

PROPORTION AND CHARACTERISTIC OF MYOGENIC LOW BACK PAIN IN UNDERGRADUATE MEDICAL STUDENTS OF UDAYANA UNIVERSITY CLASS OF 2020

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ABSTRACT

Myogenic low back pain is one type of low back pain that is common but often undiagnosed. Medical students are packed with lecture and study activities so they are more at risk of experiencing low back pain. This study is to determine the proportion, characteristics of sufferers and characteristics of myogenic low back pain in medical students at Udayana University class of 2020. This study is a descriptive cross-sectional study with a sample size of 90 people who meet the inclusion criteria. Sampling using consecutive sampling method. Data collection by filling out an online questionnaire via Google Form and checking the presence of MPS through palpation by a neurology resident. Data analysis was performed using SPSS version 25. The proportion of myogenic low back pain sufferers in medical student class of 2020, Udayana University was 26.7%. The characteristics of the majority of sufferers were 20 years old (41.7%), female (70.8%), normal BMI (91.7%), occasional exercise (62.5%), sitting duration ≥ 4 hours (95.8%), and hunched sitting position (75%). The characteristics of myogenic low back pain were mostly acute (62.5%), pain was felt gradually (62.5%), and the pain scale was mild (54.2%). Respondents mostly chose non-pharmacological therapy by lying down or stretching (95.8%). Out of the 90 respondents who were included in the inclusion criteria in this study, there were 24 (26.7%) respondents who experienced myogenic low back pain with different characteristics from previous studies. Further research with a larger population and causal relationship studies needs to be done to find out the exact cause of myogenic low back pain and how to avoid it.

Keywords : myogenic low back pain, medical students, characteristics

INTRODUCTION

The second most common neurological disease after headache is low back pain (LBP).¹ One of the common complaints among the global population is LBP that is experienced at least once in their lifetimes.^{2,3} Nowadays, LBP can be experienced by anyone, not only in the elderly but also in adolescents.⁴ Medical students are identical to lecture and study activities that are quite dense so they are at risk of experiencing LBP. 34.7% of students in the medical faculty of Udayana University, Bali in 2018 suffered from LBP.⁵

Medical students, especially in the undergraduate medical study program at Udayana University have a busy schedule. The majority of lectures and learning activities are done sitting. There is a significant relationship between sitting time and LBP.⁶ As many as 79.2% of medical students have sitting time of more than 7 hours in one day. The prevalence of LBP as much as 59.4% stated that there was a relationship between sitting time and complaints of LBP.⁷

Low back pain is pain localized below the 12th costae to the gluteus muscles with or without pain radiating to the

legs.⁸ There are various classifications of LBP, one of which is myogenic low back pain (MLBP). Myogenic pain syndrome (MPS) is caused by adhesion, spasm, or taut bands in the muscles characterized by hypersensitive points called trigger points.⁹⁻¹¹

Risk factors for LBP include two, namely internal and external. Internal risk factors include gender, age, body mass index (BMI), and interpretation of waist circumference to measure central obesity. External risk factors include physical activity, history of spinal cord injury, ergonomics, length of sitting, and sitting position.⁵

Myogenic low back pain is a common but often undiagnosed form of LBP. Fascia is often overlooked as an etiology of pain in the low back region. Gold standards for the diagnosis of trigger points are not yet available and are still debated so there is often confusion in the diagnosis.^{2,12}

The prognosis of MLBP can reduce the functionality of body parts and thus reduce one's quality of life.¹³ Long-term complications of MLBP can reduce human productivity. Epidemiological data on MLBP sufferers is

still very limited, especially in Indonesia. Therefore, the author is interested in enriching these literature sources by conducting research on Udayana University undergraduate medical student class of 2020. The study was entitled "Proportion and Characteristics of Myogenic Low Back Pain in Undergraduate Medical Study Program Students of Udayana University Class of 2020" with the urgency to prevent a decrease in student productivity and quality during lecture activities.

MATERIALS AND METHODS

The research conducted was descriptive quantitative research with a cross-sectional approach. This research was conducted at the Faculty of Medicine of the University which made students of the undergraduate medical study program class of 2020 as samples. The number of samples used was 90 samples that met the inclusion and exclusion criteria using *consecutive sampling* techniques, meaning all subjects who came during the research until the required number of subjects was met. Sample data collection was only carried out once on the same respondent.

