Original Article

Unraveling the Impact of Physical Activity Patterns on Psychological Stress in Nursing Students: Evidence from the COVID-19 Crisis

Suryo Wibisono[1], Syahruramdhani Syahruramdhani[1], Samrit Kittipayak[2]

[1]School of Nursing, Faculty of Medical and Health Sciences, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia
[2]Department of School of Radiological Technology, Chulabhorn Royal Academy, Bangkok, Thailand

OPEN ACCESS

Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)

Volume 11 (2), 251-259
https://doi.org/10.33755/jkk.v11i2

Article info

Received : April 06, 2025
Revised : April 26, 2025
Accepted : April 27, 2025
Published : April 30, 2025

Corresponding author

Syahruramdhani*
Faculty of Medical and Health Sciences, Universitas Muhammadiyah Yogyakarta
Jl. Brawijaya, Geblagan, Tamantirto, Kec. Kasihan, Kabupaten Bantul, Daerah Istimewa Yogyakarta 55183
Phone: (0274) 387656
email : Syahruramdhani@umy.ac.id

Citation
Wibisono S, Syahruramdhani S, Kittipayak S. Unraveling the impact of physical activity patterns on psychological stress in nursing students: evidence from the COVID-19 crisis. Jurnal Keperawatan Komprehensif. 2025;11(2):251–259.

Website
https://journal.stikep-ppnijabar.ac.id/jkk

p-ISSN : 2354 8428
e-ISSN: 2598 8727

Abstract

Background: During the COVID-19 outbreak, many citizens were asked to stay at home in self-quarantine, which can be difficult in terms of remaining physically active and maintaining mental health.
Objective: The goal of this study was to examine the relationship between physical activity and stress levels among nursing students during the COVID-19 pandemic.
Methods: The correlational method was used in this study. A cross-sectional method was used. The participants in this study were nursing students from the Faculty of Medicine and Health Sciences. The sampling method used was simple random sampling, and the sample size was 219 students. The IPAQ and PSS-10 questionnaires were used in this study as instruments and then analysed using Spearman Rank.
Results: According to the Spearman test results, the value of sig. (2-tailed) is 0.274, which is $p > 0.05$. It showed a relationship with an insignificant correlation value in the cross-tabulation correlation test.
Conclusions: Physical activity and stress levels among nursing students do not significantly correlate during the COVID-19 pandemic. These findings highlight the importance of physical activity in maintaining psychological well-being among nursing students in times of crisis.

Keywords: covid-19 pandemic; physical activity; stress level; nursing; students

INTRODUCTION

Physical activity is all body movements caused by the work of skeletal muscles and increases energy expenditure. Physical activity will help the body's muscles relax more and increase muscle activity and blood circulation (1). The routine physical activity carried out daily can support the reduction of high blood pressure, maintain stable body weight, and reduce the risk of stroke, heart disease, diabetes mellitus, and several other diseases. According to recent global data, 27.5% of 1.9 million adults and 81% of 1.6 million adolescents do not follow the

physical activity recommendations outlined. A study found that from May to November 2021, global average daily step counts were 4,997 steps, which is 10% lower than the pre-pandemic baseline of 5,574 steps per day recorded during the same period in 2019. The prevalence of physical activity in Yogyakarta is 79.9% of participants to have sufficient levels of physical activity, and 28.1% of participants show a lack of physical activity (2).

Before the COVID-19 pandemic, people were free to carry out physical activities outdoors, such as exercising, walking, and other physical activities. Still, during the COVID-19 pandemic, the government implemented social restrictions to suppress the increasing number of COVID-19 (3). This impacts many people who usually do outdoor activities to do WFH or online school so that people spend more of their time at home. Implementing physical distancing causes physical activities that can be done for health, such as exercise, to decrease (4).

