR = 1.82, 95% C.I (1.23-2.68) Table (1).

Furthermore, low back pain was higher among students with no physical exercise (OR= 1.638, 95% C.I (1.152-2.328) or who practice exercise < 3 times/week (OR = 1.653, 95% C.I (1.085- 2.519) Table (1).

In addition, low back pain was highly significantly associated with smokers compared to non smoker (OR = 2.18, 95% C.I (1.62 - 2.93) Table (1).

Type of college was found to be significant ($p=0.00$). The prevalence of low back pain was found to be higher among medical and business administration students (35% and 37%, respectively) as shown in Figure (2). Regarding academic grades, low back pain was found to be higher among third and fourth grades students (31.1% and 37.2%, respectively) Figure (3). As shown in Table (2), a significant association was found between drinking coffee, tea or soft drink and low back pain where the probability of low back pain increased with drinking of 2 or more times/day coffee, tea (OR = 1.961, 95% C.I (1.463- 2.629), or soft drink (OR = 3.506, 95% C.I (2.557-4.809) compared with the others.

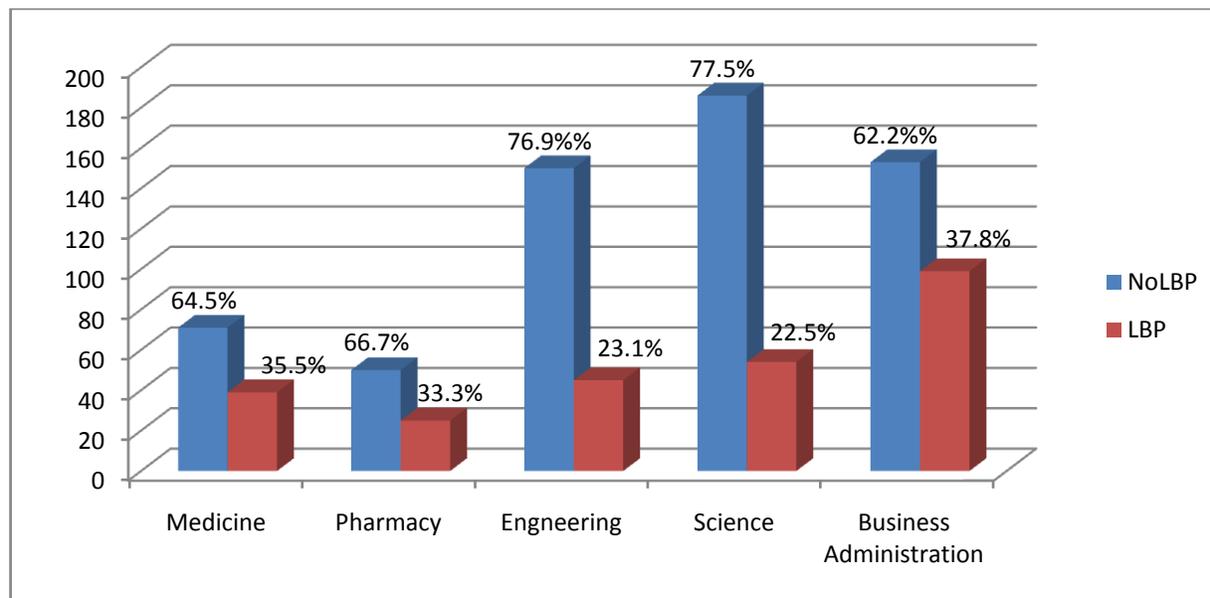
Moreover, low back pain was significantly associated with sitting on uncomfortable furniture (OR = 1.32, 95% C.I (0.98-1.77) Table (2).

Table 1. Association of socio-demographic factors and low back pain among the studied sample.

Variables	Low back pain				OR (95% CI)	P - Value
	No (610)		Yes (262)			
	No.	%	No.	%		
Age:						
19 - <22 Y	440	72.1	161	61.5	1.62 (1.19-2.20)	0.02*
22 - <25 Y	170	27.9	101	38.5		
Residence:						
Urban	518	84.9	219	83.6	1.11 (0.75-1.64)	0.62
Rural	92	15.1	43	16.4		
Marital status:						
Single	589	96.6	242	92.4	2.32 (1.23-4.35)	0.01*
Married	21	3.4	20	7.6		
No. of family members:						
4 or less	147	24.1	39	14.9	1.82 (1.23-2.68)	0.02*
5 or more	463	75.9	223	85.1		
Family monthly income:						
Low : <5000 SR	125	20.5	62	23.7	1.236 (0.818-1.869)	0.463
Middle: 5000 - <10000 SR	313	51.3	131	50.0	1.043 (0.738-1.474)	0.971
High: ≥10000 SR	172	28.2	69	11.3	1**	
Physical exercise:						
No	287	47.0	141	53.8	1.638 (1.152-2.328)	0.01
Yes, <3 times/week	123	20.2	61	23.3	1.653 (1.085-2.519)	0.02
Yes, ≥ 3 times/week	200	32.8	60	22.9	1**	
Smoking:						
No	424	69.5	134	51.1	2.18 (1.62-2.93)	0.00*
Yes	186	30.5	128	48.9		

* Significant Association ** Reference of Linear Trend OR= Odds Ratio CI= Confidence Interval SR= Saudi Riyal.