The inclusion criteria in this study were undergraduate medical students of Udayana University class of 2020 and willing to fill out questionnaires and become research subjects. Exclusion criteria in this study were students who had a history of spinal cord injury, spinal cord trauma, congenital spinal deformities, and moderate-severe scoliosis.

Data were collected by online questionnaire through Google form and examination of myogenic pain syndrome by neurology residents. The results of this study were analyzed descriptively using the SPSS version 25 program. This study has been ethically approved by the Research Ethics Commission of the Faculty of Medicine, Udayana University with protocol number 2023.01.1.0265.

RESULTS

The study was conducted at the Faculty of Medicine, Udayana University with a total sample of 91 respondents, of which there were 90 respondents who met the inclusion criteria. According to **Table 1**, most respondents were 20

years old, 49 people (54.4%), followed by respondents aged 21 years as many as 31 people (34.4%), 22 years as many as 8 people (8.9%), 19 and 23 years as many as 1 person (1.1%).

Based on gender characteristics, the largest number of respondents were women, namely 58 people (64.4%) while male respondents were 32 people (35.6%).

Based on BMI characteristics, the majority of respondents had a BMI of 18.5-22.9 or were categorized as normal, namely 36 people (40%). Followed by respondents with a BMI ≥ 25 or categorized as obese, 22 people (24.4%), a BMI 23-24.9 or categorized as overweight, 20 people (22.2%), and a BMI < 18.5 or categorized as underweight, 12 people (13.3%).

Based on the characteristics of central obesity, the largest number of respondents were those who did not experience central obesity, 65 people (72.2%) while those who experienced central obesity were 25 people (27.8%).

Based on the characteristics of previous medical history, most respondents had no previous medical history, namely 86 people (95.6%). Followed by mild scoliosis in 2 people (2.2%) and previous lower back pain in 2 people (2.2%). None of the respondents had a history of spinal cord injury, spinal cord trauma, congenital spinal abnormalities, and moderate-severe scoliosis.

Based on the characteristics of exercise frequency, the largest number of respondents were those who exercised occasionally, namely 57 people (63.3%). Followed by 20 respondents who often exercise (22.2%) and 13 people who never exercise (14.4%). There were no respondents who exercised every day.

Based on the characteristics of sitting duration, the majority of respondents had a sitting duration of ≥ 4 hours, namely 87 people (96.7%) while those with a sitting duration of < 4 hours were 3 people (3.3%).

Based on the characteristics of the sitting position, most respondents sat in a bent position, namely 53 people (58.9%). Followed by 25 people (27.8%) who sat in an upright position and 12 people (13.3%) who leaned back.

Based on MLBP complaints, the majority of respondents did not have MLBP, namely 66 people (73.3%) while those who had MLBP were 24 people (26.7%).

Table 1. Basic characteristics of the study subjects

Characteristics	n	%
Age		
19 years	1	1.1
20 years	49	54.4
21 years	31	34.4
22 years	8	8.9
23 years	1	1.1
Sex		
Male	32	35.6
Female	58	64.4
IMT	12	13.2
Underweight	36	40

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Normal	20	22.2
Overweight	22	24.4
Obesity		
Central obesity		
Yes	25	27.8
No	65	72.2
Past medical history		
None	86	95.6
Mild scoliosis	3	3.3
Low back pain	1	1.1
Exercise frequency		
Never	13	14.4
1-2x/week	57	63.3
3-5x/week	20	22.2
Everyday	0	0
Sitting duration		
< 4 hours	3	3.3
≥ 4 hours	87	96.7
Sitting position		
Slouch (70°)	53	58.9
Upright (90°)	25	27.8
Lean back (135°)	12	13.3
Myogenic low back pain		
Yes	24	26.7
No	66	73.3

As seen in **Table 2**, most respondents experienced acute MLBP classification, lasting for less than 5 weeks, as many as 15 people (62.5%). Subacute MLBP, defined as pain lasting 5-7 weeks or less than 3 months, affects up to 5 people (20.8%), while chronic MLBP defined as pain lasting 3 months or more, affects up to 4 people (16.7%).

