Low Back Pain Prevalence and Associated Factors among Medical Students

Kritsana Kientchockwiwat[1]
Sirikarn Tangcheewinsirikul[2*]
[1] Department of Rehabilitation Medicine, Faculty of Medicine Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand
[2] Division of Rheumatology, Department of Pediatrics, Faculty of Medicine Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand
* Corresponding author, e-mail address: sirikarn.t@nmu.ac.th
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Abstract

Objective: To investigate the prevalence of low back pain (LBP) and its associated factors among Thai medical students at a single university in Thailand.

Methods: Using an anonymous self-administered survey, we collected demographic data and details of LBP and associated disability (modified Oswestry disability questionnaire [MODQ]). This was distributed online to medical students between January and March 2022. Univariate and multivariate analyses were conducted, and odds ratios (ORs) and confidence intervals (CIs) were reported.

Results: Of the 150 eligible students, 146 responded (91 female, mean age 21.6 ± 1.8 years). The prevalence of lifetime LBP and significant LBP were 81 (55.5%) and 55 (67.9%), respectively. Assessed by the MODQ, 92.4% of students suffered mild disability due to LBP, which correlated with severity (r_s = 0.600, p < 0.001). Alcohol drinking (OR 2.9, 95%CI 1.1–7.7), being underweight (<18 kg/m^2; OR, 14.8; 95%CI, 1.9–117.1), not drinking caffeine (OR, 0.3; 95%CI 0.1–0.8), and a family history of LBP (OR, 3.1; 95%CI, 1.2–8.3) were significantly associated with significant LBP in the univariate analysis. In the multivariate analysis, family history (aOR, 3.5; 95%CI, 1.1–11.1) and being underweight (aOR, 15.6; 95%CI, 1.7–141.2) were independently associated with LBP.

Conclusion: LBP was common among medical students and was associated with both low weight (<18 kg/m^2) and having a family history of LBP. MODQ is practical for evaluating LBP disability

Keywords: low back pain, medical students, disability, back pain, musculoskeletal pain, undergraduate student

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ความชุกของอาการปวดหลังส่วนล่างและปัจจัยที่เกี่ยวข้องในนักศึกษาแพทย์

กฤษณะ เกียรติโชควิวัฒน์ พ.บ., ว.ว. เวชศาสตร์ฟื้นฟู[1]

สิริการย์ ตั้งชีวินศิริกูล พ.บ., ว.ว. กุมารเวชศาสตร์, ประกาศนียบัตรกุมารเวชศาสตร์โรคข้อและรูมาติสซั่ม[2*]

[1] ภาควิชาเวชศาสตร์ฟื้นฟู คณะแพทยศาสตร์วชิรพยาบาล มหาวิทยาลัยนวมินทราธิราช กรุงเทพมหานคร ประเทศไทย

[2] หน่วยวิชาโรคข้อและรูมาติสซั่ม ภาควิชากุมารเวชศาสตร์ คณะแพทยศาสตร์วชิรพยาบาล มหาวิทยาลัยนวมินทราธิราช กรุงเทพมหานคร ประเทศไทย

* ผู้ติดต่อ, อีเมล: sirikarn.t@nmu.ac.th

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความชุกของอาการปวดหลังส่วนล่างและปัจจัยที่เกี่ยวข้องในนักศึกษาแพทย์ คณะแพทยศาสตร์วชิรพยาบาล

วิธีดำเนินการวิจัย: การวิจัยศึกษาระหว่างเดือนมกราคม - มีนาคม พ.ศ. 2565 โดยใช้แบบสอบถามออนไลน์ประเมินตนเองเป็นเครื่องมือในการรวบรวมข้อมูล ประกอบไปด้วย ข้อมูลทั่วไปของนักศึกษา อาการปวดหลังส่วนล่างและปัจจัยที่เกี่ยวข้อง ร่วมกับประเมินภาวะทุพพลภาพหรือสมรรถภาพในการทำกิจกรรมต่างๆ ด้วยแบบสอบถาม modified Oswestry disability questionnaire (MODQ) ฉบับภาษาไทย วิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนาสำหรับการแจกแจงความถี่ ร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน และใช้สถิติ logistic regression analysis, correlation coefficient ศึกษาความสัมพันธ์ระหว่างปัจจัยต่าง ๆ ที่มีผลต่อภาวะปวดหลังส่วนล่าง

