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ORIGINAL ARTICLE

Nutritional Status and Physical Activity of Adolescents during Covid-19 Pandemic in Palangka Raya City, Indonesia

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Abstract

Background: The Covid-19 pandemic has brought changes in various life sectors, such as unhealthy lifestyle behaviors in adolescents due to the negative impact of online learning. Several studies have shown that stress and lack of physical activity influence nutritional status. Therefore, The purpose of the study was to describe the nutritional status and physical activity of adolescents during the COVID-19 pandemic in Palanka Raya City. **Methods:** This study is employed a survey method conducted in Palangka Raya city using 114 adolescents with incidental sampling technique. **Results:** The direct result was that the decline of physical activity has a significant impact on the nutritional status of adolescents. Furthermore, most samples with poor activity have a bigger susceptibility to being overweight/obese, while those with moderate activity have normal nutritional status. **Conclusions:** It was recommended that the government implement and promote nutrition improvement policies and health awareness on weight maintenance to deal with the health crises as impacts of the Covid-19 pandemic.

Keywords: Nutritional status, Physical activity, Adolescent, Covid-19 pandemic, Lifestyle

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Introduction

Novel Coronavirus (Covid-19) causes respiratory infections, leading to an increase in the number of cases of illness and death; therefore, it was declared a pandemic by WHO [1]. In Indonesia, the pandemic has caused many changes in various sectors of life, one of which is education. About 45 million students study from home, and around 7.5 million are already affected by the virus [2]. Undeniably, the online learning model with various implementations also leaves various negative impacts, such as lack of understanding of learning materials, lack of signal, neglected character education, and giving more assignments. This causes students to improve further their abilities and aligns with the current education system [3].

Physical activity is very influential in maintaining physical and mental health. It was defined by WHO (2017) as the burning of calories following the work of skeletal muscles in every body movement [4]. An adolescent who regularly performs physical activity has good self-confidence, self-concept, and less stress and feelings of anxiety [5]. Staying at home during the pandemic can lead to unhealthy lifestyle behaviors in society. Most adolescents did not know Benefits of physical activity, unhealthy living behavior, existence of various facilities, which affected their level of physical health. Meanwhile, lifestyle changes to sedentary life accompanied by excessive eating patterns growth the risk of overweight and obesity [6].

Nutritional status is the leading indicator of a country to determine community health [7] and one group that are vulnerable to nutritional problems is the adolescent group. In 2014, more than 1.9 billion people aged ≥ 18 years experienced overweight, and more than 600 million worldwide were obese [8]. Based on the results of Riskesdas in 2013, the prevalence of obesity in adolescents aged 13-15 years was 10.8%, consisting of 8.3% overweight and 2.5% obese. Meanwhile, the prevalence in adolescents aged 16-18 years was 7.3% consisting of 5.7% overweight and 1.6% obese.[9] Therefore, the problem of overweight and obesity ≥ 18 years has increased, with 8.6%–13.6% for overweight and 10.5%–21.8% for obesity since 2007–2018. In 20–24 years, 8.4% experienced overweight, and 12.1% were obese [10]. Meanwhile, in Palangka Raya, obesity cases increased in 2016 compared to 2015. The increase in men and women occurred ten and twelve times compared to 2015, respectively [11]. Based on the exposure to the problems, this study aimed to describe adolescents' nutritional status and physical activity during the Covid-19 pandemic in Palangka Raya City.

Methods

This study method was showed in Palangka Raya City, Central Kalimantan, in September 2021. The population used was

adolescents aged 18-20 years who are conducting lecture studies in any college of Palangka Raya City. Furthermore, about 114 adolescents referring to the Lemeshow formula using non-probability and Incidental Sampling techniques were obtained. This technique was carried out by distributing questionnaires to students used as data sources according to the criteria: aged 18-20 years, ready to be a participant, and not suffering from chronic diseases. In addition, the recruitment of participants was conducted using several campus side such as lecturers and staff to provide information about this study.

