ANALYSIS OF FACTORS ASSOCIATED WITH THE INCIDENCE OF OBESITY IN ADOLESCENTS

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ABSTRAK : ANALISIS FAKTOR YANG BERHUBUNGAN DENGAN KEJADIAN OBESITAS PADA REMAJA

Latar Belakang: Obesitas merupakan penumpukan lemak yang berlebihan akibat ketidakseimbangan energi yang masuk dan energi yang dikeluarkan pada waktu yang lama. Prevalensi obesitas pada remaja di Indonesia mengalami peningkatan pertahunnya, dari 23,6% ditahun 2013 meningkat menjadi 31% ditahun 2018. Beberapa faktor yang mempengaruhi obesitas pada remaja di Indonesia diantaranya yaitu genetik, lingkungan, psikososial dan faktor perilaku seperti aktivitas fisik dan pola makan.

Tujuan: Untuk mengetahui faktor-faktor yang berhubungan dengan kejadian obesitas pada remaja di SMPN 1 Muaragembong Bekasi Tahun 2024.

Metodologi: Jenis penelitian ini menggunakan penelitian kuantitatif dengan pendekatan *cross sectional*. Sampel dalam penelitian ini adalah seluruh siswa yang mengalami obesitas sebanyak 64 responden dengan teknik pengambilan sampel *Total Sampling*. Pengumpulan data menggunakan pengukuran antropometri dan wawancara dengan kuesioner FFQ *Semi Quantitatif*, IPAQ, PSQI, PSS-10 dan SONTUS. Data dianalisis secara *univariat* dan *bivariat* dengan menggunakan uji statistic *Chi Square*.

Hasil Penelitian: Hasil penelitian menunjukan bahwa terdapat hubungan antara konsumsi *fast food* (p=0,030), aktivitas fisik (p=0,010), tingkat stress (p=0,006) dan penggunaan media social (p=0,012) dengan obesitas pada remaja serta tidak terdapat hubungan antara pola tidur (p=0,081) dengan obesitas pada remaja di SMPN 1 Muaragembong tahun 2024.

Kesimpulan: Faktor yang berhubungan dengan obesitas pada remaja adalah konsumsi *fast food*, aktivitas fisik, tingkat stress, dan penggunaan media social. Sedangkan faktor yang tidak berhubungan dengan obesitas pada remaja adalah pola tidur.

Saran: Diharapkan dapat diadakannya program kesehatan pada penderita obesitas melalui UKS atau bimbingan konseling seperti: diet sehat remaja, melakukan senam pagi, melakukan kegiatan rutin jalan santai bersama seluruh siswa dan guru agar menumbuhkan kesadaran untuk hidup sehat.

Kata kunci : Aktivitas Fisik, *Fast Food*, Media social, Obesitas, Pola Tidur, Tingkat Stres

ABSTRACT

Background: Obesity is an excessive accumulation of fat due to an imbalance of energy intake and energy expenditure over a long period of time. The prevalence of obesity in adolescents in Indonesia has increased every year, from 23.6% in 2013 to 31% in 2018. Several factors influence obesity in adolescents in Indonesia including genetic, environmental, psychosocial and behavioral factors such as physical activity and diet.

Purpose: To determine the factors associated with the incidence of obesity in adolescents at SMPN 1 Muaragembong Bekasi in 2024.

Method: This type of research uses quantitative research with a *cross sectional* approach. The sample in this study were all students who were obese as many as 64 respondents with the *Total Sampling sampling* technique. Data collection using anthropometric measurements and interviews with FFQ *Semi Quantitative* questionnaires, IPAQ, PSQI, PSS-10 and SONTUS. Data were analyzed *univariately* and *bivariately* using the *Chi Square* statistical test.

Results: The results showed that there was a relationship between *fast food* consumption (p=0.030), physical activity (p=0.010), stress level (p=0.006) and social media use (p=0.012) with obesity in adolescents and there was no relationship between sleep patterns (p=0.081) with obesity in adolescents at SMPN 1 Muaragembong in 2024.

