ORIGINAL RESEARCH ARTICLE

Analysing Low Back Pain Among University Students in Malaysia: A Public Health Perspective on Disability and Influencing Factors

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ABSTRACT

Purpose: Low back pain (LBP) and its association with disability has emerged as an area of concern. This study aimed to investigate the influence of demographic, low back pain on disability to provide insights for informed interventions enhancing students' inclusive health and wellbeing.

Materials & Methods: A cross-sectional study was conducted among 351 students of all genders, aged 17 to 30. Nordic questionnaire was used to check the prevalence of low back pain. Oswestry disability index was employed to assess the back pain induced disability. Logistic regression analysis was used to analyse the association between risk factors and LBP.

Results: Among students, the total prevalence of LBP was 81.5%. Adjusted odds ratio and standardized coefficient, variables such as year of study (OR = 2.526, CI = 1.629–3.923), mode of study (OR = 4.725, CI = 1.767–12.630), and duration of electronic gadgets usage (OR = 2.912, CI = 1.544–5.490) were found to be independent risk factors and predictors for the occurrence of LBP among university students.

Conclusion: The study results demonstrate a substantial association between the use of computers, year of study, and use of electronic gadgets with prevalence of low back discomfort. Future investigations should focus on strategies to emphasize the significance of ergonomic guidance about computer usage and managing study workload throughout different academic years among university students.

Keywords: Low back pain, Disability, Health risks, Demographics, Students

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INTRODUCTION

Across all age groups, low back pain (LBP) is one of the most common complaints. At least 90% of people have at some point in their lives suffered low back discomfort. Low back pain is sometimes referred to as "non-specific," meaning that no organic cause of the pain has been identified.[1] The global pooled random-effect prevalence rate of young adults with chronic pain was 11.6%, meaning that 1 in every 9 young adults globally suffers from this condition.[2] Numerous studies have shown that LBP is very common among healthcare professionals, students and dancers.[3–5] Age, education, obesity, smoking, hereditary factors, prolonged standing, injuries, stress, anxiety, and depression, as well as poor interpersonal relationships and a lack of social support, have all been connected in certain studies regarding LBP.[6,7] Also, the university curriculum contributes to excessive study hours that cause students to lead sedentary lives and make them more susceptible to back pain episodes. Undergraduate students' levels of physical exercise are declining as a result of rising computer and laptop use. The occurrence of back pain may also be influenced by poor study habits.[8] in the literature from studies on college students. For instance, there were between 45.7% and 65.1% of medical students who had Musculoskeletal problems (MSP). The prevalence of neck discomfort was 64%, lower back pain was 57%, and shoulder pain was 48% among dentistry students. The prevalence of MSP was also found to be high among non-medical students, such as X-ray technology students (37% in any part of the body) and music students (60.4% for neck pain and 38.2% for lower back pain).[9]

One of the most widespread chronic pain disorders, LBP places a heavy burden on both individuals and society. It can have a significant impact on a person's quality of life due to factors like severe pain and disability, poor prognosis, severe physical limitations, and lack of ability to work.[10] Students are susceptible to stress and long study sessions, which increases their risk of developing LBP. An earlier study explored the incidence of musculoskeletal pain and its connection to computer use among college students in Malaysia. This study found a significant frequency of MSP among female students (90%) and male students (76%), but no correlation between MSP and computer use was found.[11] Many governments around globe adopted a number of measures during the COVID-19 pandemic to stop the spread of the disease, including quarantine, social withdrawal, and transitioning from traditional classrooms to other forms of online learning.[12] Numerous research have revealed that a variety of factors, including psychosocial and environmental variables, could lead to musculoskeletal pain in university students using online learning techniques. These elements may either directly or indirectly cause musculoskeletal pain.[13] Additionally, musculoskeletal pain, such as low back pain, may interfere with a student's ability to succeed academically.[14]

The pattern and prevalence of musculoskeletal pain among medical students in Malaysia have been described in certain literature. To investigate the prevalence of LBP and the degree of disability brought on by LBP, our study focused on private and public university students. The associated risk factors for LBP in the student population have been documented in numerous research. Nevertheless, the association between demographics, pain intensity, and level of disability in the student population is lacking. Universities must identify any potential modifiable musculoskeletal pain risk factors and develop early supportive and preventive strategies to improve the students' quality of life. Therefore, the objective of this study is to determine the prevalence of LPB, the level of disability, and its association with the demographic characteristics of the students.

