



The Relationship between Physical Activity and Sleep Quality for Class 2020 Students Faculty of Medicine Tarumanagara University

William Widjaya¹, Susilodinata Halim¹

¹Faculty of Medicine, Universitas Tarumanagara, Jakarta, Indonesia

Email corespondensi : william.405190005@stu.untar.ac.id

<p>Track Record Article</p> <p>Accepted: 12 April 2023 Revised: 16 June 2023 Published: 30 July 2023</p> <p>How to cite : Widjaya, W., & Halim, S. (2023). The Relationship between Physical Activity and Sleep Quality for Class 2020 Students Faculty of Medicine Tarumanagara University. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 5(3), 849-857.</p>	<p style="text-align: center;">Abstract</p> <p><i>Sleep is one of the basic needs of every human being. Disturbance to the quality of sleep can cause various problems such as a person's disruption in following lessons and low memory. Not only academics will be disrupted, but health will also be disrupted. Someone who has good quality sleep will be more focused on doing something than someone with bad quality. The purpose of this study was to determine whether there is a relationship between physical activity and the quality of sleep of students at the Faculty of Medicine, University of Tarumanagara. This research is a quantitative analytic research with a cross-sectional research design. This research was conducted in Faculty Of Medicine, Tarumanagara University, This research data collection activity took place in January 2022 until completion. The population in this study is all Students of the Faculty Of Medicine, Tarumanagara University. The total sample in this study was 140 people. The sampling method of this study is means of simple random sampling. Data collection in this study used the Global Physical Activity Questionnaire (GPAQ) questionnaire and the Pittsburgh Sleep Quality Index (PSQI) questionnaire. Data analysis used with the Chi-Square test. The results of the study showed that there was a significant relationship between physical activity and sleep quality for students of the Faculty of Medicine, Tarumanagara University, class of 2020 (p-value = 0.000; <math>\alpha</math> 0.005). It is recommended to students of the Faculty of Medicine, Tarumanagara University to improve their health status through diligent regular physical activity and quality sleep in order to increase their level of physical fitness. Oleh Therefore, students need to learn to manage time for academic and non-academic activities, as well as regular breaks and sports.</i></p> <p>Keywords: Physical Activity, Sleep Quality, Student</p>
---	--

INTRODUCTION

Sleep is a basic need for every individual. In conditions of rest and sleep, the body performs its duties by carrying out a recovery process to restore the body's stamina to optimal conditions.¹ People in general still often complain of sleep disorders in the form of insomnia, the definition of insomnia is a condition where a person is faced with the problem of difficulty sleeping, the importance of someone to sleep is to improve health, people who experience sleep disorders usually their physical and mental health will be disrupted. Lack of physical activity, gender, and mental stress are factors that cause sleep disorders. Sleep disturbances are common among young adults, especially among college students (Ashari et al., 2021).

According to the 2018 Physical Activity Guidelines for Americans, college-age adults should do 150 minutes of moderate-intensity aerobic activity (or 75 minutes of vigorous aerobic activity) and two sessions of moderate to high-intensity strength-training

activity. every week (Department of Health and Human Services, 2018). The combination of aerobic activity and strength training provides maximum benefits for heart health and metabolism (Glavin et al., 2021; Felicia, 2023). Despite the known health benefits of regular physical activity, less than 50% of college students reported meeting current aerobic activity guidelines in 2019 (American College Health Association, 2019).

The need for adequate sleep is not only determined by the hours of sleep (sleep quantity), but also by the depth of sleep (sleep quality). Sleep quality includes quantitative and qualitative aspects of sleep, such as sleep duration, time needed to fall asleep, frequency of awakenings and subjective aspects such as sleep depth and deepness (Fabbri et al., 2021). There are several other factors that can affect sleep quality, namely age, motivation, physical activity, diet, culture, alcohol consumption, smoking, lifestyle, and disease. Maintaining the quality of sleep for the elderly is one of the important things to do because it can restore body functions so that they can carry out their functional activities. Sleep quality is considered good if a person does not experience signs of sleep deprivation and does not experience sleep problems (Cebeci et al., 2023).

The basis for investigating the potential benefits of exercise-induced sleep in NDD came from previous studies evaluating the influence of exercise on sleep in healthy populations. Different modalities, intensities, and duration of exercise have been explored in healthy adults, and the type of exercise may shape the results. While cardiorespiratory (aerobic) and resistance (anaerobic) exercises are most frequently discussed, other modalities such as flexibility training or neuromotor training that emphasize balance, proprioception, coordination, and agility have also been explored in research settings (Memon et al., 2020).

