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Relationship Between Low Back Pain Severity and Standing Body Posture in Students of The Faculty of Medicine, Universitas Airlangga

Rafi Addimaysqi[1], Hanik Badriyah Hidayati[2*], Martha Kurnia Kusumawardani[3], Lukas Widhiyanto[4], Atikah[5]

[1]Faculty of Medicine, Universitas Airlangga, Surabaya
[2]Department of Neurology, Faculty of Medicine, Universitas Airlangga, Surabaya
[3]Department of Rehabilitation, Faculty of Medicine, Universitas Airlangga, Surabaya
[4]Department of Orthopedic and Traumatology, Faculty of Medicine, Universitas Airlangga, Surabaya
[5]Department of Public Health Science, Faculty of Medicine, Universitas Airlangga, Surabaya

E-mail: rafiaddimaysqi@gmail.com; hanikhidayati@fk.unair.ac.id; dr.marthakurnia.spkfr@gmail.com

*Corresponding author details: Hanik Badriyah Hidayati; hanikhidayati@fk.unair.ac.id

ABSTRACT

Background: Low back pain (LBP) is a condition with a high incidence across all age groups, particularly among college students and young adults. LBP ranks as the sixth most common symptom globally. Studies in 2022 have shown that adolescents have a notably high incidence rate of 71,2%. Standing posture is particularly problematic among students, with a 2017 study indicating that 68% of students exhibit abnormalities in their standing posture. ***Objective:*** To examine the correlation between the severity of LBP and standing posture among medical students at Universitas Airlangga, Surabaya, Indonesia. ***Method:*** This research was conducted using an analytical cross-sectional study design. Primary data were collected using a sample that fulfilled inclusion and exclusion criteria with a questionnaire and direct examination. ***Result:*** 62 samples of students have been collected. The data revealed that 52 subjects (83%) exhibited postural abnormalities, while 10 subjects (17%) had normal postures. Specific abnormalities, such as shoulder deviation (45 subjects) and forward head position (11 subjects), were identified in the majority of subjects. ***Conclusion:*** The results of the study revealed the relationship between standing posture and the severity of low back pain with a p-value of 0.053, This indicates that there is no difference in the severity of low back pain between subjects with normal and abnormal standing posture. A study in 2021 stated that standing posture as a risk factor cannot independently or directly correlate with LBP. Therefore, additional supporting data are necessary to establish significance.

Keywords: correlation, low back pain; standing posture; Oswestry low back pain disability index; PTA postural assessment.

INTRODUCTION

Low back pain (LBP) is a painful sensation located in the lumbar area (between T12-L1), it is defined as a symptom and not a disease [1][2]. Based on WHO in 2020, Up to 619 million people suffer from LBP, and by 2050, that number will rise to 843 million. Perhimpunan Dokter Saraf Indonesia (PERDOSSI) reported that in the month of May 2022, 18,37% of all patients had LBP. The prevalence of LBP among teenagers is 84% and the disability level is 12%, respectively, this indicates that LBP is very common among teenagers, especially college students [3][4]. LBP has many risk factors, such as sociodemographic, daily activity, general wellness, socioeconomic status, and genetics [5]. When performing daily activities, one of the most common problems is related to body posture [6].

Based on a study conducted in 2017, body posture refers to the position of the body in empty space, and it serves the purpose of maintaining balance during dynamic and static movement, body posture can be divided into standing, sitting, and laying positions that have specific interpretation [6][7]. Poor body posture may cause structural problems in the body's axis in all of its components, specifically in the vertebrae that help to support the body [7][8].

Standing posture abnormalities are more frequently found than other postures. According to a study in Latin America, up to 58,4% suffer from standing posture issues, while another study in 2017 found that up to 68% of students experienced standing posture abnormalities [9]. These two issues are common in society and affect people of all ages.

Given the urgency, this study tries to conduct a correlation test and determine the relationship between these two variables. The objective of this study is that it will determine whether standing posture has a significant impact on LBP.

METHODS

This study's population consists of students from the Faculty of Medicine at Universitas Airlangga, class of 2021-2023, selected at random from a pool of 62 students based on similar research. The design of this study uses observational analytics, its method combines subjective assessment using the Oswestry Low Back Pain Disability Index (ODI) to determine the severity of LBP with Google form. ODI is a questionnaire used to assess disability in the lower back area. It is considered the gold standard for functional results in those suspected of having LBP [10].

After that subject will be examined with objective examination using the PTA static postural assessment to determine students' standing posture. PTA is a qualitative method used by professionals to examine the patient's posture in a standing or static position by directly examining the anterior-posterior and lateral regions [11]. Interpretation of this examination is taken by inspecting the subjects to be assessed based on their standing posture using the checklist that is already included in the assessment. This instrument has limitations, including the need for expertise in identifying each region, both from the researcher's perspective and from the participants' clothing.

Data was collected online in the first stage, and at the Faculty of Medicine, Airlangga University in the second stage (conducted by residents of the Department of Physical Medicine and Rehabilitation). The data is being processed using the Statistical Package for the Social Sciences (SPSS) software and then tested using the Mann- Whitney U test with a 5% significance level.

RESULT AND DISCUSSION

This study occurs from the month of March to August 2024 with two stages based on the methods, The first stage uses a random sampling method in which FK Unair students from the 2021-2023 intake fill out a Google Form provided by the researcher to subjectively measure the level of LBP using the Oswestry Disability Index (ODI), which ranges from mild to intolerable. The data obtained consisted of 117 subjects who completed the questionnaire; however, 23 students were excluded because they did not wish to continue with the procedure.

