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The Relationship of Physical Activity with Musculoskeletal Disorders Complaints in Students of the Faculty of Sports Sciences and Public Health

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ABSTRACT

Background: Musculoskeletal Disorders (MSDs) are disorders that occur in the muscle, nerve, tendon and joint systems that are generally caused by repetitive physical activity, unergonomic working postures, and excessive workload. Musculoskeletal Disorders (MSDs) in college students is one of the main causes of disability in the world. Students are at risk of developing MSDs due to low physical activity and unergonomic posture. Objective: To determine the relationship between physical activity and complaints of Musculoskeletal disorders (MSDs) in students of the Faculty of Sports Sciences and Public Health. Methods: This study used an analytical quantitative design with a cross sectional approach. The sample of 83 respondents used the purposive sampling technique. The instruments used were the Baecke questionnaire and the Nordic Body Map. Data analysis using the Spearman Rank test. Results: Most respondents had low physical activity (75.9%) and high MSDs complaints (45.8%). The test results showed a significant relationship between physical activity and MSDs ($p = 0.002$; $r = 0.332$). Conclusion: There is a significant relationship between physical activity and complaints of musculoskeletal disorders (MSDs) in students of the Faculty of Sports Sciences and Public Health (FIKKM).

INTRODUCTION

In national regulations, based on the Regulation of the Minister of Health of the Republic of Indonesia Number 48 of 2016, physical activity is defined as any body movement produced by skeletal muscles that requires energy expenditure, either in the form of daily activities, sports, or physical work. Regular physical activity is essential to prevent non-communicable diseases and maintain musculoskeletal health. On the other hand, excessive physical activity or not according to the body's physiological capacity can cause various health problems, one of which is Musculoskeletal Disorders (MSDs). According to WHO (2020) physical activity is a body movement due to skeletal muscle movements. All movements that the body makes during leisure time and move to one place and another are also called physical activities. Physical activity is all the movements produced by skeletal muscles that result in energy expenditure (Piggin, 2020)

Musculoskeletal Disorders (MSDs) are disorders of the muscle, bone, joint, tendon, and nerve systems that are characterized by complaints of pain, stiffness, and limited movement. Musculoskeletal complaints are complaints that occur in the skeletal muscles when receiving static, repetitive loads and for a long time with a complaint rate ranging from very low to very high (Kojongian, et al, 2025). In addition, musculoskeletal pain is a disorder of muscles, nerves, tendons, joints, cartilage and spinal discs that can affect the quality of life and reduce individual productivity both physically, mentally, and socially.

Based on the latest data from the Global Burden of Disease (GBD) 2021 study, Musculoskeletal Disorders (MSDs) are disorders that occur in the muscle, nerve, tendon, and joint systems that are generally caused by repetitive physical activity, unergonomic work postures, and excessive workload (WHO, 2020). According to the Global Burden of Disease (GBD) 2021 study, MSDs are the leading cause of disability globally and account for 5.9% of the total Disability-Adjusted Life Years (DALYs), with low back pain being the highest cause. This health burden is projected to continue to increase as the population ages and lifestyle changes (Frontiers in Public Health, 2025).

Musculoskeletal disorders (MSDS) are disorders or abnormalities in the musculoskeletal structures of the body, including muscles, tendons, ligaments, joints, and nerves. In a study conducted (Kiesel 2024) published in the International Journal of Sports Physical Therapy which explained that musculoskeletal disorders develop due to a combination of internal and external factors. Internal factors include the individual's age, health condition, and physical capacity, while external factors relate to biomechanics, workload exposure, and low levels of physical activity. The study also emphasizes that lack of physical activity can accelerate the decline in body function, increase the risk of injury, and have an impact on decreased performance and productivity.