There was a significant increase in total sleep duration, sleep efficiency, and sleep onset latency in group (A) after six months of aerobic exercise training, while, wake time after sleep onset and rapid eye movement (REM) latency were significantly reduced after six months of aerobic training. compared with the values obtained before aerobic exercise training (El-Kader et al., 2020).

Physical activity is defined as any physical activity produced by skeletal muscles and requires energy expenditure. Physical activity refers to any movement, including leisure time, commuting to a place, or any part of one's job. Both moderate and vigorous exercise improve your health. According to WHO recommendations in 2020, children and adolescents aged 5-17 years should do at least 60 minutes of physical activity per day of moderate to vigorous intensity, mostly aerobic, physical activity throughout the week. They should combine high-intensity aerobic activity as well as activities that tone their muscles and bones, at least 3 days

per week. They are also required to limit time spent on sedentary things, especially time looking at gadget screens (WHO, 2020).

Poor sleep quality (SQ) is a crucial public health problem that increases the risk of morbidity and premature mortality. There is evidence that poor SQ is associated with impaired attention and memory, physical and mental impairment, and increased health care costs. In particular, insomnia and other sleep problems are quite common among young adults, especially university students. Evidence emphasizes that the prevalence of insomnia in universities is higher than in the general population. It is reported that the prevalence rate of poor SQ is as high as 25.7% (Zhai et al., 2021). However, research conducted by Yang (2012), obtained different results, namely, there was no significant difference in the duration and disruption of sleep between the control group and those who exercised, but there were differences in the results of the effect of exercise on sleep quality (Safaringga et al., 2018).

Based on the information the researchers got, it made the researchers interested in finding out whether exercise affected the sleep quality of class 2020 students at the Faculty of Medicine, Tarumanagara University. It is hoped that the results of this study can provide answers and find out whether exercise affects the sleep quality of class 2020 students at the Faculty of Medicine, Tarumanagara University.

METHODS

This research is a quantitative analytic research with a cross-sectional research design. The purpose of this study was to determine the relationship between physical activity and sleep quality Students of the Faculty Of Medicine, Tarumanagara University. This research was conducted in Faculty Of Medicine, Tarumanagara University, This research data collection activity took place in January 2022 until completion, where data collection was only carried out once when the researcher met with the respondent.

The sampling method of this study is means of simple random sampling following the inclusion and exclusion criteria. The population in this study is all Students of the Faculty Of Medicine, Tarumanagara University. The total sample in this study was 140 people. Retrieval of this research data with primary data which feeds the data using a questionnaire in the form of a questionnaire to measure physical activity using a questionnaire Global Physical Activity Questionnaire (GPAQ) and to measure sleep quality using a questionnaire Pittsburgh Sleep Quality Index (PSQI). Data analysis used non-parametric statistics with the Chi-Square test. All data is processed using Statistical Program for Social Science (SPSS) edition 23.

RESULTS

Characteristics of Respondents

The characteristics of the research respondents can be seen in table 1 below:

Table 1. Characteristics of Respondents

Variable	n	%	Mean + SD	Median	Minimum	Maximum
Age						
18	5	3,6				
19	64	60,0				
20	38	27,1	19,48 + 0,861	19	18	22
21	5	3,6				
22	8	5,7				
Gender						
Male	48	34,3				
Woman	92	65,7				

The respondents who were sampled in this study amounted to 140 people, with a mean distribution was $19.48 + 0.681$ years, the youngest age was 18 years and the oldest age was 22 years. The majority of patients were 19 years old (60.0%). There were 48 men (34.3%) and 92 women (65.7%).

Distribution of Sleep Quality of Respondents

The quality of sleep of respondents is categorized into 2, namely respondents with good sleep quality and bad sleep quality, which can be seen in table 2 below:

Table 2. Distribution of Respondents' Sleep Quality

PSQI	Gender		Total	%
	Male	Woman		
Good	15	14	29	20,7
Bad	33	78	111	79,3
Total	48	92	140	100

Based on the table above, respondents with good sleep quality were obtained as many as 29 people (20.7%), and respondents with bad sleep quality as many as 111 people (79.3%).

Distribution of Respondents' Physical Activity

Physical activity is divided into 2, namely respondents with passive physical activity and active activity, which can be seen in table 3 below:

Table 3. Distribution of Respondents' Physical Activity

GPAQ	Gender		Total	%
	Male	Woman		
Passive	36	65	99	70,7
Active	12	27	41	29,3
Total	48	92	140	100

Based on table 3. The results showed that out of 99 respondents, 36 men had passive sports and 65 women had passive sports. Of the 41 respondents who had active sports, 12 were male and 27 were female.