Respondents who experienced MLBP mostly experienced initial symptoms in the form of pain that appeared gradually, as many as 15 people (62.5%). Afterward, a total of 8 people (33.3%) reported experiencing MLBP that manifested suddenly, then there was 1 person (4.2%) who complained that pain initially occurred when they were palpated.

Myogenic low back pain is felt by respondents mostly after doing activities, as many as 11 people (45.8%). Subsequently, MLBP was experienced during activities up to 7 people (29.2%), 3 people (12.5%) both during and after doing activities, 2 people (8.3%) before and during activities, and 1 person (4.2%) felt pain before doing activities.

Most of the respondents did not MLBP radiates to the legs, namely 21 people (87.5%) while 3 people (12.5%) felt the MLBP radiates to the legs.

Respondents' pain quality was assessed by the presence of interference when carrying out daily activities. Most respondents did not feel MLBP that interfered with daily activities, as many as 19 people (79.2%) while 5 people (20.8%) considered MLBP that the respondents experienced interfered with daily activities.

Based on the *Numerical Pain Rating Scale* (NPRS) or pain scale from 0-10, with the lowest number indicating

mild pain while the greater the number, the more severe the pain felt. Thirteen people (54.2%) reported experiencing mild pain, which most respondents classified as falling between scale of 1 until 3. Respondents reporting moderate pain, on a scale of 4 to 6 as many as 14 people (41.6%), and severe pain, on a scale of 7 to 10 complained by 1 person (4.2%) came next.

The pain sensations complained of by respondents with MLBP mostly felt a combination of soreness and stiffness, namely 9 people (37.4%) while the sensation of only soreness was 8 people (33.3%). Followed by 2 respondents (8.3%) who felt various combinations of soreness with other sensations such as, a combination of tingling, soreness, and stiffness and a combination of numbness, tingling, soreness, and stiffness as many as 1 person (4.2%). Other sensations were felt as stiffness, a combination of pricked and electrocution, a combination of numbness and burning, and a combination of pricked and stiffness each by 1 person (4.2%). No respondents felt the sensations of prickling, numbness, burning, tingling, and electrocution as the only sensations they felt.

Positions that make the pain worse are mostly felt in a sitting position, as many as 11 people (45.8%). Followed by the position of bending the body forward as many as 3 people (12.5%). Some respondents, 2 people (8.3%) felt that some positions could increase the intensity of the pain felt such as bending the body and turning the body left and right. Followed by sitting position, and bending the body forward as many as 2 people (7.1%), as well as sitting position, bending the body forward, and turning the body left and right as many as 2 people (7.1%). Myogenic low

back pain that aggravates the pain in a standing position is 1 person (4.2%), as well as respondents who complain of pain in a sitting, standing, and bending forward position as many as 1 person (4.2%). Myogenic low back pain that is aggravated by standing and lying down complained by 1 person (4.2%). One respondent (4.2%) complained that the pain was worse in the supine position with cushioning in the lower back area, as well as in the position of only lying down as many as 1 person (4.2%).

Most respondents who complained of MLBP made non-pharmacological efforts to reduce pain complaints, namely 23 people (95.8%) while some made efforts to combine pharmacological and non-pharmacological therapies as many as 1 person (4.2%). Most of the non-pharmacological therapies chosen were rest by lying down and stretching. Some respondents do yoga to relieve MLBP experienced by respondents. The choice of drugs in

respondents with a combination of pharmacological and non-pharmacological therapies is paracetamol or ibuprofen, and applying aromatherapy oil.

Table 3 presents the proportion of MLBP based on the basic characteristics of the respondents. Based on BMI characteristics, the most respondents who experienced MLBP were respondents with normal BMI, as many as 12 people (50%). Following that, a total of 5 people (20.8%) were obese, 4 people (16.7%) were overweight, and 3 people (12.5%) were underweight.

Based on the characteristics of central obesity, the most respondents who had MLBP were respondents without central obesity, as many as 18 people (75%) while respondents with central obesity were 6 people (25%).

