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ORIGINAL ARTICLE

Prevalence and Correlates of Low Back Pain among University Students during Covid-19 Home Confinement: A Cross-sectional Study

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Abstract: Students have been confined to their homes to attend online classes during Covid-19 pandemic. This study aimed to estimate the effect of the Covid-19 Home Confinement on the prevalence and associated risk factors of low back pain, among university students in Malaysia. A total of 366 university students (155 males and 211 females) aged between 18 and 25 years participated in this cross-sectional study. A self-administered structured questionnaire on socio-demographic factors and associated risk factors was used. The prevalence of low back pain among university students before Movement Control Order (MCO) was 22.7%, while after MCO, the prevalence was 37.2%. The prevalence of LBP in females was 45.0% and males was 26.5%. Stepwise regression analysis showed that prolonged sitting, prolonged standing, being female, third year student and being obese significantly contributed to the occurrence of low back pain among university students during Covid-19 home confinement. The Covid-19 Home Confinement resulted in a significant increase in the prevalence of low back pain.

Keywords: low back pain, university student, Covid-19, Malaysia

1.0 INTRODUCTION

Public health recommendations and governmental measures during the Covid-19 pandemic have resulted in numerous restrictions on daily living including social distancing, isolation and home confinement. On 18 March 2020, the Federal Government of Malaysia imposed a strategy of infection control by implementing 2020 'Movement Control Order' (MCO), as a prevention step in response to the Covid-19 pandemic in the country to reduce the transmission of the virus. While these measures are imperative to abate the spreading of Covid-19, the impact of these restrictions on low back pain is undefined.

The prevalence of low back pain (LBP) in high-income countries was estimated at 30.0%, which is higher than low-income countries, 18.0% [1]. LBP can be developed due to many different risk factors from psychological, social, mechanical, physical, environmental, and behavioural influences. The occurrence of LBP is mostly caused by muscle strain due to poor body mechanics and sudden jerky movement. In Malaysia, the prevalence of back pain was found to be 12% [2]. Non-specific LBP has also increased in general communities, which has affected the adolescents and middle-aged people and have a major impact to functional and educational activities, which is related to the university population [3].

University students have a higher risk of developing LBP due to the demands of the academic study. They must bear the amount of academic workload such as assignment, presentations, examination, research projects etc. A class session is usually about an average of 2 hours and when combining all those activities and multiply by other different subject of classes, this can take up more time of a student in a poor and uncomfortable sitting posture. Since MCO, students are forced to stay at home to attend online classes using their available gadget devices. Thus, students easily experience LBP due to long period of time spent on sitting and working in front of the computer. Previous studies reported that prolonged sitting becomes one of the causative factors, developing musculoskeletal pain; specifically university students suffered from LBP [4, 5]. The increasing use of gadgets and poor posture are also considered as possible risk factors of LBP. This study was aimed to determine the prevalence and correlates of low back pain among university students during Covid-19 home confinement.

2.0 METHODS

A cross-sectional internet-based survey was conducted to identify the prevalence and correlates of LBP among university students during Covid-19 home confinement. This study was conducted among students of Universiti Tunku Abdul Rahman (UTAR), Malaysia uses an online questionnaire. The inclusion criteria were (a) being aged between 18 and 25 years; (b) did not suffer from chronic psychological, physiological, or psychosomatic conditions; (c) were not hospitalized during the pandemic; (d) is a resident in Malaysia (e) stayed in Malaysia before and during the

quarantine decreed by the Malaysian authorities. All subjects received detailed information about the objectives, benefits, and risks associated with participation in this study. Informed consent was obtained from all respondents in the online survey. Convenient sampling method was used for the recruitment of participants in this study. This study obtained ethical approval from the Scientific and Ethical Review Committee (SERC) of Universiti Tunku Abdul Rahman. Furthermore, all the information given by respondents was kept confidential and it was notified to participants in advance.