ผลการวิจัย: จากนักศึกษาแพทย์ทั้งหมด 150 รายที่ร่วมตอบแบบสอบถาม จำนวน 146 ราย ตกลงร่วมโครงการวิจัย พบอายุเฉลี่ยที่ 21.6 ± 1.8 ปี แบ่งเป็นเพศหญิง 91 คน ร้อยละ 55.5 รายงานว่ามีอาการปวดหลังส่วนล่าง และ ร้อยละ 67.9 แสดงอาการปวดอย่างมีนัยสำคัญ เมื่อทำการประเมินภาวะทุพพลภาพและสมรรถภาพในการทำกิจกรรมต่าง ๆ ที่เกิดจากอาการปวดหลังส่วนล่างพบว่าร้อยละ 92.4 ของนักศึกษาแพทย์มีภาวะจำกัดในการทำกิจกรรมต่าง ๆ น้อย ซึ่งความรุนแรงของอาการปวดสัมพันธ์คะแนน MODQ จากการศึกษาปัจจัยที่เกี่ยวข้องพบว่า ภาวะน้ำหนักตัวต่ำกว่าเกณฑ์และมีญาติสายตรงที่มีอาการปวดหลังส่วนล่างเป็นปัจจัยที่เกี่ยวข้องอย่างมีนัยสำคัญทางสถิติ

สรุป: ภาวะปวดหลังส่วนล่างเป็นปัญหาที่พบได้บ่อยในกลุ่มนักศึกษาแพทย์ โดยภาวะน้ำหนักตัวต่ำกว่าเกณฑ์และมีญาติสายตรงที่มีอาการปวดหลังส่วนล่างเป็นปัจจัยที่เกี่ยวข้อง โดยสามารถประเมินภาวะทุพพลภาพจากอาการดังกล่าวได้ด้วยเครื่องมือ MODQ

คำสำคัญ: ภาวะปวดหลังส่วนล่าง ทุพพลภาพ นักศึกษาแพทย์ วัยรุ่นตอนปลายและวัยผู้ใหญ่ตอนต้น

วันที่รับบทความ 5 กันยายน 2565 **วันแก้ไขบทความ** 28 กันยายน 2565 **วันตอบรับบทความ** 21 ตุลาคม 2565

Introduction

Low back pain (LBP) refers to the sensation of pain or discomfort radiating from the posterior costal margin to the inferior gluteal fold, with or without referred leg pain[1]. Several etiologies have been proposed, including infection, osteoporosis, tumor, fracture, and musculoskeletal inflammation (e.g., ankylosing spondylitis). The Global Burden of Disease (GBD) reported that more than 80% of the population may experience LBP at least once in their lives[2], however up to 85% of cases are labeled nonspecific due to the absence of detectable abnormalities[3]. LBP frequently affects daily activities as addressed by GBD[2], while other report indicated that physical work, walking posture, sitting, lifting things (posture), obesity, age, and smoking all affect symptoms[4]. LBP has also been reported among health science students, including medical students[5-10], in whom the reported prevalence ranges from 40% to 80% depending on geography and ethnicity[9-13]. Moreover, different factors affected LBP in these cross-sectional studies and its presence also affected educational abilities[5]. As a result of these findings, the further research is warranted among health science groups.

This research aimed to study the prevalence of, and the factors associated with, LBP among medical students at a single university in Thailand.