In accordance to the characteristics of past medical history, the majority of respondents who

Table 2. Characteristics of MLBP in the study subjects

Characteristics	n	%
MLBP classification		
Acute	15	62.5
Subacute	5	20.8
Chronic	4	16.7
Onset of pain		
Suddenly	8	33.3
Gradual	15	62.5
Palpated	1	4.2
MLBP occurrence		
Before activity	1	4.2
During activity	7	29.2
After activity	11	45.8
During and after activity	3	12.5
Before and during activity	2	8.3
MLBP radiates to leg		
Yes	3	12.5
No	21	87.5
Quality of pain		
Interfered daily activities	5	20.8
Didn't interfered daily activities	19	79.2
Pain scale		
Mild	13	54.2
Moderate	10	41.6
Severe	1	4.2
Type of pain	0	0
Pricked	0	0
Numbness	0	0
Burning	0	0
Tingling	0	0
Electrocution	8	33.3
Soreness	1	4.2
Stiffness	9	37.4
Soreness, stiffness	1	4.2
Pricked, electrocution	2	8.3
Tingling, soreness, stiffness	1	4.2

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Characteristics	n	%
Numbness, burning	1	4.2
Pricked, stiffness	1	4.2
Numbness, tingling, soreness, stiffness		
Position that worsens the pain		
Sitting down	11	45.8
Standing	1	4.2
Bending forward	3	12.5
Turning body left and right	0	0
Sitting down, bending forward	2	8.3
Sitting down, bending forward, turning body left and right	2	8.3
Sitting down, standing, bending forward	1	4.2
Standing, lying down	1	4.2
Bending forward, turning body left and right	2	8.3
Lying down with cushioning on low back pain area	1	4.2
Pain management		
Pharmacological	0	0
Non-pharmacological	23	95.8
Combination	1	4.2

had MLBP were respondents with no previous medical history, 22 people in total (91.7%). Subsequently, a total of 2 person (8.3%) had a history of past medical history, reported having mild scoliosis while another person reported having LBP.

Based on the characteristics of exercise frequency, the most respondents who have MLBP are respondents who sometimes exercise, as many as 15 people (62.5%). Followed by respondents who often exercise as many as 6 people (25%), and who never exercise as many as 3 people (12.5%). There were no respondents with MLBP who exercised every day.

According to sitting duration characteristics, the majority of respondents who have MLBP are respondents with sitting duration of ≥ 4 hours, as many as 23 people (95.8%) whereas the number of respondents with sitting duration <4 hours is just 1 person (4.2%).

Based on the characteristics of sitting position, the most respondents with MLBP were respondents with a hunched sitting position, as many as 18 people (75%). There were up to 3 people (12.5%) who sat upright and 3 people (12.5%) who lean back.

Table 3. Proportion of MLBP based on baseline characteristics of study subjects

Characteristics	Myogenic low back pain			
	Yes		No	
	n	%	n	%
Age				
19 years	0	0	1	1.5
20 years	10	41.7	39	59.1
21 years	9	37.5	22	33.3
22 years	5	20.8	3	4.5
23 years	0	0	1	1.5
Sex				
Male	7	29.2	25	37.9
Female	17	70.8	41	62.1
IMT				
Underweight	3	12.5	9	13.3
Normal	12	50	24	40
Overweight	4	16.7	16	22.2
Obesity	5	20.8	17	24.4
Central obesity				
Yes	6	25	19	28.8
No	18	75	47	71.2

Past medical history		91.7		
None	22	4.2	64	97
Mild scoliosis	1	4.2	1	1.5
Low back pain	1		1	1.5
Exercise frequency				
Never	3	12.5	10	15.2
1-2x/week	15	62.5	42	63.6
3-5x/week	6	25	14	21.2
Sitting duration				
< 4 hours	1	4.2	2	3
≥ 4 hours	23	95.8	64	97
Sitting position				
Hunched (70°)	18	75	35	53
Upright (90°)	3	12.5	22	33.3
Lean back (135°)	3	12.5	9	13.6