Factors influencing the COVID-19 pandemic have caused physical activity in several countries to decline. Isolation in the home can result in a profound reduction in moderate to vigorous physical activity levels and increased sedentary behaviour (5). Overall, the amount of time spent exercising prior to the COVID pandemic decreased by an average of 435 minutes, from 540 minutes per week before the pandemic to 105 minutes per week during the pandemic (6). Physical activity has a protective impact on perceived stress, according to the findings of observational and experimental studies (7). Physical activity can effectively reduce symptoms of depression and anxiety, minimize the impact of stress, and promote positive emotional well-being (8).

Stress is an individual's inability to face threats both mentally, physically, emotionally and spiritually this can affect the physical health of the human being. Stress is also considered an individual's perception of the situation or conditions that exist around the environment. Stress has become an unavoidable part of life and will always appear in everyday life wherever individuals are (9). Physical activity can increase peripheral-endorphin levels, decrease sympathetic activity, improve sleep quality, and facilitate psychological stability (10). As endorphins have a role in modulating stress responses, it is not surprising that various psychiatric disorders can be associated with some deviations in endorphin levels (11).

Nearly 350 million individuals worldwide suffer from stress, making it a rather common occurrence. According to the WHO, stress is the fourth most common ailment worldwide (12). In the first year of the pandemic, the World Health Organization (WHO) reported a 25% global increase in the prevalence of anxiety and depression. Studies across countries like China, Spain, Italy, Iran, the US, Turkey, Nepal, and Denmark reported high rates of mental health symptoms during the pandemic for example stress with 8.1% to 81.9%. The results of a study show that the prevalence of mental health problems during the COVID-19 pandemic varies widely across countries, it is estimated that the majority is higher than reports before the COVID-19 outbreak. Estimates of the global prevalence of mental health problems in all countries, especially stress, reach 36.5% (13).

A previous study found that the COVID-19 pandemic caused high levels of anxiety and low levels of psychological well-being in nursing students (14). Stress can have a negative impact, for example, causing poor performance, health and disrupted relationships with other people. Another effect of focus on our bodies is that stress can cause constriction of blood vessels and muscle stiffness. To overcome this problem, it is essential to deal with stress problems that occur during the COVID-19 pandemic outbreak as it is today (9). Engaging in outdoor activities is difficult for pupils during the COVID-19 pandemic. Physical activity that is still lacking, such as only at home or at a boarding house, tends to cause stress.

Nursing education is rigorous, requiring students to grasp clinical practice, lab work, and theory. During COVID-19, many schools switched to online instruction, increasing screen usage and sedentary behaviour. This increased academic stress and limited possibilities for activity. Lockdowns and social alienation resulted in the closure of gyms and recreational facilities, cancelation of group activities or sports, and limited access to outdoor spaces. The goal of this study was to examine the relationship between stress levels and physical activity among nursing students during the COVID-19 epidemic at School of Nursing, Universitas Muhammadiyah Yogyakarta use The International Physical Activity Questionnaire-

Short Form (IPAQ-SF) and Perceived Stress Scale (PSS-10).

METHODS

Study Design

The present study used a cross-sectional, correlational study.

Sample

Participants in this study were nursing students from the Faculty of Medicine and Health Sciences. The probability sampling technique was used in this study, with a simple random sampling method to determine the research sample using the lottery approach. In this system, each population member or element is assigned a unique number. Then it will take out any chit, and the number on it will be a random sampling. There were 219 people who took part in this study.

Instrument

The International Physical Activity Questionnaire-Short Form (IPAQ-SF), a validated and suggested tool for measuring physical activity, was used to gauge the degree of physical activity. Participants reported how often and how long they walked and engaged in other vigorous and moderate physical activity each week**.** The metabolic equivalent (MET) tasks for vigorous exercise, moderate activity, and walking are 8.0, 4.0, and 3.3, respectively**.** The physical activity levels of the participants could be classified as high (>3000 MET), moderate (600-3000 MET), or low (600 MET).

