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ASSOCIATION BETWEEN PHYSICAL ACTIVITY DURING THE COVID-19 PANDEMIC AND DEPRESSION RATES IN COLLEGE STUDENTS : ANALYTICAL OBSERVATIONAL STUDIES IN FIRST-YEAR MEDICAL STUDENTS AT DIPONEGORO UNIVERSITY SEMARANG

Salafudin Salafudin[1*], Innawati Jusup[2], Endang Kumaidah[3], Lusiana Batubara[4]
[1] Undergraduate Program, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia
[2] Department of Mental Health Sciences, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia
[3]Department of Physiology of Medicine, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia
[4]Department of Biology and Biochemistry, Faculty of Medicine, Universitas Diponegoro, Semarang, Indonesia
*Corresponding Author : E-mail : salafudin31072000@gmail.com

ABSTRACT

Background: The COVID-19 pandemic has an impact on every individual. Lifestyle changes and reduced physical activity are some of them. Less physical activity will affect a person's psychological problems, one of which is depression. Depression is a common mental disorder with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-esteem, sleep or appetite disorders, and reduced concentration.
Aim: Determine the association of physical activity during the COVID-19 pandemic with the level of depression in first-year students of the Faculty of Medicine, Diponegoro University.
Methods: The research design was observational analytics with a cross-sectional approach. The study used the International Physical Activity Questionnaire (IPAQ) and Beck Depression Inventory-II (BDI-II), presented in google form and disseminated through social media. Respondents filled out one hundred seventy-six questionnaires. The purposive sampling method obtained respondents included in the inclusion and exclusion criteria as many as 114 respondent. The data were tested with the Chi-Square test to assess correlations between variables.
Results: We found a significant association between physical activity during the COVID-19 pandemic and depression rates (p=0.043). There was a link between sex and physical activity and depression levels (p=0.007), and there is a significant association between age and physical activity and depression levels during the COVID-19 pandemic (p=0.00).
***Keywords**: COVID-19; Physical activity; Depression*

INTRODUCTION

During the COVID-19 pandemic, all countries have implemented several policies to prevent the spread of COVID-19. In Indonesia, *Gerakan 5M* (Wearing masks, washing hands, maintaining distance, staying away from crowds, and limiting mobilization and interaction) is the way to minimize the spread of COVID-19. The implementation of some of these policies impacts several sectors in the community, one of which is the education sector.[1]

Currently, the government has implemented online learning methods to reduce the spread of COVID-19 infection. Learning methods like this will potentially reduce physical activity carried out by students.[2] Physical activity is one of the essential factors for health and well-being.[3] Lack of physical activity is one of the biggest health problem today. Based on data taken before the COVID-19 pandemic, in Riset Kesehatan Dasar's (Riskesdas) report in 2018, the proportion of physical activity was less in the ≥10-year-old population increased compared to data that had taken in 2013.[4,5]

In addition to impacting physical activity, social restrictions followed by changes in learning methods during the COVID-19 pandemic can also impact students' mental health. For example, a Canadian study on the effects of quarantine on physical and psychological health found an association between the duration of quarantine and the high prevalence of stress in his research.[6,7] As for the cause of stress in students, students often feel confused with new learning methods, feel less optimal in understanding the material provided by lecturers, feel bored because of only staying at home, and need to do many tasks within a short duration of time. This causes certainly creates psychological problems for students. One of the psychological problems that one can experience is depression.

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Depression is a serious mental illness characterized by loss of interest, excitement, and reduced energy, leading to increased fatigue and decreased physical activity. Based on results of research conducted vefore the COVID-19 pandemic by Putu Ayu Emy S.V in the first-year students of PSIK FK Udayana Univesity, the higest level of depression experisnced was in the category of severe depression.[8] Untreatable depression can interfere with daily activities and effect academic achievement, which is one of the problems experienced by students, especially first-year students. At the same time, the cause changes in the new learning environment, changes in learning methods, busy schedules, and homesickness if the student is far from his family and others.

