THE PREVALENCE OF CHRONIC BACK PAIN AMONG HASHEMITE UNIVERSITY STUDENTS

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ABSTRACT

Objectives: Many healthcare workers are noticing an increase in chronic low back pain complaints (CLBP) among university students. However, no study has investigated the problem among university students in Jordan. Therefore, this study was conducted to determine the prevalence and related risk factors of chronic low back pain (CLBP) among university students at Hashemite University at Al-Zarqa city, Jordan, from February 2020 to March 2020.

Methods: A cross-sectional study was conducted, and data were collected randomly from Hashemite University students at any level and faculty. Nine hundred and sixty-seven students filled an online self-administered questionnaire in Arabic.

Results: The sample age ranged from 17 to 33 years with a mean of 19.93 (standard deviation = 1.8), and 71.4% were females. Overall, the prevalence of chronic low back pain among participants was 43.7%. Older age, more years spent in university, employed students, family's monthly income 500-1000 JODs, hours spent sleeping, studying, and public transportation are significantly associated with chronic low back pain.

Conclusion: This study highlights the risk factors contributing to developing low back pain for a critical age group. Decision-makers at the university can use the data to reduce the burden of low back pain among students.

Keywords: Chronic low back pain (CLBP), risk factors, university students, Jordan.

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INTRODUCTION

Neck and back pain is a common problem in the population. The lifetime prevalence of non-specific (common) low back pain is estimated at 60% to 70% in industrialised countries (one-year prevalence 15% to 45%, adult incidence 5% per year).

The rate for children and adolescents is lower than in adults, but it is rising [1, 2]. University students of all colleges and different socioeconomic statuses suffer from back or neck pain, which may be caused by the time spent sitting in class, studying on computers and using mobile phones for socialising and reading.

Additionally, another factor that may play a significant role is travelling to and from university. The Hashemite University is located 12 kilometres from the nearest town where the female dorms are located, and 35 kilometres from the main bus station in Amman, where most of the students reside. Thus, the majority of students use public transport or their car to reach the university.

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This study examines the prevalence and possible risk factors of non-specific chronic low back pain, which is defined as the presence of pain for more than 12 weeks, among students of different colleges from February 2020 to March 2020; before the COVID-19 lockdown. Furthermore, determining the risk factors that may be addressed to minimise the pain and its sequela.

METHODS

A cross-sectional study was conducted among different colleges in Hashemite University from February 2020 to March 2020, and approval was obtained from the Ethics Committee. Information on the identity of the students were not collected, and they were informed that refusing to participate would not affect their academic status.

This study used an online self-administration questionnaire in Arabic on Google forms. Sixth-year medical students from Hashemite University prepared the questionnaire (attached), to be distributed among other students. It included questions on: age, gender, years spent in university, faculty, grade point average, living city, marital status, family's monthly income, family size, order between siblings, family history of back pain, trauma or congenital anomalies to the back (for exclusion), chronic diseases other than chronic low back pain, mobile using time per day, neck posture while using mobile phone, sleep hours per day, sleeping position, number of pillows, mattress level, hours spent studying, neck and back posture during studying,hours per week spent in a car or bus, time spent whilst standing in facilities and labs, posture of rest time, physical exercise time and intensity, extracurricular work and it's recurrent activities, smoking, drinking alcoholic, water, or caffeinated beverages, footwear type, height and weight, the use of painkillers, and the use of A.C/fans.

Data was collected by going to the university and randomly distributing the questionnaire link to students so they could fill it in. Later on, during the COVID-19 lockdown, the link was sent to various official Facebook groups specific for Hashemite University students. The average time taken to fill it in was 8 minutes.

Data were entered and analysed using Microsoft Excel. Descriptive analysis was performed to obtain frequencies, means, medians and standard deviation. The chi-square test and t-test were conducted to get the crude odds ratio and 95% confidence interval with the significance level being ($P < .05$).

Body Mass Index (BMI) was calculated from the collected height and weight.

RESULTS

In this study, 967 participants filled in the questionnaire. Seventy-four were excluded due to having experienced previous trauma to the back or a congenital anomaly.