2. 1 Instruments

The online questionnaire used in this study consisted of 2 sections. The first section of the questionnaire was on socio-demographic data that included age, gender, and body mass index, details regarding work desk, LBP history, and duration of experiencing LBP. The second section of the questionnaire was a self-rated questionnaire with a total of 16 risk factors or conditions that may affect LBP. The questions were designed to assess the risk factors of LBP among UTAR students with a list of possible risk factors or conditions that may contribute to LBP. Respondent was required to rate the conditions that have affected LBP from 1 to 5, 1 rated as 'No impact', 'Small impact', 'Moderate impact', 'Strong impact' through to 5 rated 'Extremely strong impact' based on their experiences on LBP. The questionnaire took approximately five to ten minutes for completion.

2.2 Statistical analyses

The data from completed questionnaires collected from respondents were analysed using the IBM Statistical Package for the Social Science (SPSS) software, version 26.0 and Microsoft Excel to produce a descriptive analysis with count and percentage. The Chi - square test was performed to find the presence of significant difference between gender, age, ethnicity, year of study, BMI and type of seating furniture and LBP. The level of significant difference will be set at $p<0.05$. Stepwise regression analysis was performed to find potential predictors of LBP.

3.0 RESULTS

A total of 366 university students from UTAR, Sungai Long campus participated in this study.

Table I: Characteristics of the participants

Characteristics	n (%)
Gender	
Female	211 (57.7)
Male	155 (42.3)
Ethnicity	
Malay	3 (0.8)
Chinese	354 (96.7)
Indian	7 (1.9)
Others	2 (0.6)
Age	
18	22 (6.0)
19	60 (16.3)
20	119 (32.5)
21	112 (30.6)
22	35 (9.8)
23	14 (3.8)
24	2 (0.5)
25	1 (0.3)
Faculty	
LKC FES	140 (38.3)
FMHS	86 (23.5)
FAM	71 (19.4)
FCI	41 (11.2)
CFS	28 (7.7)
Year of Study	
Foundation	29 (7.9)
1	83 (22.7)
2	138 (37.7)
3	97 (26.5)
4	16 (4.4)
5	3 (0.8)

Table I shows the respondent's gender and were mostly females with 57% (n=211). Most of the respondents were Chinese (n=353, 96.7%) and the age of the respondents is between 18 to 25 years and the mean age of respondents is 20.37 years. The majority of respondents were 20 years old (n=119, 33%).

Table II: Anthropometric Measurements of the participants and their BMI classification

Anthropometric Measurements	Mean ± SD/ n(%)
Height (cm)	164.79 ±8.30
Weight (kg)	58.76 ±12.73
BMI (kg/m^2)	21.54 ±3.96
Underweight	66 (18.0%)
Normal	218 (59.6%)
Overweight	68 (18.6%)
Obese	14 (3.8%)

Note: BMI=body mass index; M=mean; SD=standard deviation.

Table II gives the information regarding the height in the unit of centimeter (cm), body weight in the unit of kilogram (kg), and BMI (kg/m^2) of 366 respondents. According to World Health Organization (WHO) classification of BMI, the majority of the respondents was under normal BMI (218, 59.6%).