The study aimed to determine the association between physical activity during the COVID-19 pandemic and depression level rates in first-rate college students.

METHOD

This study was conducted during the COVID-19 pandemic between July - August 2021, which was conducted online using the International Physical Activity Questionnaire (IPAQ) and Beck Depression Inventory-II (BDI-II), presented in the form of a Google form and subsequently disseminated through social media. Sampling techniques in this study used purposive sampling methods.

The population in this study was all first-year medical students at the Faculty of Medicine, Diponegoro University. Selection of samples by purposive sampling method in accordance with predefined criteria, namely based on inclusion and exclusion criteria. The criteria for inclusion in this study, namely first-year Faculty of Medicine students who were active, aged 17-20 years, and willing to follow the research by signing informed consent. While the exclusion criteria are, having a history of mental disorders, being infected with COVID-19, and having a history of diseases that can inhibit physical activity, such as cardiovascular diseases, diabetes mellitus, cancer or tumors, chronic infections, and others.

Researchers distributed questionnaires and informed consent via google forms through WhatsApp media to 250 students, but only 176 students filled out the questionnaires. The purposive sampling method obtained respondents included in the inclusion and exclusion criteria as many as 114 students. The Health Research Ethics Commission (KEPK) of the Faculty of Medicine, Diponegoro University, has permitted research with Number 271 / EC / FK-UNDIP / VII / 2021.

RESULT

According to table 1, 27.2% of respondents were male, and 83% were women. The respondent's were between 17 and 20 years old. Based on the data, the frequency of those aged 17 years was 3.5%, 18 years was 7.0%, 19 years was 75.4%, and 20 years was 14%. Student study locations are primarily at home at 89.5%, and only 12% study online at boarding houses. Physical activity in the study was measured using the international physical activity questionnaire (IPAQ), categorized into mild, moderate, and vigorous. None of the students with mild activity, those with moderate physical activity 18.4%, and those with vigorous activity 81.6%. Depression levels in college students were assessed using the Beck Depression Inventory-II (BDI-II) questionnaire, categorized into 4: normal, mild, moderate, and severe depression. Most students did not experience depression during this COVID-19 outbreak (88%), but some students experienced mild (13.2%), moderate (8.8%), and severe (0.9%) depression.

Table 2 shows a significant association between physical activity during the COVID-19 pandemic and depression rates in college students. It can also be interpreted that student physical activity during the COVID-19 pandemic correlates with depression ($p = 0.043$).

Correlations between variables were analyzed using the Chi-square test, resulting in students with moderate physical activity and not experiencing depression in as many as 14 people (12.28%); moderate physical activity and mild depression in as many as 2 people (1.75%); moderate physical activity and moderate depression as many as 4 people (3.5%); as well as moderate physical activity and severe depression as many as 1 person (0.87%). While students with vigorous physical activity and not depressed as many as 74 people (64.91%); vigorous physical activity and mild depression as many as 13 people (11.4%); vigorous physical activity and moderate depression as many as 6 people

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(5.29%); no college student with vigorous physical activity experienced severe depression.

A multivariate analysis of the association between sex, physical activity and depression levels showed a significant association between sex and physical activity and depression levels (p=0.007) (Table 3). The study also analyzed the association between age, physical activity and depression levels, resulting in a significant association (p=0.00) (Table 4).

Table 1. Characteristics of Respondents

Characteristics	Frequency	Percentage (%)
Sex		
Male	31	27,2
Female	83	72,8
Age (years)		
17 years	4	3,5
18 years	8	7,0
19 years	86	75,4
20 years	16	14,0
Study location		
Home	102	89,5
Boarding house	12	10,5
Physical activity		
Mild	0	0
Moderate	21	18,4
Vigorous	93	81,6
Level of depression		
Normal	88	77,2
Mild	15	13,2
Moderate	10	8,8
Severe	1	0,9

Table 2. Association between Physical Activity and Depression Levels

		Level of depression								P *Value*
		Normal		Mild		Moderate		Severe		
		n	%	n	%	n	%	n	%	
Physical activity	Moderate	14	12.28	2	1.75	4	3.5	1	0.87	0.043*
	Severe	74	64.91	13	11.4	6	5.29	0	0	
Total		88	77.19	15	13.15	10	8.79	1	0.87	

*Chi-Square test, p value <0.05 considered significant.