Therefore, the analysis was conducted on 893 (100%) participants. Six hundred thirty eight (71.4%) were females, and 255 (28.6%) were males. The mean age of participants was 19.93, the youngest being 17 years old and the oldest was 33 years old, with a standard deviation of 1.8. Regarding females, the mean age was 19.92 and ranged from 17-33 years, with a standard deviation of 1.8. Regarding males, the mean age was 19.94 ranging between 17-27 years, with a standard deviation of 1.8.

The mean weight was 64.3 kg (38-152 kgs), and the mean height was 165.7 cm (100-200 cm). Of the participants, 464 (52%) were from Amman, and 319 (35.7%) were from Zarqa. Most were from families with a monthly income of 500-1000 JODs; 396 (44.3%) and 303 (33.9%) from families with a monthly income of less than 500 JODs. Faculty of economics had the most participants with 160 (17.9%).

Faculty of medicine and faculty of engineering coming next with 117 (13.1%) and 106 (11.9%), respectively. Moreover, 340 (38%) had a very good GPA, 284 (31.8%) good, 156 (17.5%) excellent and 113 (12.7%) had a poor GPA. 359 (40.2%) had been in the university for 1 year, 207 (23.2%) had been for 2 years, 189 (21.1%) for 3 years, 96 (10.8%) for 4 years and 42 (4.7%) had been for five or more years.

Of the students, 111 (12.4%) stated that they smoked regular cigarettes and 193 (21.6%) stated that they smoked hookah. 222 (24.9%) students exercise regularly with high-intensity workouts (weights, swimming, football and volleyball) being the most common; 93 (41.9%).

Three hundred fifty-five (39.8%) students had worked outside university hours. All participants used public transport or a personal car to reach university. Six hundred and seventy-two (75.3%) stated that they spent a maximum of 5 hours weekly driving or on a bus. Five hundred seventy-seven (64.6%) students said that they slept on one side of their body, while 646 (72.3%) used a pillow, and 436 (48.8%) spent 7-9 hours sleeping. However, 188 (48.2%) of those who had back pain had 4-6 hours sleep. The average number of hours spent studying was 3.2 daily. Three hundred fifty (39.2%) used their mobile phone

Table 1: Analysis of numerical independent variables (risk factors) of chronic low back pain using t-test (N=893)

	Average			Df	t-value	*P-value*
	+CLBP		-CLBP			
Years in university	2.33		2.11	852	-2.469860905	.007*
BMI	23.376		23.368	876	-0.024236395	0.49
No. of family members	6.684		6.677	864	-0.05287377	0.48
No. of pillows	1.23		1.26	864	0.792512307	0.21
Sleep	6.63		6.93	794	2.66343559	.004*
Study	3.56		3.24	825	-1.903655583	.029*
Sun exposure hours	3.46		3.44	841	-0.1902	0.42

*Significant P-value
Df: degree of freedom
+CLBP: chronic back pain present. –CLBP: chronic back pain absent.

Table 2: Analysis of categorical independent variables (risk factors) of chronic low back pain using Chi-square (N=893)

		-CLBP		+CLBP		Df	X2-value	Odds Ratio	*P-value*
		No.	%	No.	%				
Gender	Males	154	60.4	101	39.6	1	2.397723	1.26261738	0.12
	Females	349	54.7	289	45.3				
GPA	Excellent	83	53.2	73	46.8	1	0.764715	1.16529208	0.38
	than excellen	420	56.99	317	43.01				
City	Zarqa	198	62.1	121	37.9	1	6.6515429	0.69289549	.034*
	Other cities	305	53.1	269	46.9				
Marital status	Married	11	52.4	10	47.6	1	0.1361277	1.17703349	0.71
	Single	492	56.4	380	43.6				
Family income	500-1000	205	51.8	191	48.2	1	6.01261	1.39522	.014*
	<500, or >1000	298	60	199	40				
Order between siblings	1st or 2nd	263	59.9	176	40.1	1	4.503565	0.75050638	.034*
	3rd or after	240	52.9	214	47.1				
Family history of CLBP	Positive	75	19.2	315	80.8	1	37.598265	2.59292605	<.001*
	Negative	192	38.2	311	61.8				
Mattress level	On the ground	83	60.1	55	39.9	1	0.9671906	0.83078583	0.32
	Bed/sofa	420	55.6	335	44.4				
Exercise	Yes	136	61.3	86	38.7	1	2.9241436	0.76339977	0.09
	No	367	54.7	304	45.3				
Chronic diseases	Present	31	62	19	38	1	0.692933675	0.779758282	0.4
	Absent	472	56	371	44				
Hours of sports per week	<1h	34	70.8	14	29.2	1	4.3393268	0.51361076	.037*
	>1hr or none	469	55.5	376	44.5				