METHODOLOGY

Study design and participants: This study employed a cross-sectional quantitative study approach. The study's population consisted of students who were currently engaged in face-to-face classes and had also attended virtual classes within the last 12 months at different public and private colleges in Negeri Sembilan state of Malaysia. This study included individuals of both genders within the age range of 17 to 30 years who were regular students and had participated in both online and face-to-face programmes. The study excluded individuals having a prior history of musculoskeletal injuries to the spine and any history of spinal surgery during the past six months.

Sample Size: The minimum sample size was determined to be 265 using OpenEpi version 3.1. This calculation was based on an estimated prevalence rate of 54% with a 95% confidence level and a precision of 5%. The sample size was determined using data from a study conducted in Malaysia.[15] Considering the potential loss of samples and anticipating dropouts, the authors have targeted 400 participants and circulated the questionnaire. Out of these, 362 completed questionnaires were received. While checking responses for accuracy and completeness, 11 questionnaires were discarded due to incomplete responses, and finally, 351 samples were included in the analysis.

Data Collection: Before conducting the study, ethical approval was acquired from the University Ethics and Research committee. The approval was granted with reference number INTI-IU/FHLS-RC/BPHTI/1NY12022/011. The participants were provided with information regarding the purpose of the study, the secure handling of their data, and the assurance of their anonymity in the research. Subsequently, they were obligated to endorse an informed consent form prior to starting the study. Participation in this

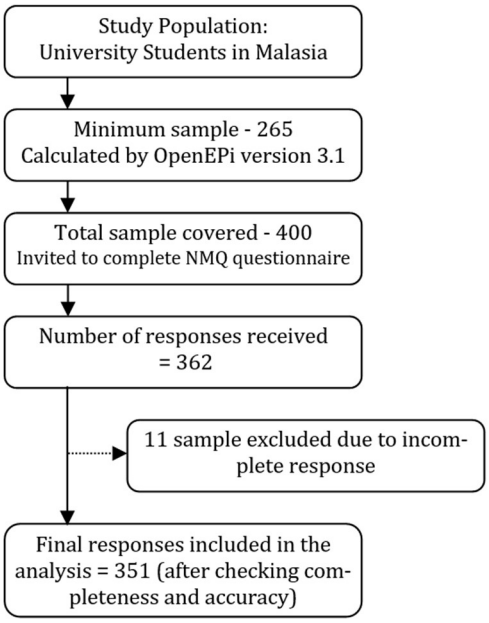

Figure 1: Sample Recruitment flowchart

research was entirely optional, and participants had the freedom to withdraw from the study at any point without providing an explanation. A survey was created to gather fundamental demographic information. The Standardized Nordic Musculoskeletal Questionnaire (NMQ) is utilised for the assessment of musculoskeletal issues. The questionnaire is divided into sections for each body part: neck, shoulders, upper and lower back, elbows, wrists/hands, hips/thighs, knees, and ankles/feet. The NMQ asks participants to indicate whether they have experienced discomfort, pain, or other musculoskeletal symptoms in any of these body areas over a specified period (often the past 7 days or 12 months). It includes additional questions about symptom presence, duration, intensity, and work Impact. NMQ interpretation typically focuses on prevalence rates, symptom severity, duration, and work-related impact, and its interpretation is mainly qualitative.[16] The assessment of pain-related impairment caused by LBP was conducted using the Oswestry Low Back Pain impairment Questionnaire. The Oswestry Disability Index (ODI) is a self-administered questionnaire that provides a subjective percentage score reflecting the degree of functional impairment (disability) in daily activities for individuals recovering from low back pain. It assesses disability across ten daily activities, each represented by six statements scored from 0 to 5, where 0 signifies minimal disability, and 5 represents maximum disability. The overall score is calculated as a percentage, with 0% indicating no disability and 100% representing the most severe disability level. Disability scores of 0% to 20%, 21% to 40%, 41 to 60%, 61% to 80%, and 81% to 100% were considered minimal, moderate, severe, crippled, and bed-bound, respectively.[17] The questionnaire link was created using Google Form as the data collection tool. Google Forms offers an accessible means for data collection, but its limitations can impact data quality. These include sampling bias due to required internet access, privacy concerns for sensitive data, and potential issues with response quality. To address these, we shared the survey widely across platforms to enhance inclusivity, ensured participant confidentiality and anonymity, and designed the form with required fields and attention checks to improve response completeness. This link was distributed over several social media platforms such as WhatsApp, Telegram, and others throughout the period of December 2022 until July 2023.