Perceived Stress Scale (PSS-10) was used to assess stress levels. Cohen designed PSS-10 in 1994. This questionnaire itself consists of 10 questions. The questions on the Perceived Stress Scale contain the respondent's feelings and thoughts in the past month. Participants were asked to fill in to indicate how often they felt or thought. The participants' stress levels could be categorized as low (1-14), medium (15-26) and high (>26)**.**

Data Collection Procedure

Data were collected using an online questionnaire administered through Google Forms. The questionnaire link was distributed to all eligible nursing student participants through institutional email and social media platforms to ensure accessibility and convenience during the COVID-19 pandemic. Prior to accessing the questionnaire, participants were provided with an electronic informed consent form explaining the study's purpose, procedures, voluntary participation, and confidentiality assurances.

The questionnaire included sections on demographic information, physical activity level, and stress level. Participants completed the form independently and submitted their responses electronically. Data collection was conducted over a four-week period to maximize the response rate and accommodate participants' schedules. All responses were automatically recorded and securely stored within the Google Forms database, accessible only to the principal investigator.

Data Analysis

Data analysis was performed using IBM SPSS Statistics version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participants' demographic characteristics, physical activity levels, and stress levels. The normality of continuous variables was assessed using the Kolmogorov-Smirnov test.

Given the non-parametric nature of the data, the relationship between physical activity level and stress level was analyzed using the Spearman Rank-Order Correlation Test. A p-value of less than 0.05 was considered statistically significant. The strength and direction of the correlation were interpreted based on the Spearman correlation coefficient (ρ), with values ranging from -1 to +1 indicating the degree of association between the two variables.

Ethical Considerations:

This study was approved by Ethical Commission of Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta (Approval No.121/EC-KEPK FKIK UMY/IV/2022). Before seeing the questionnaire, each participant provided electronic informed consent. Participants could drop out of the survey at any time without explanation.

RESULTS

Table 1. showed that that the characteristics of participants based on gender are 182 students (82.2%). Most participants were aged 19-20 years (44.7%), while most of the questionnaires were filled out by 3rd year students as many as 68 students (31.1%).

Table 1. Characteristics of Participants

Characteristics	n	%
Gender		
Male	37	16.9
Female	182	83.1
Age		
17-18	25	11.4
19-20	98	44.7
21-22	90	41.1
23-25	6	2.8
Students Level		
1st year	53	24.2
2nd year	39	17.8
3rd year	68	31.1
4th year	59	26.9

Table 2 revealed that, with a frequency of 149 students (68%), most nursing students engage in low levels of physical exercise. With a frequency of 167 students (76.2%), Table 3 demonstrated that many nursing students experience moderate levels of stress. Table 4 demonstrated that there is no significant correlation between stress levels and physical activity, with a significance value of 0.274 (P>0.05). The correlation value is 0.74, showing that the association is strong, with a negative direction, with reduced physical activity resulting in higher stress levels.

Table 2. Physical Activity

Level	n	%
Low	149	68
Moderate	62	28.3
High	8	3.7

Table 3. Stress Level

Level	n	%
Low	47	1.5
Medium	167	76.2
High	5	2.3

Table 4. Spearman Rank Test

Level	Mean + SD	*p* value	r
Physical Activity	1.36 ± 0.551	0.274	-0.74
Stress Level	1.81 ± 0.449		

DISCUSSION

This research found that most of the participants had the most age range from 19-20 years, as many as 98 students (44.7%). A study states that individual factors influence activities in late adolescence, for example, do not have skills or are not used to exercising, feeling sleepy and lazy to exercise, and body aches after exercising (15). According to the findings of a study that involved 219 participants at the 4-student level, the majority of participants engaged in low-intensity physical exercise, with 149 individuals (68%) in total.

Students in the college of health sciences were less physically active than those in the faculty of physical education and sports, according to a previous survey. Students get a lot from physical activity, including improved fitness and longer

lifespans. For this reason, motivating and encouraging students to perform routine physical conditioning is necessary, especially during the covid-19 pandemic (16). At low physical activity, most of the participants did physical activity with a duration of 15-30 minutes per day for 4-7 days. Students who were once active in sporting activities on campus and engaged in student's activities unit lost their time due to online lectures from their respective homes. During online classes, campuses usually use video conferencing facilities to connect students with lecturers. This can increase the frequency of smartphone use so that there is a reduction in student physical activity.