Type of exercise	Low intensity	73	62.4	44	37.6	1	2.014075	0.7490696	0.16
	other	430	55.4	346	44.6				
Extra-curricular Work	Yes	185	52.1	170	47.9	1	4.254231	1.32825553	.039*
	No	318	59.1	220	40.9				
Type of work	Bending	52	56.7	68	43.3	1	9.514504	1.83158146	.002*
	No bending	451	58.3	322	41.7				
	Lifting	24	50	24	50	1	0.825468	1.30874317	0.36
	No lifting	479	56.7	366	43.3				
	Standing	77	46.7	88	53.3	1	7.678165	1.61210975	.006*
	No standing	426	58.5	302	41.5				
	Sitting	43	53.1	38	46.9	1	0.380270	1.15486258	0.54
	No sitting	460	56.7	352	43.3				
Smoking	Yes	151	54.5	126	45.5	1	0.537358	0.89880952	0.46
	No	352	57.1	264	42.9				
Caffeine	Yes	435	54.8	359	45.2	1	6.914568	1.81030775	.009*
	No	68	68.7	31	31.3				
Mobile use hours	>5 hours	335	56	263	44	1	0.069319	1.03852392	0.79
	<5 hours	168	56.9	127	43.1				
Neck posture while using mobile	Acutely bent	200	52.5	181	47.5	1	3.969894	1.31203349	.046*
	Neutral/slightly bent	303	59.2	209	40.8				
Sleep posture	Prone	125	54.3	105	45.7	1	0.493285	1.11410526	0.48
	Not prone	378	57	285	43				

Study posture	Bent back	394	54.8	325	45.2	1	3.5052689	1.38324873	0.061
	Not bent	109	62.6	65	37.4				
Neck study posture	Acutely bent	280	54.3	236	45.7	1	2.1154665	1.22050093	0.15
	Not bent	223	59.2	154	40.8				
Bus hours	<5	284	62.6	170	37.4	1	14.562008	0.59587068	< .001*
	>5	219	49.9	220	50.1				
Car hours	<5	381	56.7	291	43.3	1	0.1506568	0.94122326	0.7
	>5	122	55.2	99	44.8				
Standing hours	Less than 5	426	59	296	41	1	10.973987	1.75693226	<.001*
	More than 5	77	45	94	55				
Rest time posture	Supported back	324	56.5	249	43.5	1	0.030754	0.97563698	0.86
	Not supported	179	55.9	141	44.1				
	Bent back	428	55.2	347	44.8	1	2.891073	1.41409476	0.09
	Not bent	75	63.6	43	36.4				
	Supine	392	55.9	309	44.1	1	0.219411	1.08021542	0.64
	Not supine	111	57.8	81	42.2				
	Prone	204	57	154	43	1	0.104615	0.9564224	0.75
	Not prone	299	55.9	236	44.1				
	Side lying	374	56.8	285	43.2	1	0.185239	0.93621085	0.67
	Not side lying	129	55.1	105	44.9				

Water intake	<1L	238	57.8	174	42.2	1	0.6447636	0.8969421	0.42
	>1L	265	55.1	216	44.9				
Alcohol	Yes	36	56.25	28	43.75	1	0.000166	1.0033763	0.98
	No	467	56.3	362	43.7				
Footwear	Sneakers	436	55	357	45	1	5.2146194	1.6624270	.022*
	Not sneakers	67	67	33	33				
A.C	Used	418	57.2	313	42.8	1	1.1973208	0.8266016	0.27
	Not used	85	52.5	77	47.5				

*Significant P-value
Df: degree of freedom
+CLBP: chronic back pain present. –CLBP: chronic back pain absent.