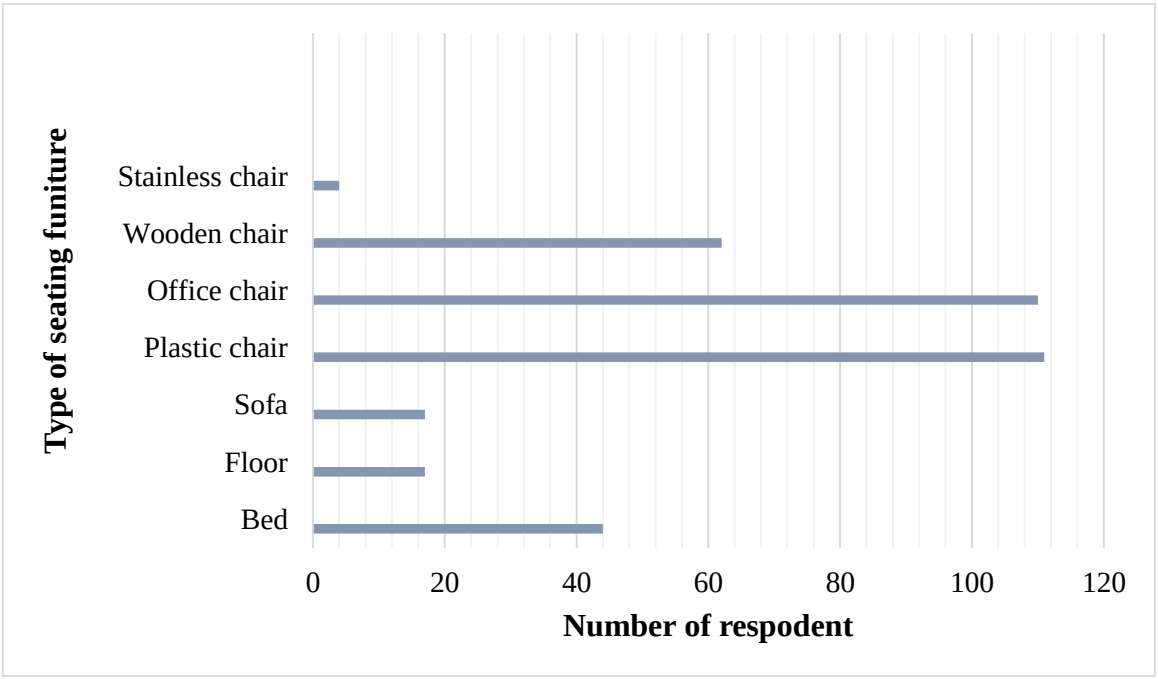

Figure I: Bar chart of type of seating furniture

The Figure I is a bar chart that displays the type of seating furniture used by participants when attending online classes. Among the 366 respondents, both office chair and plastic chair were mostly used by the respondents in this study (n=110, 30.1%, n=111, 30.4%).

Table III: Prevalence of Low Back Pain before and after of Movement Control Order

Question	n (%)	Yes n (%)	No n (%)
Low Back Pain			
Before MCO		83 (22.7)	283 (77.3)
After MCO		136 (37.2)	230 (62.8)
If YES, has the pain worsens during MCO?			
Yes	45 (54.2)		
No	38 (45.8)		
Do you have LBP now?			
Yes	138 (20.2)		
No	292 (79.8)		
Have you ever had LBP in the last 12 months?			
Yes	133 (36.3)		
No	233 (63.7)		

The prevalence of LBP among university students is as seen in Table III. This indicated that the number of respondents who experienced backache had elevated after MCO.

Table IV: Association of Low Back Pain with different selected factors before MCO

Factor		LBP (n=83) n (%)	No LBP (n=283) n (%)	x^2	*p*-value
Gender					
	Female	57 (27.0)	154 (73.0)	5.34	0.02
	Male	26 (16.8)	129 (83.2)	4	1*
Ethnicity					
	Malay	0 (0.0)	3 (100.0)	4.87	0.30
	Chinese	81 (22.9)	273 (77.1)	2	1
	Indian	1 (14.3)	6 (85.7)		
	Others	1 (50.0)	1 (50.0)		
Age					
	18	4 (18.2)	18 (81.8)	5.69	0.12
	19	13 (22.0)	46 (78.0)	63	7

	20	19 (15.8)	101 (84.2)			
	21	32 (28.3)	81 (71.7)			
	22	7 (20.0)	28 (80.0)			
	23	7 (50.0)	7 (50.0)			
	24	0 (0.0)	2 (100.0)			
	25	1 (100.0)	0 (0.0)			
Faculty						
	LKC FES	26 (19.0)	111 (81.0)		19.1	0.02
	FMHS	33 (39.8)	54 (62.8)	68	4*	
	FAM	13 (18.3)	58 (81.7)			
	FCI	4 (9.5)	38 (90.5)			
	CFS	7 (24.1)	22 (75.9)			
Year						
	Foundati	7 (24.1)	22 (75.9)		7.56	0.18
on				3	2	
	1	17 (20.5)	66 (79.5)			
	2	24 (17.4)	114 (82.6)			
	3	31 (32.0)	66 (68.0)			
	4	3 (18.8)	13 (81.3)			
	5	1 (33.3)	2 (66.7)			
BMI						
	Underwe	17 (25.4)	50 (74.6)		5.84	0.11
ight				7	9	
	Normal	44 (20.2)	174 (79.8)			
	Overwei	21 (31.3)	46 (68.7)			
ght						
	Obese	1 (7.1)	13 (92.9)			
Type of seating furniture						
	Bed	12 (27.3)	32 (72.7)		10.9	0.14
	Floor	2 (11.8)	15 (88.2)	64	0	
	Sofa	3 (17.6)	14 (82.4)			
	Plastic	18 (16.2)	93 (83.8)			
chair						
	Office	28 (25.5)	82 (74.5)			
chair						
	Wooden	17 (27.4)	45 (72.6)			
chair						
	Stainless	2 (50.0)	2 (50.0)			
chair						