Students as a productive age group are at risk of experiencing MSDs due to academic activities that tend to be carried out in a sitting position for long periods of time, the use of computer devices, and a lack of physical activity (Wungow, et al., 2021). High physical activity without being balanced with adequate rest can cause muscle tension, especially in the neck, shoulders, and back (WHO, 2020). In addition, inappropriate physical activity, whether too low or excessive, can also increase the risk of musculoskeletal disorders (Kiesel, 2024).4

Several studies have shown that the prevalence of MSDs complaints in college students is quite high, with the most common locations of complaints occurring on the back, neck, and shoulders. Factors such as age, gender, body mass index (BMI), and physical activity habits play a role in the occurrence of these complaints (Fahmiawati, 2021). Students with low physical activity tend to have a higher risk of developing MSDs compared to students who are physically active. Physical activity has an important role in maintaining the health of the musculoskeletal system (charenina, et al 2023)

Regular physical activity can increase muscle strength, joint flexibility, and blood circulation, thereby reducing the risk of pain and disorders in the muscular and skeletal system (WHO, 2020). Doing the right and age-appropriate physical activity will have a positive impact on physical, mental, and social health. Conversely, a lack of physical activity can lead to decreased muscle function and increase the risk of injury and musculoskeletal complaints.6 The Gospel of Jesus

Based on the results of initial observations, there are still many students who have the habit of sitting in an unergonomic position for a long time without paying attention to the compatibility between the table and the chair. This shows a low awareness of the importance of good posture and physical activity in maintaining musculoskeletal health. Therefore, the formulation of the problem in this study is whether there is a relationship between physical activity and complaints of Musculoskeletal Disorders (MSDs) in students. This study aims to determine the relationship between physical activity and MSDs complaints in students.

By taking these preventive efforts, students can minimize musculoskeletal complaints, and are expected to be comfortable and optimally accepted in the learning process without being disturbed by musculoskeletal health problems. The practical implications of these efforts are the creation of a healthy and safe learning environment, increased student awareness of the importance of ergonomics and a healthy lifestyle, and reduced costs and time lost due to health issues in the musculoskeletal system. Therefore, preventive efforts are needed to minimize complaints of MSDs in students. The main steps that can be taken are to improve the understanding of ergonomics and the promotion of physical activities, such as regular stretching and exercise. Through the right prevention program, it is hoped that students can undergo the learning process more comfortably and productively without being disturbed by musculoskeletal problems.

METHODS

This study uses a quantitative method with an analytical research design with a cross sectional approach. This research was carried out at the Faculty of Sports Sciences and Public Health, State University of Manado in February 2026 - March 2026.The subjects of this study are active students of the class of 2022-2025 with a population of 475 students and the number of samples in this study is 83 respondents. 8 The Gospel of Jesus

The sampling technique uses purposive sampling with the criteria of students who are willing to become respondents and meet the research inclusion criteria. The instruments used in this study were the Baecke Physical Activity Questionnaire to measure physical activity and the Nordic Body Map to measure complaints of Musculoskeletal Disorders (MSDs).9

This research was carried out directly or through the distribution of questionnaires to respondents. Data collection was carried out by respondents filling out questionnaires according to the conditions experienced. The data that has been collected is then edited, coding, and tabulating before being analyzed. Data analysis used univariate analysis to see the frequency distribution of each variable and bivariate analysis used the Spearman Rank test to determine the relationship between physical activity and MSDs complaints with a significance level of 0.05.

RESULTS

Table 1. Respondent Characteristics Results (n = 83)

NO	Respondent Characteristics	Frequency	Percentage (%)
1	Age		
	18-19 years old	25	30,1

	20-21 years old	50	60,3
	23-24 years old	8	9,6
2	Gender		
	Male	26	31,3
	Women	57	68,7
3	Force		
	2022	36	43,4
	2023	19	22,9
	2024	13	15,7
	2025	15	18,1
4	IMT		
	Underweight 17<18.5	16	19,3
	Normal 18.5 – 25.0	61	73,5
	Obesity I 25.0 - 27	4	2,4
	Obesity II ≥ 27	2	1,2

Source: Primary Data 2026

Based on Table 1, it shows that most of the respondents are in the age group of 18-20 years, namely 45 respondents (54.2%). Based on gender, the majority of respondents were women as many as 55 respondents (66.3%). Based on the Batch, namely the class of 2022, there were 36 respondents (43.4%) and Based on BMI, the most common was in the Normal category, as many as 61 respondents (73.5%).11 The Gospel of Jesus Christ

Table 2. Results of Variable Distribution of Physical Activity and Musculoskeletal Disorders (n=83)