Statistical Analysis: All data are analysed by using SPSS® IBM® software, ver. 26 (IBM, Armonk, NY, USA). Descriptive statistics were used to interpret the categorical variables. Logistic regression was used to investigate the prediction between demographic risk factors and LBP. Chi square was employed to examine the association between level of disability and the risk factors. A value below 0.05 was deemed statistically significant.

RESULTS

More than 50% of the participants in this study were male, with an average age of 21.66±2.56 and a BMI of 22.09±3.56. 48.1% of the participants were final-year students who attended face-to-face classes, accounting for 81.8% of the total. Approximately 47.3% of people spend over 90 minutes in a sitting position. 34.5% of the students reported experiencing LBP during face-to-face class sessions represented in Table 1.

Table 2 shows a logistic regression of university students' risk factors for low back pain. Based on the adjusted odds ratio and standardized coefficient, variables such as year of study (OR = 2.526, CI = 1.629–3.923), mode of study (OR = 4.725, CI = 1.767–12.630), and duration of electronic gadgets usage (OR = 2.912, CI = 1.544–5.490) were found to be independent risk factors and predictors for the occurrence of low back pain among university students in Malaysia. Specifically, the odds ratio of 2.526 indicates that students studying at high academic levels (semesters) of study are approximately 2.53 times more prone to back pain than those studying at lower academic levels (semesters). Similarly, the odds ratio of 4.725 indicates that students who attended Face-to-face classes are approximately 4.725 times more likely to be prone to back pain compared to those studying through online classes. Furthermore, the odds ratio of 2.912 indicates that those students who use gadgets (usage time) are approximately 2.912 times more likely to be prone to back pain compared to those using gadgets for a shorter duration of time. Other variables such as age, gender, BMI, frequency of performing exercise, and studying hours failed to show statistical significance. Besides the abovementioned variables, the authors conducted a bivariate analysis to study gender by keeping 'male' as 'category-1' and 'female' as 'category-2' since the response is dichotomous.

Table 1: Demographic of the study participants (n=351)

Variables	Participants (%)
Gender	
Male	188(53.6)
Female	163(46.4)
Age	21.66±2.56*
BMI (Kg/m²)	22.09±3.56*
Underweight	34(9.7)
Normal	198(56.4)
Overweight	42(12)
Obese	77(21.9)
Year of Study	
First year	61(17.4)
Second year	71(20.2)
Third year	50(14.2)
Fourth year	169(48.1)
Exercise frequency	
Regularly	107(30.5)
Not regularly	189(53.8)
No at all	55(15.7)
Hours spend on electronic gadgets	
<1 hour	43(12.3)
1 hour - < 2 hour	90(25.6)
>2 hour	218(62.1)
Hours spend sitting	
45 mins	67(19.1)
60 mins	58(16.5)
90 mins	60(17.1)
>90 mins	166(47.3)
Current mode of study	
Online class	9(26)
Face-to-face class	287(81.8)
Both	55(15.7)
Mode of study that induce LBP	
Online classes only	130(37)
Face-to-face classes	121(34.5)
Both	100(28.5)
Last 12-months low back pain	286(81.5)
Last 7 days low back pain	107(30.5)

BMI- Body Mass Index, SD-Standard deviation;
* Values in Mean±SD

From the analysis, it is observed to be significant (OR= 1.422, CI= 0.694-2.912), indicating that gender is an independent risk factor and predictor for the occurrence of low back pain among university students in Malaysia.