DISCUSSION

This cross-sectional study examined the prevalence and factors associated with Chronic Low Back Pain (CLBP) among Hashemite university students of all faculties with an online questionnaire. According to the results of our study, the point prevalence of chronic back pain among Hashemite University students of all faculties was 43.7%. This figure was lower than a similar study in Serbia [3], which showed a 12-month prevalence of 59.5%. Other studies conducted in India, Malaysia and Austria showed close results (47.5%, 46.1%, 53.4%) respectively [4, 5, 6]. On the other hand, studies on physiotherapy in Brazil and Zimbabwe showed a higher prevalence of CLBP (59.9% and 56.7%) [7, 8]. Another study done in Lebanon among office workers found the CLBP prevalence of (44.8%) [9].

According to the study, 71.4% of the responses were female students because the university has more female than male students, and females were more cooperative. Female CLBP prevalence was 45.3%, while male CLBP prevalence was 39.6%. However, there was no significant relationship between gender and back pain (P = .12). A study about bone-muscle density in men and women

showed high levels of estrogen in females that increases the development of bone mass than muscle mass, hence, making women more susceptible to back pain [10]. Studies conducted in Malaysia, China, Turkey, and India had no difference in prevalence between males and females, thus, no significant relation between CLBP and gender [5, 11, 12, 4]. A study in Serbia conducted among medical students also showed higher prevalence among females [3]. On the other hand, a study conducted among university students in Indonesia showed a higher prevalence of CLBP in males (77.8%), while females were (74.0%) [13]. A Jordanian study conducted among nurses revealed higher prevalence of back pain in male nurses (41.7% vs 31.2%) [14].

In this study, marital status was not found to have a relation with CLBP (P = .71) which came comparable to a study of an older age group where no relation was found between marital status and low back pain (P = .37) [15]. However, a study among undergraduate students at Taif University showed that low back pain was higher among married students compared to single ones (P =.01). [16]

No significance relation was found between BMI and CLBP (P = .49), which is comparable with two studies on students [17, 18] and one on university staff. [15]

The family size had no significance relation with CLBP (P = .48). This result was opposed by a research among undergraduate students which showed that the risk of chronic low back pain was higher among those who had large family members (5 or more) when compared to those with small family members (4 or less) (P = .02, OR = 1.82) [16]. Moreover, another study on the psychological comorbidity of chronic low back pain found that average family size was more in cases than controls (P =.032). [19]

It was expected that being the eldest between siblings would require more housework or extra-curricular work to support the family, thus leading to more risk of CLBP. However, the prevalence of CLBP was surprisingly

lower for the first and second born of the family with a significant relation to suggest a lower chance of developing CLBP (P = .034, OR= 0.751).

Since The Hashemite University is located in Al-Zarqa, students commuting from Al-Zarqa showed a lower risk of CLBP (P < .001) compared to students commuting from other cities. This could be explained by the lower prevalence of CLBP in people spending less time using public transport since they are less exposed to cumulative risk (<5 hours weekly vs more than 5 hours, P < .001). Palmer et al. [20] shows that there were significant trends for increased low back pain in those most exposed to whole-body vibration from transportation compared with those least exposed.

Family history plays a significant risk factor for CLBP based on Nupur Aggarwal et al. [4]. In this study, (80.7%) of the participants who had CLBP showed a positive family history of CLBP. A chi-square test showed a significant relation (P < .001). Non-specific low back pain among parents and among their children has been found to be significantly associated in several cross-sectional studies. This association evokes the possible role of genetic, environmental and/or psychosocial factors. [2]

As for the relationship between CLBP and the number of years spent in the university, this study reinforces the idea that spending more years in the university is associated with an increased risk of back pain (P = .007).

This may be due to longer and cumulative exposure to various risk factors with significant association to CLBP during university, such as using transportation and more hours studying (mentioned later). A study conducted among medical students in Saudi Arabia on years spent in the university also showed comparable results (P = .002) [17].