The second stage of the study was to measure the standing posture of 94 students directly at the Airlangga Medical Education Centre, Campus an FK Unair, Surabaya, East Java. Sampling was taken on the 5th floor, rooms 511 and 512 by PPDS Rehab Medik Dr. Soetomo Hospital Surabaya at 15.00-16.00. At this stage, 62 subjects were successfully measured, while 32 other subjects could not be measured because they were not present during the data collection procedure.

TABLE 1: Demography of Subject.

Demography	Frequency n (%)
Age (n=62)	
18	5 (8)
19	14 (23)
20	23 (37)
21	15 (24)
22	3 (0.5)
Gender (n=62)	
Man	36 (58)
Woman	26 (42)
Academic Year (n=62)	
2021	37 (60)
2022	16 (26)
2023	9 (14)

According to the demographics that have been presented, the age range is 18–22 years old with a median of 20 years. The largest distribution (mode) is 20 years old, with 23 (37%) research subjects falling into this age range, and the smallest is 22 years old, with 3 (0,5%) subjects falling into this age range. One of the study's inclusion indicators is the student class; in the 2021 class, there are 37 (60%) research subjects, the majority, and in the 2024 class, there are 9 (14%) research subjects. The dominating gender is male, with 36(58%), and female, with 26 (42%).

TABLE 2: Analysis of Severity of Low Back Pain.

Severity of LBP	Frequency n (%)
Mild	58 (93)
Moderate	3 (5)
Severe	1 (2)
Very severe	0
Intolerable	0
Total	**62 (100)**

Based on the distribution table derived from the subject's perception of the intensity of LBP suffered by a total of 62 students, it was discovered that they experienced various types of pain. A total of 58 (93%) participants were classified as mild with a score range of 0-10, followed by 3 (5%) subjects in the moderate group with a score range of 11-20, and one (2%) subject in the severe category with a score range of 21-30. The very severe category with a range of 31-40 and the intolerable category with a range of 41-50 were not classified as any research subjects.

According to another study conducted in 2024, 96 people (58%) of the research subjects experienced

LBP, with 63.5% falling into the minimal disability category, followed by moderate disability (25%), severe disability (7.3%), and very severe (4.2%). Another study conducted in Jakarta by Maria et al using the same measurement instrument, the ODI, discovered that the majority of the research subjects experienced minimal disability (93.4%), with the remaining 6.6% experiencing moderate disability [11][12].

TABLE 3: Analysis of Standing Body Posture.

Posture Category	View	Body Region	Subjects (n)
Normal Posture	-	-	10
Abnormal Posture	AP View	Upper Body	45
	AP View	Lower Body	11
	Lateral View	Upper Body	16
	Lateral View	Lower Body	4
Total			**62**

Based on the review taken in the second stage of the study, which involved evaluating the standing posture of 62 participants, it was discovered that 10 (17%) subjects had normal posture and 52 (83%) subjects had bad posture with diverse components. The upper and lower bodies were examined from two angles: the first antero-posterior (AP) view revealed abnormalities in the upper bodies of 45 subjects and the lower bodies of 11 subjects, while the second lateral view revealed abnormalities in the upper bodies of 16 subjects and the lower bodies of four subjects.

The results of the study in the table show that 52 subjects (83%) experienced abnormalities in standing posture. This is in accordance with a study conducted in 2020, which stated that 65,3% of children to adolescents in Chinese schools experienced abnormalities in their posture [13][14][15].

TABLE 4: Correlation of Severity of Low Back Pain and Standing Body Posture.

Test	Severity of LBP
Mann-Whitney U	0.472
Asymp. Sig	0.053

The Mann-Whitney U test reveals a difference in mean rank between the normal and abnormal groups, with the normal group having a higher mean than the abnormal group, indicating that the normal group is more severe than the abnormal group. The data has a significance level of 0.053 (p-value> 0.05), indicating that there is no difference between the normal and abnormal posture groups. According to Bento et al. in 2020, who measured 600 adult subjects to determine the largest distribution of all risk factors such as smoking, age, education level, metabolic disease, lifting heavy weights, and body posture, the results revealed that the body posture factor was only significant in female subjects. Another study that measured 529 subjects in various body postures such as standing, sitting, walking, and lying down discovered no relationship between body posture and LBP.

According to Kripa and Kaur, the observed relationship between body posture and pain is very minimal. Even if there is a correlation between pain and posture, it does not imply a fundamental relationship. LB pain can cause poor posture, but it is not the primary cause of LB pain. As a result, static posture is not a major factor in LBP, so other variables must be used in the search for significant relationships in searching for LBP causative factors [16][17][18].

CONCLUSION

The results of the study revealed the relationship between standing posture and the severity of low back pain with p p-value of 0.053, This indicates that there is no difference in the severity of low back pain between subjects with normal and abnormal standing posture.

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There are several limitations to this study, such as not including variables that can increase the severity of LBP, such as daily habits, medical history, and additional characteristics to further specify the inclusion criteria, and there is no direct socialisation associated with the interpretation of each available option. When checking posture, some research subjects wore loose clothing, making it difficult to interpret. Furthermore, posture was interpreted using photo media from the examination, which may have resulted in inaccurate data.

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