*Chi Square test was performed, Level of significance at $p<0.05$

Table IV provides the information of association between prevalence of LBP among students before MCO with selected factors. There was no significant difference between LBP before MCO and ethnicity, age, year of study BMI, seating furniture. However, gender ($p<0.021$), and faculty ($p<0.024$) are statistically significant to LBP before MCO.

Table V: Association of Low Back Pain with different selected factors after MCO

Factor		LBP (n=136) n (%)	No LBP (n=220) n (%)	χ^2	*p*-value
Gender					
	Female	95 (45.0)	116 (55.0)	1	<0.001*
	Male	41 (26.5)	114 (73.5)	3.199	
Ethnicity					
	Malay	0 (0.0)	3 (100.0)	4.156	0.385
	Chinese	132 (37.3)	222 (62.7)		
	Indian	3 (42.9)	4 (57.1)		
	Others	1 (50.0)	1 (50.0)		
Age					
	18	6 (27.3)	16 (72.7)	1.293	0.126
	19	14 (23.7)	45 (76.3)		
	20	43 (35.8)	77 (64.2)		
	21	47 (41.6)	66 (58.4)		
	22	18 (51.4)	17 (48.6)		
	23	7 (50.0)	7 (50.0)		
	24	1 (50.0)	1 (50.0)		
	25	0 (0.0)	1 (100.0)		
Faculty					
	LKC FES	44 (32.1)	93 (67.9)	2	0.014*
	FMHS	48 (55.2)	39 (44.8)	0.744	
	FAM	23 (32.4)	48 (67.6)		
	FCI	11 (26.2)	31 (73.8)		
	CFS	10 (34.5)	19 (65.5)		
Year					
	Foundation	10 (34.5)	19 (65.5)	1	0.025*
	1	21 (25.3)	62 (74.4)	2.806	
	2	50 (36.2)	88 (63.8)		
	3	49 (50.5)	48 (49.5)		
	4	5 (31.3)	11 (68.8)		
	5	1 (33.3)	2 (66.7)		
BMI					
	Underweight	31 (46.3)	36 (53.7)	1	0.029*
	Normal	74 (34.6)	140 (65.4)	5.623	
	Overweight	25 (37.3)	42 (62.7)		
	Obese	6 (33.3)	12 (66.7)		
Type of seating furniture					
	Bed	17 (38.6)	27 (61.4)	5.321	0.632
	Floor	6 (35.3)	11 (64.7)		
	Sofa	4 (23.5)	13 (76.5)		
	Plastic chair	36 (32.4)	75 (67.6)		
	Office chair	43 (39.1)	67 (60/9)		
	Wooden chair	28 (45.2)	34 (54.8)		
	Stainless chair	2 (50.0)	2 (50.0)		

*Chi Square test was performed, Level of significance at p<0.05

Table V shows the information of association between the prevalence of LBP among the students after MCO with selected factors. There was no significant association of LBP with ethnicity, age, and seating furniture. However, gender ($p<0.001$), faculty ($p<0.014$), year of study ($p<0.025$) and BMI ($p<0.029$) are statistically significant to LBP after MCO. Out of 155 respondents who complained of LBP, 109 participants (70.3%) reflected that their LBP lasts less than 12 weeks which indicates that they had acute back pain and 46 (29.7%) of respondents reported that their LBP persisted for more than 12 weeks, which is also called as chronic back pain.