Methods

The study protocol was reviewed and approved by the Ethics Committee for Research in Humans, Institutional Review Board (COA 238/2564). We distributed an anonymized, self-administered, structured online survey to medical students at the Faculty of Medicine between January and March 2022. Informed consent was implied when students completed and returned the questionnaires. The first section of questionnaire covered demographic data, psychological factors, and lifestyle factors, and followed by disability assessment which were evaluated by Thai version of the modified Oswestry disability questionnaire (MODQ). Students were sent a link to the online survey using existing social media professional groups (LINE) or by email. No reminders were sent. The data were privately collected online using the free Google Forms survey administration software. Anonymity and confidentiality were maintained for all students throughout the survey.

The questionnaire contained 25 questions divided into 2 parts. The first part collected demographic data such as age, sex, weight, height, body mass index (BMI), study year (1–6), previous underlying disease, and current medication. BMI was categorized into <18 kg/m^2: underweight; 18.5-22.9 kg/m^2: normal; 23.0-24.9 kg/m^2: overweight; and >25 kg/m^2: obesity[14]. The second part asked about putative risk factors correlated with LBP, including alcohol consumption, exercise, sitting posture, shoe type, caffeine consumption, screen time (hours/day), and family history of LBP. We also include red flag signs and symptoms for LBP, considering cauda equina syndrome, inflammatory back pain, chronic infection, and malignancy[15]. The following were queried: pain at night, pain causing awakening, or pain that worsens on lying down; morning stiffness lasting at least 30 minutes; fever with weight loss; abnormal urination or defecation; and intravenous drug or steroid use. Disability due to LBP was evaluated based on the Thai version of the MODQ, which has been verified as valid and reliable[16].

Continuous data are reported as means and standard deviations, or for nonnormal distributions, as medians and interquartile ranges (IQR). Categorical data are presented as numbers and percentages. For the univariate analyses, we used the chi-squared or Fisher exact test depending on the data distribution. Variables with a p-value of <0.05 in the univariate analysis were including in multiple logistic regression analysis to evaluate factors correlated with LBP. Odds ratios (OR) and 95%CI were calculated. All analyses were performed in IBM SPSS Version 28.0 for Windows (IBM Corp., Armonk, NY, USA) with p-values of <0.05 considered statistically significant. All procedures requiring human involvement were performed in accordance with the ethical standards of the institutional review board.

Results

Of the 150 medical undergraduates across six years at our university, 146 responded to the questionnaire (97.3% participation rate). The demographic and clinical data are presented in Table 1. The participants included 91 females and had a mean age of 21.6 ± 1.8 years. More than half of the students (53.4%; n = 78) had a normal BMI (18.5–22.9). Approximately half of the students reported not engaging in sport activities, 41.1% reported less than 30 minutes of exercise per day, and only 10% practiced more than 30 minutes per day. Two-thirds of the students reported a family history of LBP.

Table 1:
Demographic and clinical characteristics of the 146 participants

Variable		N (%)
Age (year)		21.6 ± 1.8
Gender	Male	55 (37.6)
	Female	91 (62.3)
Weight (kg)		59.9 ± 14.2
Height (cm)		165.6 ± 8.4
BMI (kg/m^2), median (IQR)		29.7 (19.2,23.1)
<18.5	Underweight	24 (16.4)
18.5–22.9	Normal	78 (53.4)
23.0–24.9	Overweight	20 (13.7)
>25.0	Obesity	24 (16.4)
Study year	1	35 (24)
	2	33 (22.6)
	3	30 (67.1)
	4	11 (7.5)
	5	18 (12.3)
	6	19 (13.0)
Caffeinated drink	0	34 (23.3)
	1 cup/day	85 (58.2)
	>1 cup/day	27 (18.5)
Coffee drink	0	74 (50.7)
	1 drink/day	57 (39.0)
	>1 drink/day	15 (10.3)
Smoking		1 (0.7)
Alcohol drinking		44 (30.1)
Exercise	No	71 (48.6)
	< 30 mins/day	60 (41.1)
	>30 mins/day	15 (10.3)
Abnormal sitting position		106 (72.6)