Table 3 represents the statistically significant association ($p<0.05$) between certain demographics such as age, year of study, mode of study and mode of study that induces LBP.

DISCUSSION

In our study, the prevalence of low back pain in the last 12 months was 81.5% which closely aligns with the data from a report conducted in France (72.1%). The results align with other research indicating a high occurrence of low back pain among medical students, which can greatly impact their academic performance and quality of life.[18] Another significant finding from our investigations was that the academic year of students was recognized as a substantial risk factor for experiencing low back pain.

The results contradict earlier research that found no significant variations in the occurrence of low back pain depending on the academic year.[19] Nevertheless, similar pattern of result was observed in previous studies in which final study year was one of the risk factors for LBP in medical and nursing students.[20] The increased likelihood of experiencing lower back pain in final year students may be attributed to their progressively rising academic workload and hands-on training, often characterized by repeated tasks, awkward postures, and physical patient handling.[21] The potential rationale for this significant association with academic years is that prevalence of LBP tends to grow as children and adolescents age, suggesting that these age groups are particularly susceptible to developing or showing signs of susceptibility.[22]

Another important finding of our study is that current mode of study was identified as a significant risk factor for LBP. Majority of the students (81.8%) of the students are attaining physical classes in this survey. Previous study has demonstrated that extended periods of sitting can lead to musculoskeletal issues, such as LBP. Students often spend extended periods sitting in lectures and studying, which could account for the high incidence of low back discomfort among students.[23,24] Interventions targeting the reduction of prolonged sitting and the encouragement of regular physical activity breaks may aid in preventing back pain in students. Additionally, the study also found a significant association between LBP and the mode of study.

Table 2: Multivariate Logistic regression of risk factors associated with LBP and other independent variables

Independent variables	Mean ± SD	B	S.E.	Wald	df	*P*	Odds ratio (95% C.I.)
Age	21.66±2.56	0.694	0.448	2.393	1	0.122	0.500(0.207-1.203)
BMI	22.09±3.56	0.254	0.191	1.765	1	0.184	1.289(0.886-1.874)
Year of Study	2.93 ± 1.17	0.927	0.225	17.001	1	0.000*	2.526(1.629-3.923)
Current mode of study	2.13 ± 0.40	1.553	0.502	9.579	1	0.002*	4.725 (1.767- 12.630)
Exercise Frequency	1.85 ± 0.66	0.251	0.261	0.927	1	0.336	1.286(0.771-2.145)
Electronic gadgets usage	2.50 ± 0.70	1.069	0.324	10.911	1	0.001*	2.912(1.544-5.490)
Studying hours	2.93 ± 1.18	0.023	0.190	0.014	1	0.904	0.977(0.674-1.418)
Constant		6.657	1.486	20.070	1	0.000	