Data collection was conducted using a questionnaire and interview methods, including basic information on respondents, nutritional status based on anthropometric data (Body Mass Index), and physical activity using the IPAQ (International Physical Activity Questionnaire). It was mostly done with online questionnaires (basic information of participants and physical activity) by *Zoho Form* while still providing assistance and information on the procedure for filling out the questionnaire. This method was conducted since the Covid-19 pandemic caused limited meetings, and participants felt safe and comfortable answering the questions. Meanwhile, the measurement of nutritional status was carried out by personnel trained previously using validated measurements of weight (digital scales) and height (microtoise). Finally, quantitative (univariate) analysis using the SPSS program (IBM SPSS statistics version 22.0) was presented in a frequency distribution table and then explained in the form of a narrative.

Result

About 56.2% of the total sample were malnourished (undernutrition 25.5% and overnutrition 30.7%) compared with normal nutritional status (43.9%) (Table 1).

Table 1: Frequency distribution of nutritional status among adolescents in Palangkaraya City 2021.

Nutritional Status	n = (114)	%
Very thin (<17.0)	14	12.30
Skinny (17.0-18.4)	15	13.20
Normal (18.5-25.0)	50	43.90
Overweight (25.1-27.0)	26	22.80
Obese (>27.0)	9	7.90

Table 2 showed that most of the samples were female (73.7%), while 26.3% were male. At the age of the sample, most were at the age of 19 (45.6%), while the least was at 18 years (26.3%). Based on the semester of lectures, most of the samples were in the first semester (48.2%) and the least in the fifth semester (18.4%). Finally, based on place of residence, most of them lived with their parents (73.7%), and a small proportion lived with other families (7.0%) (Table 2).

Table 2: Frequency distribution of general characteristics of adolescents in Palangka Raya City 2021

Characteristics	n = (114)	%
Gender		
Man	30	26.30
Woman	84	73.70
Age (year)		
18	30	26.30
19	52	45.60
20	32	28.10
Semester		
1	55	48.20
3	38	33.30
5	21	18.40
Residence		
Parent	84	73.70
Boarding house	22	19.30
Another family	8	7.00

In the general characteristics of the sample by gender, most of the women had 61.9% undernutrition and overnutrition compared to men with 40.0%. Based on age, most of the samples had undernutrition and overnutrition at 19 years (57.7%). Based on the semester level, most of them with 48.8% had undernutrition and overnutrition in semester 1. Finally, based on the place of residence, most of the students with 59.5% who lived with their parents had abnormal nutritional status (Table 3).

Based on the proportion of physical activity of the sample, more respondents had moderate activity than those with less and excess activities with 42.1%, 36.0% and 21.9%, respectively (Table 4).

Table 3: Distribution of nutritional status based on general characteristics of adolescents in Palangka Raya City 2021.

Characteristics	Nutritional Status						Total	
	Undernutrition		Normal		Overnutrition			
	N	%	N	%	n	%	N	%
Gender								
Man	6	20.0	18	60.0	6	20.0	30	100.0
Woman	23	27.4	32	38.1	29	34.5	84	100.0
Age (year)								
18	8	26.7	12	40.0	10	33.3	30	100.0
19	16	30.8	22	42.3	14	26.9	52	100.0
20	5	15.6	16	50.0	11	34.4	32	100.0
Semester								
1	13	23.6	28	50.9	14	25.5	55	100.0
2	10	26.3	16	42.1	12	31.6	38	100.0
3	6	28.6	6	28.6	9	42.9	21	100.0
Residence								
Parent	21	25.0	34	40.5	29	34.5	84	100.0
Boarding house	5	22.7	14	63.6	3	13.6	22	100.0
Another family	3	37.5	2	25.0	3	37.5	8	100.0

Table 4: Frequency distribution of adolescent physical activity in Palangka Raya City 2021.

Physical Activity	n = (114)	%
Less	41	36.00
Moderate	48	42.10
Excess	25	21.90

Table 5: Crosstabulation of physical activity with nutritional status in adolescents in Palangka Raya City 2021.

Physical Activity	Nutritional Status						Total	
	Undernutrition		Normal		Overnutrition			
	n	%	n	%	n	%	n	%
Less	11	26.8	6	14.6	24	58.5	41	100.0
Moderate	12	25.0	30	62.5	6	12.5	48	100.0
Excess	16	24.0	14	56.0	5	20.0	25	100.0

The results of the crosstabulation of physical activity with nutritional status in the sample (Table 5) showed that those with less activity had a more significant susceptibility to being overweight/obesity with a percentage of 58.5%. In comparison, 62.5% of the samples with moderate activity had normal nutritional status.