The participants were asked whether they had ever skipped class due to LBP, and 98.6% (n=361) of the students did not skip class due to LBP. However, only 5 (n=1.4%) students claimed that they had skipped class because of LBP. In addition, they were asked if the LBP had affected their mood, 103 (28.1%) reported LBP had affected their mood whereas the rest (71.9%, n=263) reported no effect.

Table VI: Stepwise logistic regression analysis for predictors of LBP.

Variables	Adjusted odd ratio (95% confidence intervals)	*p*-value
Long hours of sitting (<4 hours/day)	0.148 (0.052-0.425)	<0.001*
Family history of LBP	2.403 (1.549-3.727)	<0.001*
Year of study (Third year)	2.136 (1.331-3.427)	0.01*
Gender (female)	2.277 (1.454-3.565)	<0.001*
Long hours of standing (4 to 6 hours)	1.656 (0.889-3.086)	0.01
Obese (>30 kg/m^2)	0.271 (0.061-1.230)	<0.001*

*Stepwise logistic regression test was performed, Level of significance at $p<0.05$

Table VI displays the result of stepwise regression analysis for predictors of LBP. In this study, there are 6 predictors of LBP included prolonged sitting, family history of LBP, third year student, female, prolong standing and those who are obese. Among 6 risk factors, prolonged sitting with less than 4 hours is the strongest predictor of LBP.

4.0 DISCUSSION

The home confinement due to Covid-19 resulted in a significant increase in the percentage of the university students involving in distance learning. In this study, 22.7% (n=83) of participants had experienced LBP before Movement Control Order (MCO). After MCO, prevalence of LBP among the respondents was 37.2% (n=136), increased by 14.7% (n=53). This finding indicated that the number of respondents who experienced LBA elevated after MCO. A study conducted in Turkey reported that the prevalence of LBP increased after 3 months of Covid-19 quarantine [6]. Their findings revealed that participants who stayed at home had higher prevalence of LBP when compared to participants who continued working in their workplace. Several studies conducted in Malaysia and Pakistan reported that LBP is a major health issue among university students [7, 8]. The Covid-19 home confinement resulted in a significant increase in intensity and prevalence of LBP.

4. 1 Association between prevalence of LBP and socio-demographic factors

The findings of this study showed that gender ($p<0.000$), faculty ($p<0.014$), year of study ($p<0.025$) and BMI ($p<0.029$) have significant association with LBP among university students. It was found that the prevalence of LBP before and after MCO among females was significantly higher than males. LBP has been reported consistently in a higher proportion of females than males [9, 10]. In terms of age, participants aged 21 years were the most affected with LBP though the association is not statistically significant. This finding is supported by a study that reported student's age was not significantly associated with the prevalence of LBP [11]. However, the findings of a previous study

revealed that students aged 20 or 21 years old was significantly associated with LBP [12]. Issa et al. (2016) also reported higher prevalence of LBP among university students aged 19 to 22 years [5].

Recent studies reported that LBP is prevalent among medical or clinical students [13]. A similar finding is seen from the results of the present study. The students of the Faculty of Medicine and Health Sciences (FMHS) reported the highest number of cases of LBP before MCO (n=33, 39.8%) and after MCO (n=48, 55.2%) compared to students from other faculties. The students of FMHS were attending their clinical posting through online modules due to Covid-19. This demands prolonged sitting that may precipitate in the development back pain. In addition, factors such as poor body posture, severe fatigue and long hours of study are identified as common contributing factors among medical students in most of the studies. Regarding year of study, third year students reflected with the highest rate of prevalence of back pain. This may be explained by the fact of students of Year 3 were mostly working on loads of assignments, and taking more courses compared to other years of study. Similar finding was shown in another study that revealed students from Year 3 onwards were more likely to get affected by LBP [14]. As for the BMI categories, participants with normal BMI (18.5-24.9 kg/m^2) had the highest prevalence with 34.6%. A previous study reported 14.8% of LBP prevalence among the same population [15]. As for type of seating furniture, plastic chair had the highest score of back pain prevalence, though it was found not significantly associated with LBP.