Table 3. The association between sex and activity and depression levels

Variable		*Value*	F	*Hypothesis df*	*Error df*	P *Value*
Sex	Pillai's Trace	0.086	5.252[b]	2.00	111	0.007
	Wilks's Lamda	0.914	5.252[b]	2.00	111	0.007
	Hotelling's Trace	0.095	5.252[b]	2.00	111	0.007
	Roy's Largest Root	0.095	5.252[b]	2.00	111	0.007

Multivariate tests; [b]Exact statistic.

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Table 4. The association between Age and activity and depression levels

Variable		*Value*	F	*Hypothesis df*	*Error df*	P *Value*
Age	Pillai's Trace	0.721	20.683	6.00	220	0.00
	Wilks's Lamda	0.325	24.885[b]	6.00	218	0.00
	Hotelling's Trace	1.630	29.342	6.00	216	0.00
	Roy's Largest Root	1.490	54.632[b]	3.00	110	0.00

Multivariate tests; [b]Exact

DISCUSSION

The study aimed to determine the association between physical activity during the COVID-19 pandemic and depression rates in first-grade students. A total of 114 data that matched the inclusion and exclusion criteria were analyzed using the Chi-Square hypothesis test.

The results showed that students did no mild physical activity, students with moderate physical activity had a percentage of 18.4%, and vigorous physical activity had a percentage of 81.6%. Based on KEMENKES RI data on the Proportion of Physical Activity in the population of ≥10 years, especially the age of 15-24 years is 58.6%, so it can be seen that physical activity in first-year students at the Faculty of Medicine, Diponegoro University is still quite high. The results are in line with research conducted by Shania Sondang at the Usu Faculty of Medicine during the COVID-19 pandemic using the same questionnaire (The International Physical Activity Questionnaire (IPAQ)). In this study, about 14% of students had mild physical activity, 64% had moderate physical activity, and 22% had vigorous physical activity.[4] The results are also in line with research conducted by Martha Yuliani Habut on students at the Faculty of Medicine udayana University before the COVID-19 pandemic, obtained about 33.6% of students have a moderate activity level. About 28% of students have a level of severe physical activity.[32] in this study also used the same questionnaire as the questionnaire used by researchers, namely the International Physical Activity Questionnaire (IPAQ).

Analysis related to depression rates in first-year medical students during the COVID-19 pandemic showed that most college students did not experience depression (77.2%), but there were also some students experiencing depression from mild to severe. Based on KEMENKES RI data on the prevalence of depression in the population of ≥15 years, especially adolescents aged 15 - 24 years is 6.2%, so it can be concluded that the level of depression in students at the Faculty of Medicine is quite high.[33] This is in line with research conducted by Surain Raaj in 2017, it was found that about 22.63% of students at the Faculty of Medicine experienced depression from mild to severe.[14] The study conducted by Sanian Inama Regarding the description of stress in USU School of Medicine students during the COVID-19 pandemic also stated that the majority of students have stress levels from moderate to severe with percentages of 49.1% and 21.8%.[34]

Then an analysis of the association between physical activity during the COVID-19 pandemic and depression levels was found to be a significant association between the two variables (p =0.043). It can be interpreted that college students who actively engage in physical activity mean they are less likely to experience depression. On the other hand, students who engage in light to moderate physical activity are less likely to experience depression. These results anSurain Raaj and Wayan Westa, which stated that students with high activity tend to have low levels of depression.[14] The results of this study were also in accordance with research conducted by Grazia Maugheri in 2020, which states that there was a significant positive association between Physical Activity and Mental Health (r =0.01758, p<0.0001).[25]

Physical activity such as exercise can induce the release of myokines decreasing the release of pro-inflammatory cytokines. In addition, exercise can also increase neurotransmitters, such as serotonin, epinephrine, norepinephrine, and dopamine. These neurotransmitters can decrease the occurrence of depression, which is mediated by the activation of the Brain-Derived Neurotrophic Factor (BDNF).