*$p<0.05$ considered significant

Table 3: The association between demographic and Oswestry disability index

Demographic Variables (n = 351)	Mild disability (%)	Moderate disability (%)	Severe disability (%)	Chi-square (p-value)
Gender				
Male	155 (82.4)	33 (17.6)	0	5.567
Female	120 (73.6)	41 (25.2)	2 (0.9)	**0.062**
Age				
17-20	119 (88.8)	15 (11.2)	0	15.547
21-25	141 (72.7)	51 (26.3)	2 (1)	**0.04***
26-30	15 (65.2)	8 (34.8)	0	
BMI				
Underweight	24 (70.6)	9 (26.5)	1 (2.9)	8.134
Normal	160 (80.8)	38 (19.2)	0	**0.228**
Overweight	30 (71.4)	12 (28.6)	0	
Obese	61 (79.2)	15 (19.5)	1 (1.3)	
Year of Study				
First year	53 (86.9)	8 (13.1)	0	20.741
Second year	66 (93)	5 (7)	0	**0.002***
Third year	39 (78)	11 (22)	0	
Fourth year	117 (69.2)	50 (29.6)	2 (1.2)	
Physical Activity				
Regular	75 (70.1)	31 (29)	1 (0.9)	8.767
Not Regularly	155 (82)	34 (18)	0	**0.067**
Not at all	45 (81.8)	9 (16.4)	1 (1.8)	
Hours spend on electronic gadgets				
<1 hour	38(88.4)	511.6)	0	4.952
1 – 2 hours	73(81.1)	1718.9)	0	**0.292**
>2 hors	164(75.2)	52(23.9)	2(0.9)	
Hours spend sitting				
45 Mins	52(77.6)	15(22.4)	0(0)	7.495
60 Mins	39(67.2)	18(31.0)	1(1.7)	**0.277**
90 Mins	51(85)	9(15)	0	
> 90 mins	133(80.1)	32(19.3)	1(0.6)	
Mode of study				
Online class	1(11.1)	8(88.9)	0(0)	58.740
Face to face class	246(85.7)	40(13.9)	1(1.6)	**0.001***
Both	28(50.9)	26(47.3)	1(1.8)	
Mode of study inducing LBP				
Online class	85(65.4)	44(27.4)	1(0.7)	36.138
Face to face class	116(95.9)	5(4.1)	0(0.0)	**0.001***
Both	74(74.0)	25(25)	1(1.0)	

*$p<0.05$ considered significant, ODI-Oswestry disability index

This is supported by previous study that a significant prevalence of lower back pain (LBP) in medical students participating in online classes during the pandemic. This is especially pertinent during the COVID-19 pandemic, as students have been dependent on online education.[25] Furthermore, using computers was a significant risk factor for LBP in the study. This is corroborated in the literature. For instance, students spend more time using laptops, personal computers and smart devices during online learning, leading to an increase in musculoskeletal pain, including lower back pain.[26] The result of our study revealed that computer usage was associated with risk of LBP.S hah & Desai found that prolonged hours of working in an inappropriate posture while using a laptop or computer can lead to LBP.[27] Consequently, several risk variables associated with lower back pain (LBP) may vary slightly compared to those identified in most published studies.[27]

The current study additionally investigates the association between the disability caused by low back pain and demographics of the students. In current study participants shown an association between age, year of stud and the development of disability caused by low back pain. More than half of the participants in this study reported limited disability caused by low back pain, is consistent with earlier data.[28] This study revealed a notable association between the method of study chosen by students and the disability caused by LBP. According to the previous research, a correlation was shown between sitting position and the occurrence of low back discomfort.[29] The current study also demonstrated an association between the level of education and disability. Similarly previous study focuses on college students in the health field and observed that the increase in LBP disability is a result of excessive workload, which may hinder students from engaging in physical activities and cause them to adopt improper postures.[30] A study revealed that fifth and final year students had the highest percentage of disability across the key disability categories, including minimum, moderate, and severe. This could be attributed to the program's greater emphasis on clinical aspects and

the higher number of clinical sessions in comparison to previous years.[31] However, the study conducted among medical students in Saudi Arabia did not report any similar findings.[32]

Our study has some limitations that should be acknowledged. Firstly, the study does not include the field of study of the participants, alcohol, smoking habits, and ergonomic factors such as use of chair and position of computer during online classes was not addressed. Furthermore, the study results were based exclusively on the self-administered questionnaire, without any additional medical examinations conducted to verify the existence of LBP. Hence, it is impossible to rule out the presence of information bias and subject bias. Therefore, future study must include psychosocial and physical factors and its correlation with LBP and academic performance. This necessitates the adoption of proactive measures to mitigate the issue.

Conclusion

The study's findings showed a significant prevalence of lower back pain in university students, highlighting the need to create and execute thorough preventive measures. Most of the risk factors identified through this study can be modifiable. Therefore, efforts can be made to mitigate those risk factors that potentially enhance students' overall health and quality of life. It is also recommended that universities have a policy incorporating information on ergonomic awareness of postures when using laptops and computers to prevent musculoskeletal diseases that could help reduce lower back pain among students.

Availability of the data

The data that supports the findings of this study are available from the corresponding author upon reasonable request. No AI tools were used in the preparation of this manuscript.

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