The research results on 219 participants in this study showed that most of the participants were female, with a frequency of 182 students (83.1%). This research found that most participants had the age range of 19-20 years, as many as 98 students (44.7%). Previous study states that the level of stress experienced by students needs attention because students tend to have high-stress levels in their late teens. High levels of stress can lead to undesirable behaviours like smoking, drinking, arguing, engaging in free sex, and even abusing drugs. They can also make students agitated and distracted from their studies (17).

Most participants experienced moderate stress, with a total of 167 (76.2%). Participants have a stress level value between 15-26 points at an average stress level. A study stated that as many as 27 (38.57%) participants experienced moderate stress levels, and one of the reasons was lectures conducted online. This is because students have difficulty understanding the material during online classes (18). Students must make various preparations, such as starting from learning applications that support online lectures to the readiness of the internet connection. In addition, it takes effort to understand the material previously given orally in writing and video or live streaming.

In line with a study showed that online learning carried out by campuses forces students to study from home (19). This reduces the intensity of communication and interaction between students. As a result, the support among friends decreases, which can increase stress. Support from fellow students can improve self-confidence and confidence in their abilities, making it easier for them to find coping strategies to deal with stress. Previous study showed that on undergraduate Nursing students revealed the same results, most of the responses experienced increased stress, it was stated in this study that the stress level in students was high (20). Stress levels are measured based on physical, psychological/emotional and behavioural indicators. Students experiencing stress will bring up several things, including feeling unable to feel positive, not strong in carrying out activities, sad and depressed, hopeless, losing interest in everything, and feeling worthless as a human being. Therefore, the increasing stress experienced by students gradually can reduce energy and adaptive responses.

The present study showed no statistically significant relationship between the level of physical activity and stress levels in the research subjects. The negative correlation means that the relationship between the two variables is not unidirectional, which means that the lower the level of physical activity, the stress level experienced will increase. The negative correlation of the two variables in this study is in line with a study which states that research subjects with high physical activity have low-stress levels (21). This study is in line with study which explains that students noted the level of robust physical activity and perceived stress, and individuals who applied the recommendations for intense physical activity had fewer mental health complaints (22).

This study also is in line with study which claim there is no link between physical activity and stress levels. It was explained that there was no correlation between total MET and depression, anxiety and stress (23). Inaccurate information about over-reported or under-reported physical activity can occur because the reporting tends to self-estimate the duration and intensity of physical activity. Thus, these factors lead to inconsistent findings in recent studies, which found that engaging in high levels of physical activity can lead to better physical and psychological status and may contribute to a positive relationship between physical and mental health.

Daily physical activity, physical exercise, and exercise are the three categories of physical activity that are measured in this study in relation to stress levels. Physical activity in leisure time, such as physical exercise and

sports, is more beneficial for mental health than physical activity at work or in household activities. Previous study showed that physical activity is not consistently associated with mental health, other factors such as diversion from stress and motivation exist (24). Physical activity that is carried out in a social context can create interactions so that it diverts stress thoughts but not on work activities which are the source of stress.

According to the study's findings, there is no meaningful correlation between stress levels and physical activity levels. This is contrary to several previous studies which showed significant impacts on both variables (25). Physical activity and stress levels have been linked. The relationship between physical activity and stress was found to be statistically significant. Participants who engaged in more physical activity reported lower levels of perceived stress than those who did not regularly engage in significant physical activity.

Physical activity can affect mental health in 3 ways, namely physiological, immune and psychological. Physical activity has health benefits based on physiological mechanisms such as increasing endorphins and body temperature, especially in the brain stem, which will reduce muscle tension and provide relaxation to the body (26). Handling increased stress during the COVID-19 pandemic is needed to deal with the impacts caused. Three steps can be taken. First, equip yourself with sufficient knowledge regarding Covid-19. Second, find out your health condition, for example, through self-screening. Third, determine attitudes and steps according to the health conditions experienced. One way to reduce stress is by starting to talk about the feelings experienced with the closest person or family who can be trusted to help and share stories (27).