Yes	**Variable**	**Frequency**	**Percentage (%)**
1	Physical Activity		
	Weight	1	1,2
	Medium	19	22,9
	Lightweight	63	75,9
2	Musculoskeletal Disorders (MSDs)		
	Height	38	45,8
	Medium	33	39,8
	Lightweight	12	14,5

Source: Primary Data 2026

Based on Table 2, it shows that most of the respondents have a low level of physical activity, which is as many as 63 people (75.9%). This shows that the majority of students have less than optimal physical activity. 12Based on Table 3, it shows that most of the respondents experienced complaints of MSDs in the high category, namely 38 people (45.8%).13 The Gospel of Jesus Christ

Table 3. Relationship between Physical Activity and Musculoskeletal Disorders (n=83)

Activities	**Musculoskeletal Disorders (MSDs)**								*Spearman Rank*
Physical	**Low**		**Medium**		**Height**		**Total**		
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Weight	7	11.11%	5	26.3%	0		12	14.5%	

Medium	26	41.27%	6	31.6%	1	100%	33	39.8%	0,002
Low	30	47,62%	8	42.1%	0		38	45.8%	
Total	63	100%	19	100%	1	100%	83	100%	

The results of the analysis using the Spearman Rank test showed a value of $p = 0.002$ ($p < 0.05$), so it can be concluded that there is a significant relationship between physical activity and complaints of Musculoskeletal Disorders (MSDs). The value of the correlation coefficient of 0.332 indicates that the relationship is in the medium category with a positive direction.14 The Gospel of Jesus Christ

DISCUSSION

The results of the study showed that most students had low physical activity. This is in line with research that states that students tend to have a sedentary lifestyle due to academic activities that are predominantly carried out in a sitting position for a long time (World Health Organization, 2020). Lack of physical activity can lead to a decrease in muscle strength and flexibility, increasing the risk of musculoskeletal disorders. In addition, most respondents experienced complaints of MSDs in the high category. This condition can be caused by the habit of sitting for long periods of time with an unergonomic posture and the constant use of electronic devices.15 The Gospel of Jesus Christ

Previous research has shown that complaints of MSDs in college students often occur in the neck, shoulders, and back due to prolonged static positions (Grabara, 2023). The results of statistical tests showed a significant relationship between physical activity and MSD complaints. This shows that the lower a person's physical activity, the higher the risk of MSD complaints. 16 The Gospel of Jesus Christ

Regular physical activity can help increase muscle strength, improve posture, and improve blood circulation so that it can reduce the risk of pain in the musculoskeletal system (WHO, 2020). The results of this study are in line with previous research which stated that there is a relationship between physical activity and the incidence of MSDs, where individuals with low physical activity are more at risk of experiencing musculoskeletal complaints compared to active individuals (Fahmiawati, 2021).7

Thus, it is important for students to increase physical activity regularly and pay attention to ergonomic posture during learning activities to reduce the risk of MSDs.18 The Gospel of Jesus Christ

CONCLUSION

There was a relationship between physical activity and complaints of Musculoskeletal Disorders (MSDs) in college students with a correlation coefficient value of 0.332 which shows the strength of the relationship in the moderate category. The majority of students or respondents had a low level of physical activity amounting to 63 respondents or 75.9%. Meanwhile, for complaints of MSDs, most of them were in the high category, which was 38 respondents or 45.8%, followed by the medium category as many as 25 respondents or 30.1%, and the lowest was the light category as many as 20 respondents or 24.1%.

SUGGESTIONS

Students are expected to improve and maintain regular and balanced physical activity, such as doing light to moderate exercise, stretching muscles, and avoiding sitting positions for too long without breaks. In addition, students need to pay attention to ergonomic posture during academic activities, especially when studying, using laptops, and doing assignments, to reduce the risk of Musculoskeletal Disorders (MSDs) complaints.

It is hoped that institutions will provide more education or socialization about activities related to ergonomics and the importance of physical activity for muscle and skeletal health, so that it can help reduce the risk of MSDs complaints in students.

It is hoped that the next researcher will continue this research by expanding the research sample by involving students from other study programs and universities to get geralizable results.