Analysis of Research Results

The results of statistical tests with *Chi-Square* between physical activity and sleep quality Tarumanagara University Faculty of Medicine students 2020 of Tarumanagara University students, Faculty of Medicine, Class of 2020, West Jakarta obtained a *P value* of < 0.05 , which can be seen in table 4 below:

Table 4. Relationship between sleep quality and physical activity Tarumanagara University Faculty of Medicine students 2020

PSQI	GPAQ				Total		p-value	OR (95% CI)
	Passive		Active		n	%		
	n	%	n	%				
Good	3	10,3	26	89,7	29	100	0,000	0.018 (0,005-0,067)
Bad	96	86,5	15	13,5	111	100		
Total	99	70,7	41	29,3	140	100		

Based on table 4. The results showed that the results of the significance value analysis were 0.000. Because the significance is < 0.05 , then H_0 is rejected, meaning that H_a is accepted, which means that there is a significant relationship between physical activity and sleep quality Tarumanagara University Faculty of Medicine students 2020.

DISCUSSION

Sleep is very important for the body. Because during sleep most organs including the brain will rest. If we don't get enough sleep, our brain doesn't have enough rest, this causes the concentration of learning to be disrupted. In fact, many students actually have poor sleep time and quality due to setting sleep schedules, bedtime habits, and other things related to sleep (Haryati et al., 2020).

Based on the results of research that has been done that there is a significant relationship between physical activity and sleep quality Tarumanagara University Faculty of Medicine students 2020 (p-value = 0.000).

The results of this study are in line with the results of the study Adrianti (2017) which states that there is a strong relationship between sports activity and sleep quality in students of the Faculty of Medicine, University of Muhammadiyah Malang. Things are different from the results of research Haryati et al., (2020) which states that there is no effect of physical activity on the sleep quality of University Medical Faculty students Halu Oleo (p-value=0,519). It's the same with research Nurrachmawati et al., (2022) shows that there is no relationship between physical activity on sleep quality (p-value=0,068).

In line with research Rahma (2022) which states that there is a relationship between physical activity and sleep quality p-value= 0,001 $< \alpha$ 0,005. This is because exercise and fatigue can affect sleep quality, with fatigue due to high activity requiring more sleep to maintain the energy balance that has been expended. This can be seen in people who have

done activities and reach fatigue, so that person will be able to fall asleep faster because of the slow wave sleep stage or Non-Rapid Eye Movement (NREM) shortened. So it can be concluded that physical activity affects the quality of a person's sleep, if someone has good activity, it can be said that the quality of sleep is also good (Rahma, 2022).

Research Aminuddin et al., (2022) states that there is a significant relationship between the quality of sleep and the level of physical fitness ($p\text{-value}=0,019$). This is because a person with good quality sleep gives the body the opportunity to experience a passive period, inactivity. The body will reduce metabolic activity, rest the activities of muscles and other organs, and give the organs a chance to recover so that the body will be fresher after waking up.

Students who do not exercise regularly will have less sleep quality (Priya et al., 2017). Conversely, an increase in sleep quality is associated with involvement in sports and extracurricular activities (Corrêa et al., 2017). Someone who usually exercise will find it easier to fall asleep. This is caused by the fatigue that they usually feel after they finish exercising.

One of the factors that affect the quality of sleep is physical activity. And this is also in accordance with the opinion Kredlow et al., (2015) supported by Garfield et al., (2016) who said that the level of physical activity had a positive effect on sleep duration, and that physical activity was beneficial for sleep quality. A person who does active physical activity will be 3-5 times more likely to get good quality sleep compared to those who do not do physical activity, because people who are tired usually get a good and optimal sleep, especially if they do regular exercise (Ashari et al., 2022).

Adolescents who have strenuous activities have a 2.48 times higher risk of experiencing better sleep quality (Baso et al., 2019). This difference can occur due to student motivation in accordance with the research conducted Ratnaningtyas et al., (2019) students with high learning motivation to get good grades will use their time to achieve goals so they will use their free time, namely at night to improve their abilities. This is what causes physical activity in students, even though it is high, has poor sleep quality due to other reasons.