While the students with the highest Grade-Point Average (GPA) had the highest prevalence of CLBP (46.8%), no significant relation was found between the GPA and the CLBP in this study (P =.38). This was in contrast to the results of a study among Kuwaiti children and adolescents [21], which stated that high grade-point average students were found to experience more low-back pain (P = .044). However, the result of our study was close to a study among the Bahraini University students [22], which showed that the relationship between CLBP and grade point average was not significant. A study at Florida University generally stated that the GPA did not differ by rating of overall physical or psychological health [23].

Another correlation was also found between CLBP and long standing hours in university facilities, labs for different faculties, and clinical rotations for medical students (P < .001). A study in Saudi Arabia showed similar results among Al-Taif university students (P = .039) [17].

Long studying hours contributed to a significant increase in CLBP (P = .028), which corresponds to a study contributed on Al Taif university students (P = .039) [16]. However, Grace O et al. found no significance, which contradicted this [24].

Having a job besides university studies had a significant relation with CLBP (P = .039). In detail, jobs that included bending and standing for long periods had significant CLBP association (P = .002 and P = .006, respectively). On the other hand, neither lifting heavy objects at work was associated with CLBP (P= .36) nor sitting for prolonged periods (P= .54). In a systematic review of physical load during work by Wilhelmina E Hoogendoorn et al, it was found that manual materials handling includes lifting, moving, carrying, and holding loads had a statistically significant positive effect in 3 studies and no effect in 1 study. A strong evidence for a positive effect for bending and twisting was also found. However, that same systematic review showed no evidence for an effect of prolonged standing, walking, or prolonged sitting [25]. This difference in results could be due to the difference in impact level of these work exposures on the different-age studied population.

Family monthly income ranging from 500-1000 JODs was associated with CLBP when compared with higher or lower monthly incomes (P = .014). This may be explained that people within this income group have to work outside university hours and use public transport more often, exposing themselves to more cumulative effect of risk factors from work and transport. However, this result was contradicted by a study carried out by Taif University that showed no association (P = 0.46) [16].

This study showed an association between lower back pain and the type of footwear students wore; wearing sneakers showed an increase in the risk of back pain compared to wearing formal shoes and boots. (P = .022). However, this finding may be explained by the fact that most of the students who filled the questionnaire wore sneakers (88.5%).

Less sleep hours was associated with an increase in CLBP (P = .004). Average sleeping hours were 6.63 hours in students who had more back pain compared to 6.93 hours in students without back pain.

While students who sleep in the prone posture had a higher prevalence of CLBP, the relation was not significant (P= .48). Other studies recommended side lying as the sleep posture least likely to provoke cervical or lumbar spinal symptoms and to use side lying or supine positions for those with lumbar spinal pain [26] [27]. No significant relation (P = .21) was found between pillow numbers and CLBP. More focus should be on relation of the type of pillow with cervical pain as in other studies. While the level of the mattress did not have any association with back pain (P= .32), the type and hardness of the mattress itself should be considered as a possible risk factor in future studies.

Coffee contains caffeine that helps combat fatigue and drowsiness and alleviate pain. This study confirmed that increasing caffeine intake is associated with an increased risk of CLBP (P = .009). Additionally, McPartland and Mitchell also 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 [28]. However, A Malaysian study on neck, shoulder and lower back pain in medical students did not find any relation on caffeine intake and an increased risk of lower back pain. (P = .09) [5].

The association of smoking with back pain has been controversial in different studies. In this study, there was no association with CLBP (P = .46). Taibah University also did not find any relation (P = .38) [29]. We believe that this finding has to do with that most of the participants were females in both studies, and females are believed to be more hesitant in disclosing such subjects. Contrastingly, a study at Al-Taif University in Saudi Arabia has shown an association (P < .001) [16].