Discussion

Overview of nutritional status in adolescent

The results showed that most of the samples with a 56.2% were malnourished, specifically 25.5% of undernutrition and 30.7% of overnutrition than those of 43.9% with normal nutritional status. Being incarcerated due to the COVID-19 pandemic can affect dietary profiles, especially adolescents who are highly susceptible to poor eating habits. Social isolation during lockdown/quarantine included with the pandemic had a more severe impact on nutritional status. According to a Dutch study, 20-32% of those surveyed during the pandemic reported overeating mainly through snacking, while 7-15% continued to suffer from malnutrition by skipping hot meals. These eating habits have important implications for the health effects of the pandemic [12].

This study also showed an increase in nutritional status problems in the sample where overweight/obesity (30.7%) had a more significant proportion than undernutrition (25.5%). The study by Jia et al. (2020) conducted a national online survey in China with a sample of adolescents, where their average BMI increased significantly from 21.8 to 22.1 kg/m2 with the increasing prevalence of overweight and obesity at 21.4% and 10.5%, respectively, as well as increased sedentary activity during the pandemic [13]. Nutritional issues negatively affect the level of public health, for example, decreased learning density, the risk of giving birth to a baby with a low birth weight, and a decrease in physical fitness [14]. People with poor nutritional status are exposed to infectious disease, while those with overnutrition are exposed to degenerative disease [15].

Based on the distribution of the general characteristics, the results showed that most of the females had nutritional problems, specifically 27.4% undernutrition and 34.5% overnutrition compared to males. According to Putra (2017), female students tend to have nutritional problems than males. Based on age, most respondents had nutritional problems at the age of 19 years with undernutrition and overnutrition at 30.8% and 26.9%, respectively [16]. This study is in line with the study in Botswana, which revealed that nutritional status changes with age and level of study. This is because of several lifestyle habits, such as spending a long time in front of the computer to do tasks and stress, which can increase or decrease appetite [17].

Most of the students who had nutritional problems were in the first semester with 23.6% undernutrition and overnutrition 25.5%. First-year students are faced with a significant change in their lives, where there is a transition process from senior in high school to a new person in college that can be a stressful time for individuals entering early adulthood [18]. The stressor for new students in the 2020/2021 academic year has increased with the Covid-19 pandemic, which requires lecture activities to be carried out online. Sari (2020) conducted a study on 70 first-year nursing students at a Health Sciences College (STIKES) in Kediri, where most experienced moderate stress during online lectures. The impact of this stress will affect a person's nutritional status [19].

Based on the residence condition, most respondents with nutritional problems live with their parents, where 25.0% suffering from undernutrition and 34.5% from overnutrition. Sulistyoningsih (2011) stated that the role of parents is related to the nutritional status of children. This role is directly proportional to the nutritional status of children (standard). In this case, parents can be role models about good eating habits to impact their children's eating patterns [20].

Overview of physical activity in adolescent

The results showed that most samples had a moderate physical activity of 42.1%. Although according to the American College of Sports Medicine (ACSM) (2015), physical activity is a positive behavior as a controller of energy balance since every body movement can cause an increase, expenditure, or burning of energy [21]. Therefore, less activity in adolescence will tend to be less active in later life, causing obesity [22] and this study, 36.0% of the samples had less activity. Unicef (2021) reported that during the Covid-19 period, there was a 52.0% reduction in physical activity in adolescents compared to the pre-pandemic period. On the other hand, only 7% of teens engage in more than 6 hours of physical activity per week [23]. A study in the UK conducted by Robinson et al (2021) predicts that the lifestyle during the pandemic is overeating and low physical activity. This reduction in physical activity is due to the implementation of distancing/lockdown, which limited movement to prevent transmission of the virus [24].

This study also found that 58.5% of samples with less activity had a more significant susceptibility to being overweight/obese. This is because much energy is accumulated in the body without burning calories due to insufficient activity [25]. According to Condello et

al. (2016), the combination of insufficient physical activity and high energy intake is responsible for overweight and obesity. The more active a person is in physical activity, the more energy is expended. Meanwhile, when the energy intake is excessive without being balanced by physical activity, adolescents will quickly become overweight/obese [26].