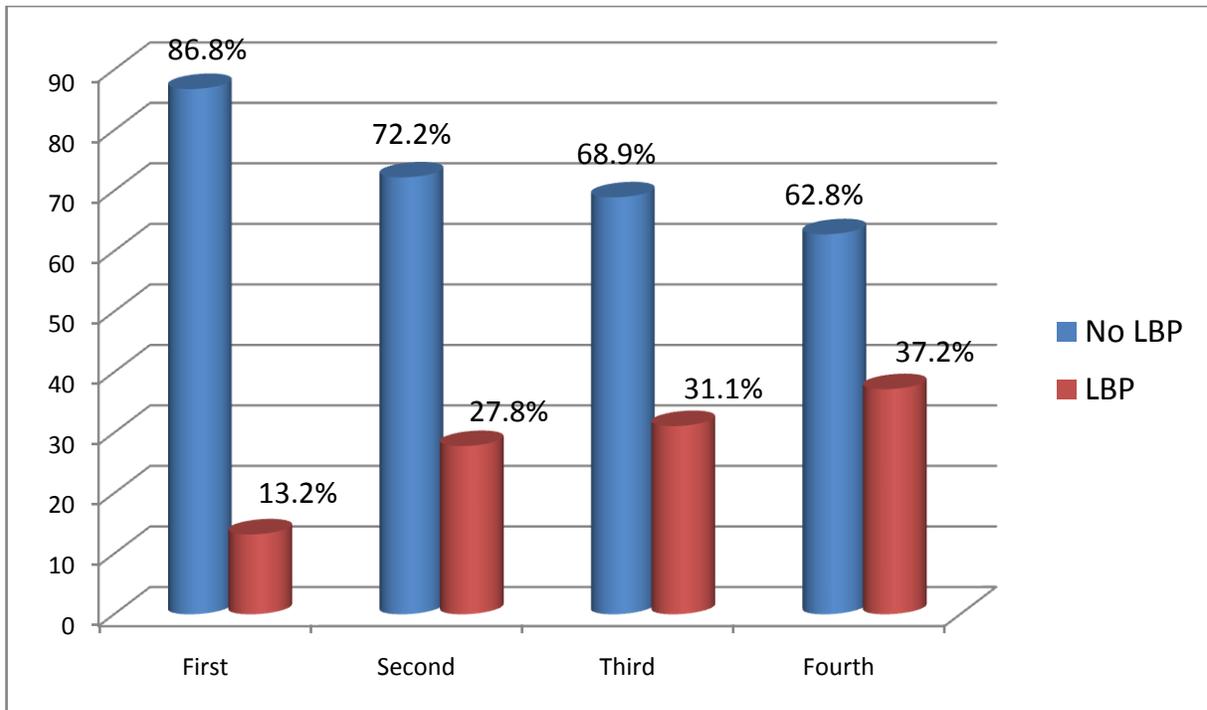
Figure 2. Relationship between type of college and low back pain among the studied sample.



P-value = 0.000

In addition, low back pain was highly significantly associated with students who had a positive history of psychological problem (OR = 9.24, 95% C.I (4.64- 18.39)

or positive family history of musculoskeletal disorders (OR = 2.95, 95% C.I (2.13- 4.07) Table (2). Finally, there was significant association between low back

Figure 3. Relationship between academic grades and low back pain among the studied sample.

P-value = 0.000

pain and overweight (OR= 2.436, 95% C.I (0.995- 5.965) or being obese (OR = 4.727, 95% C.I (1.828-2.225) compared to others, as shown in (Table 2).

DISCUSSION

Low back pain (LBP) is a social, economic and most common orthopedic health problem that affects population of all ages globally. It is one of the most common problems in adolescents and known to affect both older and younger adults (Kelsey and White, 1980; Coyte et al., 1998; Brennan et al., 2007). Few studies were done to define risk factors among university students, but more studies are needed to identify and better understand the risk factors related to the increasing levels of low back pain and to develop appropriate prevention strategies.