The findings of this study show no connection between stress levels and physical exercise. The researchers adhered to the full research flow throughout the investigation. Researchers claim that there is no connection between stress levels, which are impacted by a number of factors, and physical activity. First, the researchers conducted research at the end of the pandemic period to allow conditions between the beginning and the pandemic's end. Second, the researcher argues that although one respondent to another has the same stress level, it is not necessarily that the respondent has the same level of coping.

Implication

This study provides important insights for nursing education programs, highlighting the potential role of integrating physical fitness and mental health promotion into the nursing curriculum. Although no significant relationship was found between physical activity and stress levels among nursing students during the COVID-19 pandemic, the findings underscore the complexity of factors influencing student well-being during public health crises. Proactive incorporation of wellness initiatives could foster resilience, reduce stress, and enhance both academic and clinical performance, preparing future nurses to better cope with future health emergencies.

Limitation

Several limitations should be noted when interpreting the results of this study. First, the use of convenience sampling limits the generalizability of the findings to broader student populations. Second, the cross-sectional study design precludes any inference of causality between physical activity and stress levels. Third, reliance on self-reported data may introduce response biases, including social desirability bias and recall bias. Given the preliminary nature of these findings, further research involving representative samples, objective measures of physical activity, and longitudinal designs is needed to validate and extend these observations across diverse populations.

CONCLUSION

This study found no significant correlation between physical activity levels and stress among nursing students at the School of Nursing, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta during the COVID-19 pandemic. The lack of a substantial association may be attributable to overriding pandemic-related stressors, including academic uncertainty and fear of infection, which could have diminished the relative impact of physical activity on stress reduction. Additionally, variability in the type, intensity, and frequency of physical activity, as well as individual differences in coping mechanisms, may have influenced the observed outcomes.

Future research should employ longitudinal designs to establish causal pathways and

provide more definitive evidence regarding the role of physical activity in mitigating psychological stress among nursing students. By addressing these limitations, future studies can better inform targeted interventions that promote holistic well-being among healthcare students, especially during periods of public health disruption.

Acknowledgement

The authors would like to express their sincere gratitude to all nursing students of the School of Nursing, Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, who participated in this study. Appreciation is also extended to the faculty and administrative staff for facilitating the distribution of the online questionnaire during the data collection process.

Funding

The Research and Innovation Institute of Universitas Muhammadiyah Yogyakarta (LRI UMY).

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Author Contribution

SW : Conceptualization and Study Design, Methodology, Data Curation, Writing – Original Draft, Writing – Review & Editing
SS : Conceptualization and Study Design, Methodology, Formal Analysis, Writing – Review & Editing, Writing – Review & Editing
SK : Data Curation, Writing – Review & Editing, Methodology, Formal Analysis

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All shared data will be de-identified to protect participant confidentiality.