Al-Hourani et al. (2021) revealed that during Lockdown, the average weight and body mass index of children and adolescents showed significant increases ($p < 0.001$). Also, more than 50% of people have spent more than 3 hours in front of screens and food intake has increased significantly compared to before the lockdown [27]. Philipou et.al. (2020) found that weight gain was highly correlated with exercise, boredom caused by isolation, anxiety/depression, increased eating, snack intake and unhealthy foods such as cereals and sweets [28].

Results of a study in Turkey by Yilmaz et al. (2020) on students affected by Covid-19 stated that there were significant changes in terms of limitations in activities and behavior in buying food. Most of the students admitted that they had increased the amount of food and snacks consumed compared to their pre-pandemic habits [29]. The findings in Poland (2018) stated that the risk of obesity or overweight in adolescents active in physical activity can increase two times ($p<0.01$) [30]. This is under the theory of Nhantumbo et al. (2013), where people with excessive body weight and good activity are very likely to have a normal nutritional status than someone who has normal nutritional status but is not healthy due to low physical activity [31].

Conclusion

Currently, the Covid-19 pandemic is becoming a significant topic of conversation worldwide because of its impact on changes in aspects of life, especially health. The direct result was that the decline of physical activity has a significant effect on the nutritional status of youngsters. This also showed that most samples with poor activity have a more significant susceptibility to being overweight/obese. In contrast, most samples with moderate activity have normal nutritional status.

This study is expected to be a forum for increasing information and constant motivation to improve public health, especially during this Covid-19 pandemic. It is recommended as a reference in responding to the presence of the Covid-19 pandemic through an effective and efficient approach in handling health nutrition problems, especially for adolescents. Furthermore, it can contribute or become a reference material in further study, such as by analyzing other factors that trigger changes in a person's nutritional status.

What is known about the subject?

The dietary transitions and sedentary lifestyle especially during this Covid-19 pandemic, may collectively contribute to the dual burden of malnutrition in adolescence. Some studies revealed that they can contributed to an increased prevalence of overweight and obesity and related noncommunicable disease in later life.

What does the study performed add to the literature?

We found there were risks of unhealthy nutritional behavior among adolescents who increased of body weight and stressful. Hence, this study was performed to participate in reminding and guiding to stakeholders in finding the most effective intervention in optimizing the nutritional status.

What are the implications of the results obtained?

This study provided that Physical activity plays an important role in preventing excess weight/obesity. Besides that, this research is expected to contribute ideas, improved access to healthy foods and nutrition counselling to solving of adolescent's nutritional problems.