Our results showed the overall prevalence of low back pain among male university students was 30%. These results were in agreement with other studies where the prevalence of low back pain among these age groups was 27% (Balagué et al., 1988), 30% (Olsen et al., 1992) and 32% (Brennan et al., 2007).

The prevalence in our study was found to be more than that of (Watson et al., 2002) who reported prevalence of 23.9% and (Fairbank et al., 1984) who recorded low back pain prevalence of 17.6%. However, (Shehab and Al-

Jarallah, 2005) reported a prevalence of 57.8% among Kuwaiti adolescents which is more than our prevalence. Also, our findings were lower than findings reported by (Aggarwal et al., 2013; Moroder et al., 2011; Kennedy et al., 2008) which were (48%, 53% and 43%, respectively). The differences might be due to differences in methodology, population sample and size, the definitions of low back pain used, and the variability in the perception and effects of pain.

In the current study, low back pain was more significantly associated with increasing age. This finding corroborates the findings of other researchers reported from several studies in many countries (Grimmer and Williams, 2000; Wedderkopp et al., 2001; Watson et al., 2002; Shehab and Al-Jarallah, 2005; Mohamed and El-Sais, 2013). This possibly due to exposure to high physical and environmental insults in old age students with increasing stress and constrains on the back (Troussier et al., 1994; Shehab and Al-Jarallah, 2005).

The results in the current study showed significant association between academic grades and low back pain among university students as we found low back pain was more among high academic grades. This was in accordance to other studies (Nyland and Grimmer, 2003) who reported that, years of study had a significant association with low back pain. This can be expected as undergraduates with more years in study are generally older in age. Also, the reason for this could be increasing

Table 2. Other factors associated with low back pain among the studied sample.

Variables	Low back pain				OR (95% CI)	P - Value
	No (610)		Yes (262)			
	No.	%	No.	%		
Drinking coffee or tea\day: No or Yes, <2 times\day Yes, ≥ 2 times\day	367 243	60.2 39.8	114 148	43.5 56.5	1.961 (1.463-2.629)	0.00*
Drinking soft drink\day: No or Yes, <2 times\day Yes, ≥ 2 times\day	494 116	81.0 19.0	143 119	54.6 54.4	3.506 (2.557-4.809)	0.00*
Studying period sitting straight\day: < 3 hours\day ≥ 3 hours \day	345 265	56.6 43.4	146 116	55.7 44.3	1.03 (0.77-1.39)	0.82
Studying period bending at a table\day: < 3 hours\day ≥ 3 hours \day	367 243	60.2 39.8	161 101	61.5 38.5	0.95 (0.70-1.28)	0.72
Sitting on uncomfortable furniture: No Yes	400 210	65.6 34.4	155 107	59.2 40.8	1.32 (0.98-1.77)	0.04*
Using lumber support while sitting: No Yes	268 342	43.9 56.1	140 122	53.4 46.6	0.68 (0.51-0.91)	0.01*
Hours of study\day: < 5 hours\day ≥ 5 hours\day	376 234	61.6 38.4	182 80	69.5 30.5	0.71 (0.52-0.96)	0.03*
History of psychological problem: No Yes	599 11	98.2 1.8	224 38	85.5 14.5	9.24 (4.64-18.39)	0.00*
Family history of musculoskeletal disorder: No Yes	500 110	82.0 18.0	159 103	60.7 39.3	2.95 (2.13-4.07)	0.00*
Body mass index: Underweight Normal Overweight Obese	34 400 138 38	5.6 65.6 22.6 6.2	9 138 65 50	3.4 52.7 24.8 19.1	1** 1.751 (0.741-4.135) 2.436 (0.995-5.965) 4.727 (1.828-2.225)	0.20 0.05 0.00*

* Significant Association ** Reference of Linear Trend OR= Odds Ratio CI = Confidence Interval.

level of work, stress, anxiety, dissatisfactions and book bag load with each year.

In addition, we found a significant association between low back pain and type of college, where the probability of low back pain was more among medical and business administration students. This finding was in contrast with (Moreder et al., 2011) who determined no difference in low back pain of medicine and other colleges, but was consistent with (Falavigna et al., 2011) and other studies who previously reported that students of medical departments are at higher risk of low back pain than students of other departments. This might be explained by the long periods of studying hours and more sedentary life among medical students.

The present study showed significant increased odds of low back pain among married participants compared with

unmarried. This was consistent with other studies (Knox et al., 2009).

It is possible that low back pain is more likely to be reported by students with large family members. According to the literature, people with large family members have an increased prevalence of low back pain (Webb et al., 2003; Croft and Rigby, 1994; Deyo and Tsui-Wu, 1987). These findings were also found among our participants. Small family members and high family monthly income may provide resources that influences on the lack of low back pain.