A fit body has benefits for humans, including increasing body immunity, maintaining physical and mental health and being able to prevent disease (Wouters et al., 2020). Conversely, an unhealthy body has a negative impact on increasing risk factors in adolescents for cardiovascular disease in old age (Zhao et al., 2019). In addition, fitness is very important for students in supporting their academic achievement, where physical fitness can improve

their concentration and academic abilities (Bianco et al., 2018; Reigal et al., 2020; Wouters et al., 2020). So that students' physical fitness can reduce their concentration power and reduce their learning achievement. Low physical fitness is related to a person's weak physical and mental health. The higher a person's physical ability, the higher the person's productivity (Wouters et al., 2020).

Students to be able to improve sleep quality so that physical fitness can increase and can have implications for increasing concentration in receiving learning material or carrying out other lecture activities. Based on writer opinion that when someone is doing exercise, it can cause the body to be tired so that the quality of one's sleep will be good.

CONCLUSIONS

The conclusion from the results of this study is that there is a significant relationship between physical activity and sleep quality Tarumanagara University Faculty of Medicine class of 2020 (p -value = 0.000). It is recommended to students of the Faculty of Medicine, Tarumanagara University to improve their health status through diligent regular physical activity and quality sleep in order to increase their level of physical fitness. Oleh Therefore, students need to learn to manage time for academic and non-academic activities, as well as regular breaks and sports.

REFERENCE

- Adrianti, S. (2017). *Hubungan Antara Aktifitas Olahraga Dengan Kualitas Tidur Pada Mahasiswa Fakultas Kedokteran Universitas Muhammadiyah Malang*.
- Aminuddin, M., Rahmadhani, S., & Maimia, E. (2022). Hubungan Kualitas Tidur Dan Aktivitas Fisik Dengan Tingkat Kebugaran Fisik Di Era Pandemi Covid-19. *Husada Mahakam: Jurnal Kesehatan*, 12(1), 1–09. <https://doi.org/http://dx.doi.org/10.35963/hmjk.v12i1.264>
- Ashari, M. H., Hardianto, Y., & Amalia, R. N. (2021). The Relationship Between Physical Activity and Sleep Quality In Elderly. *Jurnal Fisioterapi Dan Rehabilitasi*, 6(1), 35–41. <https://doi.org/10.33660/jfrwsh.v6i1.153>
- Ashari, M. H., Hardianto, Y., Hasanuddin, U., Fisik, A., & Tidur, K. (2022). Hubungan antara Aktivitas Fisik dengan Kualitas Tidur pada lansia The Relationship Between Physical Activity and Sleep Quality In Elderly. *Jurnal Fisioterapi Dan Rehabilitasi*, 6(1), 35–41. <https://doi.org/10.33660/jfrwsh.v6i1.153>
- Baso, M. C., Langi, F. L. F. ., & Sekeon, S. A. . (2019). Hubungan Antara Aktivitas Fisik Dengan Kualitas Tidur Pada Remaja Di Sma Negeri 9 Manado. *Kesmas*, 7(5), 5–10.
- Bianco, A., Gentile, A., Boca, S., Paoli, A., Messina, G., Gómez-López, M., Palma, A., & Tabacchi, G. (2018). An exploratory analysis of factors associated with health-related physical fitness in adolescents. The ASSO project. *Sustainability (Switzerland)*, 10(6), 1–13. <https://doi.org/10.3390/su10061847>
- Cebeci, Z., Canakci, E., Tas, N., & Coskun, İ. (2023). Evaluation of sleep quality on