Table 1:
Demographic and clinical characteristics of the 146 participants (Continued)

Variable		N (%)
Sitting, hours/day		9.4 ± 3.5
Sleeping, hours/day		7.3 ± 2.0
Standing, hours/day		4.0 ± 2.5
Night shift, per week (day)		0.8 ± 2.9
Screen time, per day (hours)		9.6 ± 3.6
Family history of LBP		101 (69.2)
Lifetime LBP		81 (55.5)
Shoe preference	Ballerina flats	22 (15.1)
	Slip-ons	35 (24.0)
	Sneakers	60 (41.1)
	Flip-flops	20 (13.7)
	Leather shoes	9 (6.2)
	High heels	0 (0)
MODQ disability group	Mild	73 (92.4)
	Moderate	6 (7.6)
	Severe	0
	Cripple	0
	Bed bound	0

Abbreviations: BMI, Body mass index; LBP, Low back pain; IQR, interquartile range; MODQ, Modified Oswestry disability questionnaire.

Most students (92.4%) were classified as having mild disability from LBP according to the MODQ. Lifetime LBP was reported by 81 (55.5%) and significant LBP with a pain score ≥3 was reported by 55 (67.9%) students. In the univariate analysis (table 2), the following factors were significantly associated with significant LBP: underweight BMI (i.e., <18 kg/m^2; OR, 14.8; 95%CI, 1.9–117.1), family history of LBP (OR, 3.1; 95%CI, 1.2–8.3), no caffeine consumption (OR, 0.3; 95%CI, 0.1–0.8), and alcohol consumption (OR, 2.9; 95%CI, 1.1–7.7). In multivariate analysis, the independent risk factors for low back pain are shown in Table 3, which confirmed roles for a positive family history of LBP and an underweight BMI, with adjusted ORs of 3.5 (95%CI, 1.1–11.1; $P = 0.032$) and 15.6 (95%CI, 1.7–141.2; $P = 0.015$), respectively. None of our cohort reported any red flag signs or symptoms.

The LBP score correlated significantly with the MODQ score ($r_s = 0.600$, $p < 0.001$), while the severity of LBP showed a trend to correlate with BMI ($r_s = -0.367$, $p < 0.001$), as shown in Figure 1. Other variables did not show statistically significant correlations (table 4).

Table 2:
Factors associated with significant low back pain by univariate logistic regression

Factor		Significant LBP			
		N (%)	OR	95%CI	*p*
BMI					
	Underweight	16 (94.1)	14.8	1.9-117.1	0.001*
	Healthy	28 (58.3)	0.9	0.4-2.0	0.767
	Overweight	7 (43.8)	0.454	0.2-1.4	0.156
	Obesity	4 (36.4)	0.34	0.1-1.2	0.110
	p trend				0.001*
Study year	1	13 (76.5)	2.6	0.8-8.6	0.120
	2	11 (55)	0.8	0.3-2.1	0.622
	3	9 (69.2)	1.6	0.5-5.7	0.453
	4	3 (60.0)	1.0	0.2-6.3	0.992
	5	10 (55.6)	0.8	0.3-2.3	0.683
	6	9 (47.4)	0.5	0.2-1.5	0.215
	p trend				0.128
Family History of LBP		46 (66.7)	3.1	1.2-8.3	0.02*
Female			1.2	0.5-2.8	0.686
Exercise	No	21 (51.2)	1.9	0.8-4.4	0.135
	< 30 mins	29 (67.4)	1.8	0.8-4.3	0.160
	≥ 30 mins	5 (62.5)	1.1	0.3-5.1	1.000
Abnormal sitting position		41 (63.1)	1.6	0.6-3.9	0.317
Coffee consumption	No	25 (52.1)	2.0	0.8-4.6	0.116
	Yes 1 drink/day	24 (68.6)	1.8	0.8-4.4	0.178
	Yes >1 drink/day	6 (66.7)	1.4	0.3-5.9	0.736
	p trend				0.169
Caffeine drinking	No	9 (37.5)	0.3	0.1-0.8	0.012*
	Yes 1 drink/day	35 (64.8)	1.7	0.7-3.9	0.241
	Yes >1 drink/day	11 (78.2)	2.8	0.7-11.0	0.119
	p trend				0.008*
Alcohol		22 (75.9)	2.9	1.1-7.7	0.033*
Shoe preference	Ballerina Flats	9 (60)	1.0	0.3-3.1	0.986
	Slip-ons	15 (65.2)	1.4	0.5-3.6	0.539
	Sneakers	23 (54.8)	0.7	0.3-1.6	0.368
	Flip-flops	2 (33.3)	0.3	0.1-1.8	0.215
	Leather shoe	6 (100)	0.6	0.5-0.7	0.078