In addition, there was a significant association between low back pain and physically inactive or less active students. These results were consistent with (Jones and Macfarlane, 2005) who reported that a moderate level of physical activity was associated with general conditioning

effect that may reduce the risk of low back pain. In contrast, low back pain and physical fitness association in young adults were reported as not significant in a few previous studies (Anderson et al., 2006; Nyland and Grimmer, 2003). This difference might be as a result of using self-reported physical fitness in the present study which is totally dependent on ones' perception, which can lead to over or under-reporting of an event.

Moreover, smoking appeared as a factor that increases low back pain in university students as low back pain was significantly associated with smoking. This result is similar to the results of other studies which reported a relationship between daily smoking amount and chronic low back pain of young adults (Alkheray and Agbi, 2009). Also, (Wang et al., 2011) reported a relationship between smoking and musculo-skeletal pain. Some researchers explained the relation between smoking and low back pain as follow: it is known that bone mineral density is reduced by smoking, and osteoporosis may develop following this reduction, enabling micro-fractures to form in the vertebrae. Some researchers have suggested that this may cause degenerative changes in the vertebral column. Another suggestion is that coughing, that causes an increase in the intradiscal and intra-abdominal pressure, is increased by smoking. This pressure increase may cause disc herniation in some cases (Kelsey and White, 1980).

Coffee, tea and soft drink contain caffeine. (McPartland and Mitchell, 1997) reported high consumption of caffeine by patients with low back pain and discussed the importance of reducing coffee intake among patients with chronic low back pain, as caffeine increases urinary calcium and could have a detrimental effect on bones on long term. The results of the present study are in agreement with these results.

The findings of our study were consistent with those of (Watson et al., 2002; Skoffer, 2007; Nyland and Grimmer, 2003) in relation to time sitting at college who found no relationship between low back pain and sitting at school, but in contrast with (Nyland and Grimmer, 2003) who found an association between length of time in the program of the study and prolonged sitting and low back pain.

Our findings were in contrast with (Watson et al., 2002; Skoffer, 2007) in relation to the types or dimensions of the school furniture or body dimensions as we found in our study there was a significant association between low back pain and sitting on uncomfortable furniture. Also, our results were consistent with (Ramadan, 2011) who 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 much university furniture was made to be durable rather than ergonomically sound.

Furthermore, our results showed the history of psychological problem was found to be highly significantly associated in those students suffering of low back pain. The present data was in agreement with (Hoogendoorn et al., 2000; Linton, 2001) who reported the important role of stress and depression as risk factors of low back pain and psychological stress can influence the development and severity of multiple disorders including low back pain.

In addition, the family history of musculoskeletal disorders was found to be significantly associated in those suffering of low back pain. This finding is consistent with research done by (Shuster and Kim, 2010; Aggarwal et al., 2013).

Finally in our study, there was a significant positive association between body mass index especially obese and overweight and low back pain. This finding corroborates (Urquhart et al., 2011) who showed a significant positive association was found between body mass index, pain and disability in an adult population with low back pain findings in a recent study that included participants who were categorized as obese. However, a positive weak significant association was reported by (Leboeuf-Yde, 2000). This finding was in contrast with the findings of other studies (Chung et al., 2005; Grimmer and Williams, 2000; Levangie, 1999) who reported no significant association was shown between body mass index and low back pain.

The limitations of this study were: data collection was by self administered questionnaire and this may be subject to recall bias or missing data. The sample of students was taken from one university which may not be representative of all university students in Saudi Arabia. Study sample involved male students only, so the result cannot be generalized to all students or people in the same age.

In conclusion, prevalence of low back pain among University students was 30% which is quite high. The most important risk factors which were found to be significantly associated with low back pain were increasing age, being medical student, high academic grades, being married, large family size, being physically inactive and smokers. In addition, consumption of more coffee, tea and soft drink, sitting on uncomfortable furniture, history of psychological problem, family history of musculoskeletal disorders, overweight and obesity were significantly associated with low back pain.

In the light of our results, we recommend that more studies are needed among large sample representing all University students males and females in Saudi Arabia for more investigations. Students should be encouraged to adapt and maintain physical activities which should be integrated into daily routine when possible to maintain

healthy life style behaviors and normal body weight. Furthermore, great attention needs to be given to ergonomic improvement of chair and desk to prevent or at least to delay the occurrence of low back pain. In addition, health education program should be done for university students and to their families which increase their awareness about a healthy lifestyle, risk factors and low back pain health problems. Thus, increasing awareness is the essential step for planning and future modifications of public health interventions for decreasing the prevalence of low back pain among university students and their community.

Conflicts of interest: None to declare.

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