REFERENCES

1. Slimani M, Paravlic A, Mbarek F, Bragazzi NL, Tod D. The Relationship Between Physical Activity and Quality of Life During the Confinement Induced by COVID-19 Outbreak: A Pilot Study in Tunisia. Front Psychol [Internet]. 2020 Aug 7;11:1882. Available from: https://doi.org/10.3389/fpsyg.2020.01882
2. 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 [Internet]. 2020 Dec;54(24):1451–62. Available from: https://doi.org/10.1136/bjsports-2020-102955
3. Hori N, Shiraishi M, Harada R, Kurashima Y. Association of Lifestyle Changes Due to the COVID-19 Pandemic with Nutrient Intake and Physical Activity Levels during Pregnancy in Japan. Nutrients [Internet]. 2021 Oct 26;13(11):3799. Available from: https://doi.org/10.3390/nu13113799
4. Jiménez-Pavón D, Carbonell-Baeza A, Lavie CJ. Physical exercise as therapy to fight against the mental and physical consequences of COVID-19 quarantine: Special focus in older people. Prog Cardiovasc Dis [Internet]. 2020/03/24. 2020;63(3):386–8. Available from: https://doi.org/10.1016/j.pcad.2020.03.009
5. Peçanha T, Goessler KF, Roschel H, Gualano B. Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease. Am J Physiol Heart Circ Physiol [Internet]. 2020/05/15. 2020 Jun 1;318(6):H1441–6. Available from: https://doi.org/10.1152/ajpheart.00268.2020
6. Xiang M, Zhang Z, Kuwahara K. Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected. Prog Cardiovasc Dis [Internet]. 2020/04/30. 2020;63(4):531–2. Available from: https://doi.org/10.1016/j.pcad.2020.04.013
7. Mendoza-Vasconez AS, Marquez B, Linke S, Arredondo EM, Marcus BH. Effect of Physical Activity on Depression Symptoms and Perceived Stress in Latinas: A Mediation Analysis. Ment Health Phys Act [Internet]. 2019/03/12. 2019 Mar;16:31–7. Available from: https://doi.org/10.1016/j.mhpa.2019.03.001
8. Dogra S, MacIntosh L, O'Neill C, D'Silva C, Shearer H, Smith K, et al. The association of physical activity with depression and

stress among post-secondary school students: A systematic review. Ment Health Phys Act [Internet]. 2018;14:146–56. Available from: http://dx.doi.org/10.1016/j.mhpa.2017.11.001
9. Lumban Gaol NT. Teori Stres: Stimulus, Respons, dan Transaksional. Buletin Psikologi [Internet]. 2016;24(1):1. Available from: http://dx.doi.org/10.22146/bpsi.11224
10. Valim V, Natour J, Xiao Y, Pereira AFA, Lopes BB da C, Pollak DF, et al. Effects of physical exercise on serum levels of serotonin and its metabolite in fibromyalgia: a randomized pilot study. Revista Brasileira de Reumatologia (English Edition) [Internet]. 2013;53(6):538–41. Available from: http://dx.doi.org/10.1016/j.rbre.2013.02.001
11. Pilozzi A, Carro C, Huang X. Roles of β-Endorphin in Stress, Behavior, Neuroinflammation, and Brain Energy Metabolism. Int J Mol Sci [Internet]. 2020 Dec 30;22(1):338. Available from: https://doi.org/10.3390/ijms22010338
12. Ambarwati PD, Pinilih SS, Astuti RT. Gambaran Tingkat Stres Mahasiswa. Jurnal Keperawatan Jiwa [Internet]. 2019;5(1):40. Available from: http://dx.doi.org/10.26714/jkj.5.1.2017.40-47
13. Nochaiwong S, Ruengorn C, Thavorn K, Hutton B, Awiphan R, Phosuya C, et al. Global prevalence of mental health issues among the general population during the coronavirus disease-2019 pandemic: a systematic review and meta-analysis. Sci Rep [Internet]. 2021 May 13;11(1):10173. Available from: https://doi.org/10.1038/s41598-021-89700-8
14. Gallego-Gómez JI, Campillo-Cano M, Carrión-Martínez A, Balanza S, Rodríguez-González-Moro MT, Simonelli-Muñoz AJ, et al. The COVID-19 Pandemic and Its Impact on Homebound Nursing Students. Int J Environ Res Public Health [Internet]. 2020 Oct 10;17(20):7383. Available from: https://doi.org/10.3390/ijerph17207383
15. Wigiyandiaz JA, Br. Purba M, Padmawati RS. Pola Makan Dan Aktivitas Fisik Remaja Akhir Dengan Riwayat Diabetes Di Yogyakarta. Gizi Indonesia [Internet]. 2020;43(2):87–96. Available from: http://dx.doi.org/10.36457/gizindo.v43i2.283
16. Farradika Y, Umniyatun Y, Nurmansyah MI, Jannah M. Perilaku Aktivitas Fisik dan Determinannya pada Mahasiswa Fakultas Ilmu - Ilmu Kesehatan Universitas Muhammadiyah Prof. Dr. Hamka. ARKESMAS (Arsip Kesehatan Masyarakat) [Internet]. 2019;4(1):134–42. Available from: http://dx.doi.org/10.22236/arkesmas.v4i1.3548
17. Khrismadani PH, Sawitri NKA, Nurhesti Poy. Gambaran Tingkat Stres Mahasiswa Keperawatan Universitas Udayana Dalam Proses Pembelajaran Selama Pandemi Covid-19. Coping: Community of Publishing in Nursing [Internet]. 2022;10(2):166. Available from: http://dx.doi.org/10.24843/coping.2022.v10.i02.p07
18. Sari I. Analisis Dampak Pandemi Covid-19 Terhadap Kecemasan Masyarakat : Literature Review. Bina Generasi : Jurnal Kesehatan [Internet]. 2020;12(1):69–76. Available from: http://dx.doi.org/10.35907/bgjk.v12i1.161
19. Lubis H, Ramadhani A, Rasyid M. Stres Akademik Mahasiswa dalam Melaksanakan Kuliah Daring Selama Masa Pandemi Covid 19. Psikostudia : Jurnal Psikologi [Internet]. 2021;10(1):31. Available from: http://dx.doi.org/10.30872/psikostudia.v10i1.5454
20. Hatmanti NM, Septianingrum Y. Faktor-Faktor Yang Mempengaruhi Stres Akademik Mahasiswa Keperawatan. Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing) [Internet]. 2019;5(1):40–6. Available from: http://dx.doi.org/10.33023/jikep.v5i1.217
21. Association between Perceived Stress and Resilience among University Students. Indian Journal of Public Health Research & Development [Internet]. 2020; Available from: http://dx.doi.org/10.37506/ijphrd.v11i7.10278
22. Can S. The Determining of Relationship Between Physical Activity and Perceived Stress Level in Security Service Employees. J Educ Train Stud [Internet].