DISCUSSION

In this study, there were 90 respondents of 2020 batch students of the medical education study program, Udayana University, 24 respondents (26.7%) who experienced MLBP and 66 respondents (73.3%) who did not have MLBP complaints. Research on the prevalence of non-specific NPB in medical students at Universitas Muhammadiyah Jakarta class of 2019 amounted to 52.2% of 113 students.¹⁴ Similar LBP research results were obtained in a study conducted in the city of Curitiba, which was 58%.¹⁵ The study on the prevalence of LBP in medical students at the University of Taif, Saudi Arabia amounted to 33.3%.¹⁶

Three different studies on the relationship between age and LBP stated that there was no relationship between age and LBP in medical students at two universities in Indonesia and one university in France.^{6,17,18} This is because in the age range of 20-22 years there has not been a decrease in elasticity due to bone degeneration. The risk of experiencing decreased bone elasticity due to bone degeneration increases with age.¹⁹ Bone density also decreases when reaching the age of 30 years and above due to increased osteoclast activity compared to osteoblasts.²⁰

Based on gender, the most cases of MLBP were experienced by female respondents, namely 17 people with a percentage of 70.8%. The prevalence of women who experienced LBP amounted to 68% of 366 medical students at Umm Al-Qura University, Saudi Arabia.²¹ Alturkistani's research on medical students at the University of Taif, Saudi Arabia also showed the proportion of women with LBP was 67.1%.¹⁶ A prospective study in France showed an association between gender and LBP complaints.¹⁷ Different results were found in five other studies that showed no significant relationship between NBP complaints and gender.^{6,15,18,22,23}

Aspects that may predispose women to LBP include smaller body size, less muscle mass, lower bone density, more vulnerable joints, and a greater proportion of fat.¹⁵ Women who experience menopause also experience decreased muscle ability due to a decrease in the hormone estrogen which can cause low back pain.¹⁸ In this study, the majority of respondents were still at a young age (19-23

years) so there were no hormonal disorders such as women experiencing menopause.

Based on BMI, most respondents with MLBP have normal BMI, namely 12 people with a percentage of 50%. Alturkistani's research was also dominated by respondents with normal BMI.¹⁶ The difference in results found in Taha et al research is that the prevalence of LBP is significantly lower in underweight students and high in overweight and obese students.²⁴ Similar results were found in Ramdas & Jella's study, where 44.7% of LBP respondents were individuals with overweight or obese BMI.²⁵ Obesity can increase pressure on the articular structures of the lower back which increases the risk of spinal degeneration.²⁵

Based on central obesity, the proportion of MLBP sufferers is dominated by those who are not centrally obese, which is 75% of 24 people. In theory, individuals with central obesity are more likely to suffer from back pain because it disrupts the static and kinetic balance of the spine.⁵ A positive correlation was found between waist circumference and abdominal muscle strength. This indicates a tendency to decrease abdominal muscle strength which may contribute to the incidence of LBP.²⁶ Similar results were also found that the abdominal muscle strength in the LBP group subjects was significantly lower than the group without LBP.²⁷

Based on medical history, 91.7% did not have a history of diseases related to the spine. This is directly proportional to the results of Amelot's study which did not show a significant relationship between a history of spinal cord injury and LBP.¹⁷ Sanjaya's study showed that out of 14 people who had a history of spinal cord injury, 11 of them suffered from back pain, and 8 of them suffered from LBP.⁵ Different results were found in a cross-sectional study at Umm Al-Qura University which showed a significant association between a history of LBP, especially in women, and the incidence of LBP currently suffered.²¹

Based on the frequency of exercise, 62.5% experienced NPB with a frequency of exercise sometimes (1-2x a week). Similar research results were obtained in Rizkiandini and Hamzah's research at the medical faculty of Muhammadiyah University Jakarta, 77% of 113 exercised 1-2x a week.¹⁴ Research on medical students at Umm Al-Qura University found 45.3% of students who experienced

LBP did not exercise.²¹ According to Taha's research, not doing exercise can be independently associated with LBP.²⁴ This is due to poor exercise habits that will result in poor back performance due to reduced oxygen supply in the muscles.²⁸ Good exercise habits can improve LBP and reduce analgesic consumption.¹⁷