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Based on research conducted by Fitri Afifah Nurullah, out of 78 respondents, 21 respondents (26.92%) did not suffer from depression and regular exercise, in comparison 9 other respondents (10.26%) suffered from depression and did not exercise regularly.[30]

A multivariate analysis of the association between sex and physical activity and depression levels showed a significant association between sex and physical activity and depression levels (p=0.007). The study also analyzed the association between age and physical activity and depression levels, resulting in a significant association in this analysis (p=0).

Age is the length of a lifetime calculated from birth until now. The determinant of age is done using a count of years. One of the health disorders that can arise with age is a mental disorder. The higher the age a person will be risk of experiencing health problems because there are factors of aging, that age will experience changes. One of them is depression, as the age of depression increases.[36] In addition, age factors also affect the physical activity carried out by respondents. The older the respondents, the less physical activity they tended to do. This can be caused by the body's endurance level, which decreases with age.[37]

This study has limitations. Namely, researchers use the physical activity questionnaire (IPAQ) used by researchers can calculate physical activity based on MET in the last seven days, so this study can not measured physical activity during the COVID-19 pandemic.

CONCLUSION

This study concludes that first-year students have a relationship between physical activity and depression levels. There was also a association between gender and age to physical activity and depression levels in first-year students of the Faculty of Medicine during the COVID-19 pandemic.

REFERENCES

1. Kharshiing KD, Kashyap D, Gupta K, Khursheed M, Shahnawaz MG, Khan NH, et al. Quality of Life in the COVID-19 Pandemic in India: Exploring the Role of Individual and Group Variables. Community Ment Health J [Internet]. 2021;57(1):70–8. Available from: https://doi.org/10.1007/s10597-020-00712-6
2. Kementrian Pendidikan dan Kebudayaan Republik Indonesia. Surat Edaran Nomor 4 Tahun 2020 Tentang Pelaksanaan Kebijakan Pendidikan Dalam Masa Darurat Penyebaran Corona Virus Disease (COVID- 1 9). InfoDATIN. 2019. p. 64.
3. Pujilestari Y. Dampak Positif Pembelajaran Online Dalam Sistem Pendidikan Indonesia Pasca Pandemi Covid-19. Adalah [Internet]. 2020;4(1):49–56.
4. Sondang S, Bulan NI. Hubungan Aktivitas Fisik selama Pandemi COVID-19 dengan Kualitas Tidur Mahasiswa Fakultas Kedokteran Universitas Sumatra Utara. J Kedokteran Universitas Sumatra Utara; 2021.
5. Hasil Utama Riset Kesehatan Dasar (RISKESDAS). InfoDATIN. 2019. p. 12.
6. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. Emerg Infect Dis. 2004;10(7):1206–12.
7. Hasanah U, Fitri NL, Supardi S, PH L. Depression Among College Students Due to the COVID-19 Pandemic. J Keperawatan Jiwa. 2020;8(4):421.
8. Maslim R. Diagnosis Gangguan Jiwa Rujukan Ringkas dari PPDGJ - III dan DSM - 5. Jakarta: Ilmu Kedokteran Jiwa Atmajaya; 2013.
9. Emmy SK. Gambaran Tingkat Depresi pada Mahasiswa Tingkat Pertama Program Studi Ilmu Keperawatan Fakultas Kedokteran Universitas Udayana. J Medika Udayana. 2017;4:9–15.
10. Sekar S, Ananda D, Apsari NC. Mengatasi Stress Pada Remaja Saat Pandemi Covid-19. Fakultas Ilmu Sosial Universitas Padjajaran. J Ilmiah Widya Sosiopolitika. 2020;7(2):248–56.
11. Akhtarul Islam M, Barna SD, Raihan H, Nafiul Alam Khan M, Tanvir Hossain M. Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. PLoS One [Internet]. 2020;15(8 August):1–12. Available from: http://dx.doi.org/10.1371/journal.pone.0238162
12. Sharma A, Tiwari S, Kanti M, Louis J. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus

JURNAL KEDOKTERAN DIPONEGORO
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JKD (DMJ), Volume 11, Number 6, November 2022 : 293-299

COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company's public news and information. Science (80-). 2020;(January).
13. Marcus M, Yasamy MT, van Ommeren M, Chisholm D. Depression, a global public health concern. WHO Dep Ment Heal Subst Abus [Internet]. 2012;1–8. Available from: http://www.who.int/mental_health/management/depression/who_paper_depression_wfmh_2012.pdf
14. Thurai S, Westa W. Tingkat depresi dalam kalangan mahasiswa kedokteran semester VII Universitas Udayana dan keterlibatan mereka dalam kegiatan fisik. Intisari Sains Medis [Internet]. 2017;8(2):147–50. Available from: http://isainsmedis.id/%0Ahttps://isainsmedis.id/index.php/ism/article/view/131
15. Trilistya S. Tingkat Depresi Korban Tanah Longsor di Banjarnegara. J Kedokteran Diponegoro. 2006;5.
16. Maulida A. Gambaran Tingkat Depresi Pada Mahasiswa Program Sarjana Yang Melakukan Konseling Di Badan Konseling Mahasiswa Universitas Indonesia. Medical Journal of Indonesia. 2012;11–4.
17. Samlani Z, Lemfadli Y, Ait Errami A, Oubaha S, Krati K. The impact of the COVID-19 pandemic on quality of life and well-being in Morocco. Arch Community Med Public Heal. 2020;(June):130–4.
18. Handikasari RH. Hubungan Intensitas Penggunaan Media Sosial dengan Gejala Depresi Mahasiswa Kedokteran. J Kedokteran Diponegoro. 2018. :7–35.
19. Pramudita S. Hubungan Intensitas Penggunaan Situs Jejaring Sosial dengan Depresi pada Mahasiswa Tingkat Akhir. J Chem Inf Model. 2013;53(9):1689–99.
20. Kapci EG, Uslu R, Turkcapar H, Karaoglan A. Beck depression inventory II: Evaluation of the psychometric properties and cut-off points in a Turkish adult population. Depress Anxiety. 2008;25(10).
21. Ika I. Hubungan antara Aktivitas Fisik dan Daya Tahan Kardiovaskuler pada Mahasiswa. E-Jurnal Medika Udayana. 2015;22–39.
22. Direktorat Pencegahan dan Pengendalian Penyakit Tidak Menular. Buku Ayo Bergerak Melawan Obesitas. Kementrian Kesehatan Republik Indonesia. InfoDATIN. 2019. p. 32.
23. Triwahyuni, Endah. Aktivitas Fisik pada Lansia di Panti Wreda di Surakarta. J Biomedika Universitas Muhammadiyah Surakarta. 2012;3–8.
24. Handikasari RH. Hubungan Intensitas Penggunaan Media Sosial dengan Gejala Depresi Mahasiswa Kedokteran (Studi pada Mahasiswa Kedokteran Tingkat Akhir yang Menggunakan Kurikulum Modul Terintegrasi). J Kedokteran Diponegoro. 2018 :5–13.
25. Maugeri G, Castrogiovanni P, Battaglia G, Pippi R, D'Agata V, Palma A, et al. The impact of physical activity on psychological health during Covid-19 pandemic in Italy. Heliyon [Internet]. 2020;6(6):e04315. Available from: https://doi.org/10.1016/j.heliyon.2020.e04315
26. Woods JA, Hutchinson NT, Powers SK, Roberts WO, Gomez-Cabrera MC, Radak Z, et al. The COVID-19 pandemic and physical activity. Sports Med Heal Sci. 2020;2(2):55–64.
27. Dewita NR. Hubungan Aktivitas Fisik Terhadap Kejadian Obesitas Berdasarkan Body Mass Index Di Rw 20 Dusun Dlingseng Banjaroyo. J Kedokteran Universitas Sanata Dharma;2017.
28. Fogelholm M, Malmberg J, Suni J, Santtila M, Kyröläinen H, Mäntysaari M, et al. International Physical Activity Questionnaire. Med Sci Sport Exerc. 2006;38(4):753–60.
29. Pingkan R, Berawi KN, Budiarto A, Mutiara UG. Efektivitas Olahraga sebagai Terapi Depresi. Fakultas Kedokteran Universitas Lampung. 2019;8:240–6.
30. Dewi MK. Hubungan Olahraga Rutin dengan Tingkat Depresi pada Lansia di Kecamatan Coblong Kota Bandung. Pros Pendidik Dr [Internet]. 2015;694–9. Available from: http://repository.unisba.ac.id/handle/123456789/12085
31. Santoso A, Ardi WR, Luhur Prasetya R, Dwidiyanti M, Wijayanti DY, Mu'in M, et al. Tingkat Depresi Mahasiswa Keperawatan di Tengah Wabah COVID-19. J Holist Nurs Heal Sci [Internet]. 2020;3(1):1–8. Available from: https://ejournal2.undip.ac.id/index.php/hnhs
32. Habut MY, Nurmawan IPS, Wiryanthini IAD. Association of Body Mass Index and Physical Activity for Dynamic Balance. Maj Ilm Fisioter