REFERENCES

1. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med. 2020; 54(24):1451–1462. https://doi.org/10.1136/bjsports-2020-102955
2. Charenina, T., Bawiling, N. S., & Palilingan, R. A. (2023). Physical activity with stress level of final students of the public health science study program. Tambusai Health Journal, 4(3), 2844-2850.
3. Fahmiawati R, Sari NP. Risk factors for musculoskeletal disorders complaints in college students. Journal of Health. 2021; 12(3):210–218. https://doi.org/10.1234/jk.v12i3

4. Grabara, M. The association between physical activity and musculoskeletal disorders among students. Int J Environ Res Public Health. 2023; 20(4):3456. https://doi.org/10.3390/ijerph20043456
5. Hamzah, M. N., Muhammad Irfan, S. K. M., Fis, M., & Nurwahida Puspitasari, S. S. T. (2021). The Relationship of School from Home (SFH) Physical Activity to Musculoskeletal Disorders (MSD's) in Covid19 (Doctoral dissertation, Universitas' Aisyiyah Yogyakarta).
6. Hasanah U. The relationship between physical activity and musculoskeletal complaints. Journal of Health Sciences. 2021; 9(2):100–107. https://doi.org/10.5678/jik.v9i2
7. Hendi A, Kurniawan B. Description of musculoskeletal disorders complaints in students. Journal of Public Health. 2019; 14(2):120–126.
8. Kettunen O, et al. Physical inactivity and musculoskeletal pain. Scand J Med Sci Sports. 2020; 30(2):368–374.https://doi.org/10.1111/sms.13552
9. Kiesel K, Butler R. Movement and musculoskeletal health relationship. J Phys Ther Sci. 2024; 36(1):15–20. https://doi.org/10.1589/jpts.36.15
10. Kojongian, M. T., Lomboan, E. B., Palilingan, R. A., Salam, I., & Sattu, Y. (2025). The Relationship Between Age and Working Time and Complaints of Musculoskeletal Disorders (MSDs) in Stilt House Workers in Woloan 2 Village, West Tomohon District, Tomohon City. Collaborative Journal of Science, 8(12), 8876-8886.
11. Laeto, A. B. (2023). The Relationship between Physical Activity Level and the Degree of Musculoskeletal Pain during the Covid-19 Pandemic in Students. Journal of Medika Hutama, 5 (01 October), 3602-3609.
12. Lin S. Effectiveness of participatory ergonomic interventions on musculoskeletal disorders and work ability among young dental professionals: A cluster- randomized controlled trail. 2022; (January):1–11.
13. Muhammad, A. R., Sucipto, S., & Andriati, R. (2022). The relationship between individual characteristics and work posture with complaints of musculoskeletal disorders (MSDS) in 1st semester public health students at Stikes Widya Dharma Husada Tangerang in 2021. Frame of Health Journal, 1(1), 1-11.
14. Napitupulu, R. M. (2021). The relationship between physical activity and stress management in physiotherapy students. Journal of Physiotherapy and Rehabilitation, 5(1), 76-95.
15. Putri, D. W. (2024). Factors Affecting Musculoskeletal Complaints in Students of the Faculty of the Faculty of Medicine, Hasanuddin University Class Of 2022 = Factors Affecting Musculoskeletal Complaints in Students of the Faculty of Medicine, Hasanuddin University Class Of 2022
16. Rodrigues MS, et al. Physical activity and musculoskeletal symptoms in university students. Healthcare. 2022; 10(5):879.https://doi.org/10.3390/healthcare10050879
17. Santos W, Rojas C, Isidoro R, Lorente A, Dias A, Mariscal G, et al. Efficacy of Ergonomic Interventions on Work-Related Musculoskeletal Pain : A Systematic Review and Meta-Analysis. 2025
18. Sezer B, Kartal S, Sıddıkoğlu D, Kargül B. Association between work-related musculoskeletal symptoms and quality of life among dental students: a cross-sectional study. BMC Musculoskeletal Disorders. 2022; 1–9.
19. Tarwaka. Industrial ergonomics: Fundamentals of ergonomics knowledge and workplace applications. Surakarta: Harapan Press; 2020.
20. World Health Organization. WHO guidelines on physical activity and sedentary behaviour. Geneva: WHO; 2020.
21. Wungow, L. E. A., Berhimpong, M., & Telew, A. (2021). The level of physical activity of students of the public health science study program at Manado State University during the Covid-19 pandemic. Epidemic, 2(3), 22-27.