*$p < 0.05$
Abbreviations: CI, Confidence interval; BMI, body mass index; LBP, low back pain; MODQ, Modified Oswestry disability questionnaire; OR, odds ratio.

Table 3:
Factors associated with significant low back pain by multivariate logistic regression analysis

	Significant LBP		
	Adjusted OR	95%CI	*p*
Family History of LBP	3.5	1.1-11.1	0.032*
Underweight	15.6	1.7-141.2	0.015*
Alcohol used	2.8	0.9-9.3	0.088
Caffeinated drink	0.3	0.1-1.0	0.057

*$p < 0.05$
Abbreviations: CI, Confidence interval; LBP, low back pain; OR, odds ratio.

Table 4:
Factor correlated with the Low back pain score

	Correlation coefficient	*p*
Sitting, hours/day	-0.030	0.774
Standing, hours/day	0.085	0.421
Sleeping, hours/day	-0.091	0.389
BMI, kg/m^2	-0.367	<0.001*
MODQ score	0.600	<0.001*
Weight, kg	-0.267	0.01*
Age, year	-0.258	0.013*
Study Year, 1–6	-0.302	0.003*

Calculations were performed using Spearman's rank correlation.
Abbreviations: BMI, body mass index; LBP, low back pain; MODQ, Modified Oswestry disability questionnaire.

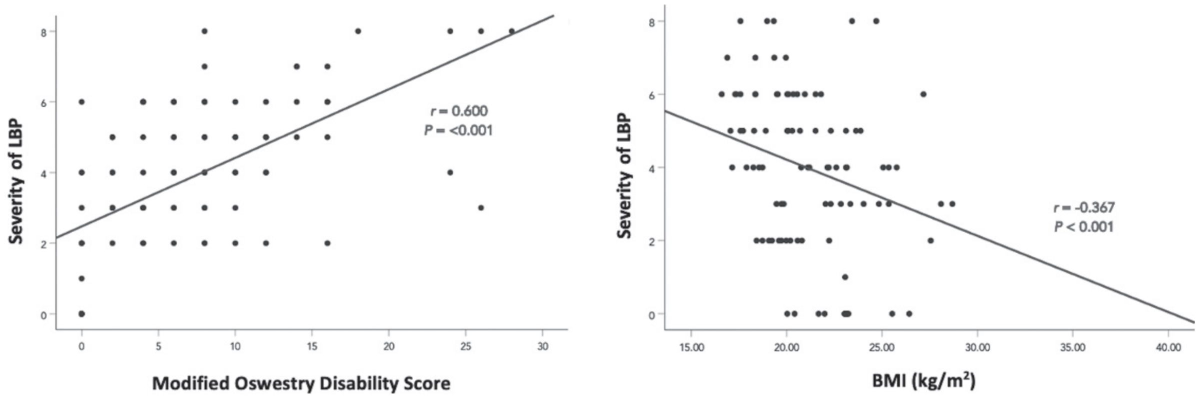

Figure 1: Correlation of low back pain severity by Modified Oswestry disability questionnaire score and body mass index