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : https:// 10.14710/jkd (dmj).v11i6.36250
JKD (DMJ), Volume 11, Number 6, November 2022 : 293-299

Indones. 2018;2:45–51.
33. Pusat Data dan Informasi Kementerian Kesehatan RI. Situasi Kesehatan Jiwa Di Indonesia. InfoDATIN. 2019. p. 12.
34. Inama S. Gambaran Tingkat Stres Mahasiswa Fakultas Kedokteran Universitas Sumatera Utara Dalam Sistem Pembelajaran Daring Pada Era Pandemi Covid-19. SCRIPTA SCORE Scientific Medical Journal. 2021;46.
35. Suprayoga IM. Hubungan Jenis Kelamin dengan Aktivitas Fisik pada Mahasiswa Pendidikan Dokter Angkatan 2012 FK UNS. J Tunas Bangsa. 2013;185–97.
36. Muharrom, Miftachul. Hubungan Usia , Jenis Kelamin , Aktivitas Fisik terhadap Depresi pada Lansia di Samarinda. Borneo Student Res. 2020;1(3):1359–64.
37. Wijaya NK. Hubungan Karakteristik Individu, Aktivitas Fisik dan Gaya Hidup dengan Tingkat Kebugaran fisik pada Lansia. J Ilmiah Mahasiswa Kedokteran Universitas Airlangga. 2019;12–31 p.
38. Yulianty R. Faktor – faktor yang berhubungan dengan kejadian depresi pada lansia di pstw budi luhur yogyakarta skripsi. Repos STIKES A Yani Yogyakarta [Internet]. 2013;3(1):1–8. Available from: repository.unjaya.ac.id/908/1/Rinna Yulianty_3209013_nonfull.pdf%0A%0A
39. Silvia. Faktor-Faktor Faktor Yang Berhubungan Dengan Kejadian Depresi Pada Lansia Di Posyandu Lansia Rimbo Kaduduk Wilayah Kerja Puskesmas Sintuk Padang Pariaman Penelitian Keperawatan Gerontik. J Keperawatan Sekolah Tinggi Ilmu Kesehatan Jendral Ahmad Yani. 2011;10(1):8-10.