- anesthesia specialists who worked in Turkey. *Middle Black Sea Journal of Health Science*, 9(February), 152–158. <https://doi.org/10.19127/mbsjohs.1226260>
- Corrêa, C. de C., de Oliveira, F. K., Pizzamiglio, D. S., Ortolan, E. V. P., & Weber, S. A. T. (2017). Sleep Quality in Medical Students. *Jornal Brasileiro de Pneumologia*, 43(4), 285–289. <https://doi.org/10.1590/S1806-37562016000000178>
- El-Kader, S. M. A., & Al-Jiffri, O. H. (2020). Aerobic exercise affects sleep, psychological wellbeing and immune system parameters among subjects with chronic primary insomnia. *African Health Sciences*, 20(4), 1761–1769. <https://doi.org/10.4314/ahs.v20i4.29>
- Fabbri, M., Beracci, A., Martoni, M., Meneo, D., Tonetti, L., & Natale, V. (2021). Measuring subjective sleep quality: A review. *International Journal of Environmental Research and Public Health*, 18(3), 1–57. <https://doi.org/10.3390/ijerph18031082>
- Felicia, C., & Hawari, I. (2023). The Correlation of Sleep Quality and Cognitive Function In Students Of the Faculty Medicine during the Covid-19 Pandemic. *Contagion: Scientific Periodical Journal of Public Health and Coastal Health*, 5(1), 70. <https://doi.org/10.30829/contagion.v5i1.14989>
- Garfield, V., Llewellyn, C. H., & Kumari, M. (2016). The relationship between physical activity, sleep duration and depressive symptoms in older adults: The English Longitudinal Study of Ageing (ELSA). *Preventive Medicine Reports*, 4, 512–516. <https://doi.org/10.1016/j.pmedr.2016.09.006>
- Glavin, E. E., Matthew, J., & Spaeth, A. M. (2021). Gender Differences in the Relationship Between Exercise, Sleep, and Mood in Young Adults. *Health Education & Behavior*, 49(5), 109019812098678. <https://doi.org/10.1177/1090198120986782>
- Haryati, H., Yunaningsi, S. P., & RAF, J. (2020). Faktor yang Mempengaruhi Kualitas Tidur Mahasiswa Fakultas Kedokteran Universitas Halu Oleo. *Jurnal Surya Medika*, 5(2), 22–33. <https://doi.org/10.33084/jsm.v5i2.1288>
- Kredlow, M. A., Capozzoli, M. C., Hearon, B. A., Calkins, A. W., & Otto, M. W. (2015). The effects of physical activity on sleep: a meta-analytic review. *Journal of Behavioral Medicine*, 38(3), 427–449. <https://doi.org/10.1007/s10865-015-9617-6>
- Memon, A. A., Coleman, J. J., & Amara, A. W. (2020). Effects of exercise on sleep in neurodegenerative disease. *Neurobiology of Disease*, 140, 1–21. <https://doi.org/10.1016/j.nbd.2020.104859>
- Nurrachmawati, D. A., Nugrohowati, N., & Simanjuntak, K. (2022). Hubungan Aktivitas Fisik dan Stres terhadap Kualitas Tidur Selama Pandemi Covid-19 Pada Mahasiswa Tingkat 2 Fakultas Kedokteran UPN Veteran Jakarta. *Jurnal EnviScience*, 6(1), 55–64. <https://doi.org/10.30736/6ijev.v6i1.336>
- Priya, J., Singh, J., & Kumari, S. (2017). Study of the factors associated with poor sleep among medical students. *Indian Journal of Basic and Applied Medical Research*, 2(6), 422–429.
- Rahma, S. (2022). Aktivitas Fisik Berhubungan dengan Kualitas Tidur pada Mahasiswa. *Journal of Public Health Education*, 2(1), 269–276. <https://doi.org/10.53801/jphe.v2i1.106>
- Ratnaningtyas, T. O., & Fitriani, D. (2019). Hubungan Stres Dengan Kualitas Tidur Pada Mahasiswa Tingkat Akhir. *Edu Masda Journal*, 3(2), 181–191. <https://doi.org/10.52118/edumasda.v3i2.40>
- Reigal, R. E., Moral-Campillo, L., Mier, R. J. R. de, Morillo-Baro, J. P., Morales-Sánchez, V., Pastrana, J. L., & Hernández-Mendo, A. (2020). Physical Fitness Level Is Related to Attention and Concentration in Adolescents. *Frontiers in Psychology*, 11(February), 1–9. <https://doi.org/10.3389/fpsyg.2020.00110>
- Safaringga, E., & Herpandika, R. P. (2018). Hubungan antara Kebugaran Jasmani dengan

- Kualitas Tidur. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 4(2), 235–247. https://doi.org/10.29407/js_unpgri.v4i2.12467
- WHO. (2020). *Physical Activity*. World Health Organization.
- Wouters, M., Evenhuis, H. M., & Hilgenkamp, T. I. M. (2020). Physical fitness of children and adolescents with moderate to severe intellectual disabilities. *Disability and Rehabilitation*, 42(18), 2542–2552. <https://doi.org/10.1080/09638288.2019.1573932>
- Zhai, X., Wu, N., Koriyama, S., Wang, C., Shi, M., Huang, T., Wang, K., Sawada, S. S., & Fan, X. (2021). Mediating effect of perceived stress on the association between physical activity and sleep quality among Chinese college students. *International Journal of Environmental Research and Public Health*, 18(1), 1–11. <https://doi.org/10.3390/ijerph18010289>
- Zhao, F., Sun, S., Xiong, J., & Zheng, G. (2019). The effect of Baduanjin exercise on health-related physical fitness of college students: A randomized controlled trial. *Trials*, 20(1), 1–9. <https://doi.org/10.3389/fpubh.2022.965544>