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References

1. *World Health Organization. Advice for the public: Coronavirus disease (COVID-19) [Internet]. 2021 [cited February 15, 2021]. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public*
2. *Oktavian R, Aldya RF. Efektivitas pembelajaran daring terintegrasi di era pendidikan 4.0. Didakt J Pendidik dan Ilmu Pengetah. 2020;20:129–35.*
3. *Argaheni NB. A systematic review: The impact of online lectures during the covid-19 pandemic against Indonesian students. PLACENTUM J Ilm Kesehat Dan Apl. 2020;8:99–109.*
4. *World Health Organization. Physical Activity [Internet]. 2021 [cited February 15, 2021]. Available at: http://www.who.int/mediacentre/factsheets/fs385/en*
5. *Brown JE, Isaacs J, Krinke B, et al. Nutrition Through The Life Cycle. USA: Wadsworth; 2013.*
6. *Proverawati A. Obesitas dan gangguan perilaku makan pada remaja. Yogyakarta Nuha Med. 2010;1–12.*
7. *Almatsier S. Prinsip Dasar Ilmu Gizi. VII. Jakarta: Gramedia Pustaka Utama; 2009.*
8. *World Health Organization. Overweight and Obesity [Internet]. 2015 [cited February 21, 2015]. Available at: http://www.who.int/mediacentre/factsheets/fs311/en*
9. *Kemenkes RI. Hasil Utama Riskesdas 2013. Jakarta: Kementerian Kesehatan RI; 2013.*
10. *Kemenkes RI. Hasil Utama Riskesdas 2018. Jakarta: Kementerian Kesehatan RI; 2018.*
11. *Badan Perencanaan Pembangunan Daerah Kota Palangkaraya. Profil Kota Palangkaraya Tahun 2017. Palangkaraya: Badan Perencanaan Pembangunan Daerah Kota Palangkaraya; 2018.*
12. *Visser M, Schaap LA, Wijnhoven HAH. Self-reported impact of the COVID-19 pandemic on nutrition and physical activity behaviour in Dutch older adults living independently. Nutrients. 2020;12:3708.*
13. *Jia P, Zhang L, Yu W, et al. Impact of COVID-19 lockdown on activity patterns and weight status among youths in China: the COVID-19 Impact on Lifestyle Change Survey (COINLICS). Int J Obes. 2021;45:695–9.*
14. *Notoatmodjo S. Promosi kesehatan dan ilmu perilaku. Jakarta: Rineka cipta; 2010.*
15. *Rahmawati T. Hubungan Asupan Zat Gizi Dengan Status Gizi Mahasiswa Gizi Semester 3 Stikes Pku Muhammadiyah Surakarta. Profesi (Profesional Islam Media Publ Penelit. 2017;14:49–57.*
16. *Putra WN. Hubungan pola makan, aktivitas fisik dan aktivitas sedentari dengan overweight di SMA Negeri 5 Surabaya. J Berk Epidemiol. 2017;5:298–310.*
17. *Obirikorang C, Anto EO, Addai P, et al. Prevalence and risks factors of overweight/obesity among Undergraduate students: An institutional based cross-sectional study, Ghana. J Med Biomed Sci. 2017;6:24–34.*
18. *Villatte A, Marcotte D, Potvin A. Correlates of depression in first-year college students. Can J High Educ. 2017;47:114–36.*
19. *Sari RP, Tusyantari NB, Suswandari M. Dampak pembelajaran daring bagi siswa sekolah dasar selama covid-19. Prima Magistra J Ilm Kependidikan. 2021;2:9–15.*
20. *Sulistyoningsih H. Gizi untuk kesehatan ibu dan anak. Yogyakarta: Graha ilmu; 2011.*
21. *American College of Sports Medicine (ACSM). Physical Activity in Children and Adolescents [Internet]. 2021. Available at: https://www.acsm.org/docs/default-source/brochures/physicalactivity-in-children-and-adolescents.pdf*

22. Wijayanti DN. Analisis faktor penyebab obesitas dan cara mengatasi obesitas pada remaja putri. Universitas Negeri Semarang; 2013.
23. Unicef. Effects of the Covid-19 pandemic on adolescent and youth nutrition and physical activity [Internet]. 2021. Available at: https://www.unicef.org/lac/en/effects-of-covid-19-pandemic-on-adolescent-and-youth-nutrition-and-physical-activity
24. Robinson E, Boyland E, Chisholm A, et al. Obesity, eating behavior and physical activity during COVID-19 lockdown: A study of UK adults. Appetite. 2021;156:104853.
25. Serly V, Sofian A, Ernalia Y. Hubungan body image, asupan energi dan aktivitas fisik dengan status gizi pada mahasiswa fakultas kedokteran Universitas Riau Angkatan 2014. Jom FK. 2015;2.
26. Condello G, Capranica L, Stager J, et al. Physical activity and health perception in aging: Do body mass and satisfaction matter? A three-path mediated link. PLoS One. 2016;11:e0160805.
27. Al Hourani H, Alkhatib B, Abdullah M. Impact of COVID-19 lockdown on body weight, eating habits, and physical activity of Jordanian children and adolescents. Disaster Med Public Health Prep. 2021;1–9.
28. Phillipou A, Meyer D, Neill E, et al. Eating and exercise behaviors in eating disorders and the general population during the COVID-19 pandemic in Australia: Initial results from the COLLATE project. Int J Eat Disord. 2020;53:1158–65.
29. Yilmaz HÖ, Aslan R, Unal C. Effect of the COVID-19 pandemic on eating habits and food purchasing behaviors of university students. Kesmas J Kesehat Masy Nas (National Public Heal Journal). 2020;15.
30. Glinkowska B, Glinkowski WM. Association of sports and physical activity with obesity among teenagers in Poland. Int J Occup Med Environ Health. 2018;31:771–82.
31. Nhantumbo I, Norfolk S, Pereira JCG. Community Based Natural Resources Management in Mozambique: A Theoretical Or Practical Strategy for Local Sustainable Development. Sustainabl. Brighton: Institute of Development Studies, University of Sussex; 2003.