The association of LBP with the risk factors was also estimated. Gender (female), year of study (third year), and BMI (>30 kg/m^2) have shown significant associations with LBP. Participants who spent more than 4 hours a day in sitting was the strongest predictor in contributing the risk of LBP (OR 0.148; 95% CI: 0.052-0.425). Prolonged sitting is defined as an activity involved with sitting at least 2 hours per day. Our finding is in accordance with another similar study involving undergraduates that reported incidence of LBP was highly affected by sitting more than 3 hours per day [7]. A previous study reported that co-contraction levels of trunk muscles increased during 2 hours of prolonged sitting and it is highly associated with the development of the back-pain [16]. The results of this study revealed that having a family history of low back pain act as a vital predictor of LBP (OR 2.403; 95% CI: 1.549-3.727), which is in agreement with the findings of a systematic review [17]. Genetics on disc disease act as a strong contributor in the development of back pain and it runs in

families. A previous study concluded that at least one person among half of young adults aged 20 to 22 years old suffered from disc degeneration disease [18]. Notably, being a third year student was one of the predictors for LBP in this study (OR 2.136, 95% CI: 1.331-3.427). This is in accord with the findings of a previous study that identified year of study as one of the risk factors of LBP [19]. Another study conducted among university students in Malaysia reported by 31.1% of LBP incidence [7]. The current finding of LBP prevalence among Year 3 students (50.5%) were found almost similar to a reported study in Pakistan with 51.1% [14]. In addition, female gender was another potential risk factor of LBP (OR 2.277; 95% CI: 1.454-3.565). Wáng et al. (2016) conducted a literature research on 98 studies and hypothesized the prevalence of LBP among female was generally higher than male regardless of age. It was noted that hormone fluctuation, menstruation and psychological factors were the risk factors of higher prevalence among young females. The female sex hormone is the main contributor of LBP among females and further studies regarding the effect of hormonal changes in female on LBP should be carried out [20].

Stepwise regression analysis also indicated standing for 4 to 6 hours a day induced low backache (OR 1.656; 95% CI: 0.889-3.086). This is in accord with the findings of a study that concluded prolonged standing for more than 4 hours may increase the risk of having back pain [21]. Besides, the authors defined prolonged standing as more than 4 hours of standing a day and standing without moving more than 1 hour from the workstation. Postural stress is the most common cause of low back pain. Generally, during standing and walking, the increased pressure on the spine can tighten the lower back muscles and develop spasm, leading to pain. Taylor et al. (2014) reported that females were more prone to experience LBP after more than 2 hours of standing, when compared to males [17]. However, most of the studies reported that LBP symptoms occur when standing for a period of 30 minutes to 2 hours [22, 23]. The findings from other studies suggested the mechanisms behind the development of LBP during static standing was the increased of compression force between intervertebral disc, increased co-contraction and weak hip and trunk muscles [24]. Researchers have suggested that the risk of LBP is increased due to excessive co-activation of the muscles involved in postural stability during prolonged standing [23, 25]. Specifically, it was postulated that prolonged standing results in a significant increase in co-activity of the gluteus medius muscle, a muscle group

that serves to stabilize the pelvis during standing by abducting, medially rotating, and laterally rotating the thigh at the hip. The results of the present study revealed that BMI of more than 30 kg/m^2 increase the prevalence of LBP (OR 0.271; 95% CI: 0.061-1.230). This is consistent with the findings of previous studies [26, 27]. Obesity was a potential risk factor of LBP in both genders. Obesity may have both biomechanical and meta-inflammatory effects on the spine.

5.0 CONCLUSION

The confinement decreed due to the Covid-19 pandemic led to a significant increase in LBP intensity among university students residing in Malaysia. The present study revealed that the prevalence of LBP during MCO among university students is 37.2%, with gender, faculty and year of study significantly associated with LBP. Higher prevalence was found amongst third year students, female students, and age of 21 years old. Further studies suggest to work on preventive measures and strategies regarding back pain.

COMPETING INTEREST

There is no conflict of interest.

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