2018;7(1):149. Available from: http://dx.doi.org/10.11114/jets.v7i1.3907

23. Teng M, Hassan Z, Kasa M, Nor NNM, Bandar NFA, Ahmad R. Mediating Role of Boredom in the Workplace on Turnover Intention: A Proposed Framework. International Journal of Academic Research in Business and Social Sciences [Internet]. 2020;10(12). Available from: http://dx.doi.org/10.6007/ijarbss/v10-i12/8385
24. White RL, Babic MJ, Parker PD, Lubans DR, Astell-Burt T, Lonsdale C. Domain-Specific Physical Activity and Mental Health: A Meta-analysis. Am J Prev Med [Internet]. 2017;52(5):653–66. Available from: http://dx.doi.org/10.1016/j.amepre.2016.12.008
25. Mehta Asha Tatipamul E. Prevalence of Occupational Stress, Perceived Stress and Fatigue among Private School Teachers in Surat City: A Cross-Sectional Study. International Journal of Science and Research (IJSR) [Internet]. 2023;12(5):507–12. Available from: http://dx.doi.org/10.21275/sr23502103058
26. Amana DR, Wilson W, Hermawati E. Hubungan tingkat aktivitas fisik dengan tingkat depresi pada mahasiswa tahun kedua Program Studi Kedokteran Fakultas Kedokteran Universitas Tanjungpura. Jurnal Cerebellum [Internet]. 2021;6(4):94. Available from: http://dx.doi.org/10.26418/jc.v6i4.47800
27. Fauziyyah R, Awinda RC, Besral B. Dampak Pembelajaran Jarak Jauh terhadap Tingkat Stres dan Kecemasan Mahasiswa selama Pandemi COVID-19. Jurnal Biostatistik, Kependudukan, dan Informatika Kesehatan [Internet]. 2021;1(2):113. Available from: http://dx.doi.org/10.51181/bikfokes.v1i2.4656
28. Debora O, Sulistyono S. The Effect of Touch Less Spiritual Therapy and Yin Yoga Toward Student's Perceived Stress During Covid-19 Pandemic. Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal). 2022;8(2).