Discussion

This survey of Thai medical students, with the period of late adolescent and early adulthood, from an urban area revealed a high prevalence of LBP. The prevalence of LBP among Thai adolescent was 26.7%[17], which was less commonly than our study. Comparable to findings in Malaysia (46.1%)[6], India (47.5%)[18], and Iran (56.8%)[19], more than half of our students (55.5%) reported a lifetime prevalence of LBP. By contrast, only 20.8% and 23.2% of medical students reported LBP in Serbia and Saudi Arabia, respectively[13,20]. Although data from the Malaysian cohort indicated that ethnicity might alter the prevalence due to observed differences among Malay, Chinese, and Indian populations, no statistical significant differences were reported[6]. Instead, the variation between study results could be explained by differences in the populations, study protocols, lifestyles, cultures, and education.

Furthermore, the univariate and multivariate analyses revealed several interesting factors associated with the presence of LBP in this cohort. The significant association for family history of LBP is confirmed by the results of other studies[13,18]. A systematic review previously demonstrated that a family history of chronic back pain in parents could lead to poorer outcomes in offspring when compared with pain-free families[21]. It has been suggested that genetics[22] or the shared family environment[21] could explain this association.

Being underweight (BMI, <18 kg/m^2) correlated with LBP in our study. Suboptimum health behavior could play a key role for medical students, possibly related to the lower priority that doctors tend to put on their health[23]. Health care professionals have less time for self-care, which could directly affect their weight[24]. Vitamin D insufficiency or deficiency has been reported at a high prevalence in underweight populations[25]. Surprisingly, despite Thailand being located in a tropical region with adequate sun exposure, several studies indicate a high prevalence of hypovitaminosis D in the Thai population[26-27]. A potential association between vitamin D deficiency and LBP[28-29], which possibly mediated by IL-6[27], could explain the link between being underweight and having LBP. In addition, LBP was associated with the atrophy of multifidus and paraspinal muscles which is more likely to happen in underweight people[30]. However, our study did not measure serum vitamin D levels, and a future study including this metric could be illuminating.

A significant univariate association was found with not drinking caffeinated beverages. Overall, 78.2% reported consuming two or more caffeinated drinks per day, including coffee, tea, cocoa or chocolate beverages, and so-called energy drinks. In a previous study, caffeine consumption was associated with chronic back pain, with the authors explaining that caffeine could help by alleviating pain, fatigue, and drowsiness[31]. However, caffeine also induces hypercalciuria, and as such, could have negative long-term effects on bone health[32-33].

Several studies have revealed that LBP is associated with stress, alcohol consumption, abnormal posture, 10 or more hours of screen time per day, and tobacco use[11,13,18-20]. However, none of these variables had a significant impact in our cohort. The variations in the prevalence and associated factors of LBP between current studies could be explained by differences in the target populations, protocols, and environments.

Our study has several limitations. First, this single center study included only a small number of medical students, without a power calculation, which may reduce the difference between outcomes and affect the statistical significance. Second, the COVID-19 pandemic prevented in-person interviews, which might have influenced the number of participants. However, this is the first cross-sectional study of LBP prevalence among urban medical students in our country, and we believe the findings are valid. Our results suggest the need to encourage greater education about LBP, mental health, fitness, and healthy relaxation among medical students to support their basic needs as the doctors of tomorrow.

In summary, LBP remains the major cause of disability among urban medical students. Increasing awareness to improve early diagnosis could significantly enhance quality of life. We found that the MODQ offers a practical clinical tool for assessing disability online. Further studies are warranted that evaluate LBP prevalence and associated factor in other health care professionals.

Conflict of interest

The authors declare no conflict of interest.

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