Based on the length of sitting, the proportion of MLBP was 95.8% sitting for ≥ 4 hours. Research conducted on woven fabric crafters in Sidemen Village showed a relationship between sitting duration and MLBP. Woven fabric crafters who sit ≥ 4 hours are 5.781 times more at risk of experiencing LBP than those who sit for <4 hours.²⁹ Similar results from the results of research by Wijaya et al, namely the existence of a significant relationship between the length of sitting ≥ 4 hours a day with complaints of LBP in online game players.³⁰ Taha's research showed a significant relationship between medical students who sit for a long duration (>8 hours/day) and LBP. This is due to the long duration of lectures and individual study spent in a sitting position.²⁴ The results of 3 different studies showed no significant relationship between sitting duration and complaints of LBP.^{1,18,31}

Based on sitting position, the proportion of MLBP who sat in a hunched position (70°) was 75%. A hunched sitting position is a position that is not ergonomic.³² Research conducted by Pramana & Adiatmika showed a significant relationship between sitting position in laptop use and LBP in medical faculty students at Udayana University.¹ Similar results were found in Mutiara's research on the relationship between sitting position and LBP in students of the Sriwijaya University medical education study program.⁷ Low back pain can occur due to an incorrect and static sitting position with a long duration of sitting so that the postural load is heavy.

Based on pain quality, the proportion of MLBP that interfered with daily activities was 20.8%. In Alturkistani's study, 18.8% and 12.2% of respondents felt disturbed during work and leisure activities. The proportion of MLBP that interfered with daily activities was found in Taha's study, which amounted to 54.7%.²⁴ The impact of LBP that has a significant relationship on quality of life, namely work, sleep quality, personal life, and personal social activities.¹⁷

Based on the type of pain, a combination of stiffness (37.4%) and soreness (33.3%) is the dominating type of pain in undergraduate medical students of Udayana University. Similar results in Umm Al Qura University medical students, namely *dull pain* (43%). *Dull pain* is pain that is often associated with a sedentary lifestyle and incorrect sitting position, in contrast to the sharp type of pain commonly associated with injury or sciatica.²¹

Based on the position that made the pain worse, 45.8% felt the pain was worse when sitting. The majority of medical student study in a sitting position. Based on Taha's study, 73.6% of medical students choose to study in a sitting position.²⁴ Similar results in Goweda's study, 74.4% studied in a sitting position.²¹ The body experiences opposing pressure forces when sitting due to gravity.⁶ Sitting in the

wrong position and static for a long time can reduce blood flow to the muscles resulting in muscle fatigue.¹⁹

Based on efforts to alleviate the pain, most respondents chose non-pharmacological efforts for their MLBP complaints (95.8%). Most respondents chose to rest by lying down or stretching. Lesions due to poor mechanical positioning can usually improve with rest.³³ Similar results in Taha's study, 92.5% chose non-pharmacological efforts to reduce LBP.²⁴ Non-pharmacological efforts can be made by maintaining good posture, sleeping, and sitting in the correct position.²¹ Application of heat and ice can also be done to reduce LBP.²⁴ Efforts to reduce LBP pharmacologically most commonly use analgesics such as paracetamol and ibuprofen. Monthly and weekly analgesic consumption was significantly associated with LBP.¹⁷

CONCLUSIONS AND SUGGESTIONS

This study concluded that 26.7% of 90 respondents suffered from MLBP with the characteristics of the majority aged 20 years (41.7%), female (70.8%), normal BMI (50%), without central obesity (75%), without a history of previous disease (91.7%), occasional exercise (62.5%), sitting duration ≥ 4 hours (95.8%), and sitting position hunched (75%). The characteristics of NPBM felt by the majority were acute (62.5%), the pain was felt gradually (62.5%), began to be felt after doing activities (45.8%), there was no MLBP radiates to the legs (87.5%), did not disrupt with activities (79.2%), mild scale (54.2%), the pain felt was a combination of soreness and stiffness (37.4%), sitting position made the pain worse (45.8%), and non-pharmacological efforts to reduce pain (95.8%).

Further research is needed with prospective methods using primary data to obtain a direct relationship between risk factors and myogenic low back pain. In addition, providing education to medical students regarding the risks associated with myogenic low back pain needs to be done as a preventive measure.

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