Physical exercise was not found to be related to CLBP in this study (P= .09). Other studies found contrasting results as some found that physical activity to be associated factors with CLBP [21], while others found it to have a protective effect [15, 16, 30,31]. While exercise per se or the lack of it was not related to CLBP in this study, exercising for a maximum of 1 hour per week was found to be associated with less back pain when compared to more time exercising or no exercising at all (P= .037). This result came close to Heneweer et al. [32], which found that exercise for 1-2.5 hrs/week had a significant relation with lower risk of CLBP. A moderate increased risk for CLBP was found for both participants with a sedentary lifestyle and for those being involved in physical strenuous activities suggesting a U-shaped relation [32]. Moreover, it is stated that Physical activity was not associated with CLBP when studied by the dimension of activity, by the intensity or by the duration of physical activity [32], which is consistent with the finding of our study about the relation between CLBP and the intensity of exercise.

Mobile using duration was not significantly associated with CLBP (P= .79), which is close to Hakala et al. results [33], that times spent on using mobile phones were not associated with CLBP. Although neck posture while using mobile phones is more related to neck pain, people who maintained their neck posture at a much-flexed angle were more likely to experience CLBP (OR= 3.97, P= .046). On the other hand, neck position during studying did not have a significant relation with CLBP (P= .15). This difference in significance could be due to the higher cumulative exposure of neck bending while using mobile phones due to more time spent on mobile phones than studying and more acute angle of neck bending while using mobile phones. Although it was expected that the bending posture of the back while studying would have a significant effect on low back pain such as found in Murphy et al. [34], the positive correlation did not have a statistically significant value (P= .061). During the COVID-19 pandemic, online teaching through multiple platforms replaced conventional face-to-face learning.

Therefore, more research should be conducted on how this may affect the development of back pain.

While many studies suggest a positive and strong relation between the time spent in the car and CLBP, this study did not find any significance (P= .7). This could be due to the fact that the studies which found the significant relation had participants who drive or spend time in the car for more than 4h/day [35], or 20h/week [36] while in this study, 75.3% of participants spent less than 5 hours per week in a car. Regarding the postures used in rest time, none had any significant relation with CLBP (Table 2).

While the prevalence of CLBP was less among people who drank <1L of water per day, the association was not significant (P=.42). In contrast, a study by Cowbrough et al. found that a sample of people with back pain drank more fluid than a similar group without
back pain [37]. Alcohol consumption was neither found to be significantly associated with CLBP in this study (P= .98) nor in two others.[15][38]
While this study found no relation between sun exposure and CLBP (P= .42), other studies that take Vitamin D levels in consideration suggest otherwise. [39][40]

This study found no relation between chronic illnesses and CLBP (P= .4). A comparable result was found in Taif University students [17] while increased odds of developing low back pain were observed among drivers of an older age group with chronic diseases other than CLBP. [41]

CONCLUSION

The prevalence of chronic back pain among the Hashemite University students was (43.7%) with females having a higher prevalence than males. The risk factors that were found to have a significant association with CBP were the number of years spent in the university, family income 500-1000JDs, fewer sleeping hours, increased hours spent studying, increased time spent in public transport (buses), increased hours standing in university facilities, having a job outside university hours, bending and prolonged standing, drinking caffeinated beverage, acutely bending the neck while using mobile phones, wearing sneakers, and having a family history of chronic low back pain. On the other hand, residing in Al-Zarqa, being the first or second born between siblings, exercising for an hour per week, and spending less time in a vehicle were protective factors.

LIMITATION

The study was limited to Hashemite University students, which is one of 35 universities in Jordan (10 public and 25 private), and this may limit the study since it may be considered non-representative to the whole population. Another possible limitation of the study is the use of self-reported measures of all variables. In addition, a list of the students with their names and university numbers/ university emails was not available and could not be obtained, thus using the method of randomization by assigning numbers randomly to students could not be applied. For that reason, manually distribute the questionnaire to random students to fill the questionnaire started by directly engaging with the participants. However, due to the COVID-19 pandemic and the subsequent lockdown, the questionnaire link was sent to different Hashemite university Facebook groups, which made it difficult to explain certain questions or monitor respondent's impressions; this is known as a confirmation bias.

Another limitation is the lack of studies conducted about back pain among university students in Arab countries, none of which focused on Jordan.

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