Conclusion: Factors associated with obesity in adolescents are *fast food* consumption, physical activity, stress levels, and social media use. While factors that are not associated with obesity in adolescents are sleep patterns.

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Suggestion: It is hoped that a health program can be held for obese people through UKS or counseling guidance such as: a healthy diet for adolescents, doing morning exercises, conducting routine leisurely walks with all students and teachers in order to foster awareness of healthy living.

INTRODUCTION

Adolescence is a period of growth and the process of human maturity, during this period there are continuous changes. Changes in physique due to growth will affect health and nutritional status. The imbalance between intake needs or sufficiency will cause nutritional problems, both in the form of malnutrition and overnutrition or obesity. It is defined as an excessive accumulation of fat due to an imbalance of energy intake and energy expenditure over a long period of time.(F. Azzahra & Anggraini, 2022).

World Health Organization (WHO) data in 2016 showed that the problem of overnutrition in 5-19 year olds quadrupled from 4% to 18% with 340 million people, consisting of 19% of men and 18% of women. Based on the Central for Disease Control and Prevention (CDC), from 2017 to early 2018, 19.7% of children and adolescents aged 12-19 years were overnourished. (Simpatik et al., 2023).

The prevalence of obesity in adolescents in Indonesia has increased, from 23.6% in 2013 to 31% in 2018. The prevalence of obesity in adolescents aged 13-15 years was 4.8% and 4.0% in adolescents aged 16-18 years(Yosa NurSidiq Fadhilah et al., 2021). The results of the West Java Province Riskesdas in 2018 showed that the prevalence of obesity in adolescents aged 13-15 years was 4.89% and in adolescents aged 16-18 years was 4.51%. Meanwhile, in Bekasi Regency, the prevalence of obesity in adolescents aged 13-15 years was 11.6%, while in adolescents aged 16-18 years it was 4.11%. (Pratiwi & Ridwan, 2021).

The high prevalence of obesity in adolescents can have an impact on development, especially aspects of psychosocial development (Februhartanty et al., 2019). Based on Masdar et. al (2016), the lack of self-confidence experienced by adolescents with obesity about their body image makes them often alienated in relationships, feel inferior, tend to withdraw and experience depression. Obesity in adolescence has a high risk of becoming obese in adulthood and has the potential to experience various diseases such as hypertension, type II diabetes mellitus, heart disease, stroke, metabolic syndrome and can trigger the emergence of cardiovascular disease (Alfiah, 2020).

Efforts that can be made to reduce obesity rates in Indonesia include detecting cases of obesity as early as possible so that it will be easier to intervene appropriately. In addition, obesity prevention measures can also be enlivened through education or health promotion about the importance of physical activity, proper eating patterns, good sleep patterns, avoiding excessive mental burdens and can provide education about the use of soc media (Pertiwi & Niara, 2022).

Fast food is a food that contains high calories, high fat and low fiber, therefore it can cause overnutrition. The results showed that adolescents who consume *fast food* affect the occurrence of obesity(Hanafi & Hafid, 2019).

Physical activity is also associated with obesity in adolescents. Light physical activity causes low energy output so that there is an imbalance between more energy input compared to energy out. This can cause the remaining energy to be stored as fat and then become obese(Widyantari et al., 2018).

Sleep pattern is one that is associated with the incidence of obesity. This is because the lack of sleep duration (2-4 hours / day) can result in a loss of 18% leptin and increase 28% ghrelin, causing an increase in appetite of approximately 23-24%. (Amrynia & Prameswari, 2022).

Stress levels can also be a factor in obesity because hormonal changes in someone experiencing stress trigger increased secretion of cortisol which can cause an increase in body fat accumulation and can signal hunger to the brain(Fiantis, 2021). Meanwhile, adolescents with excessive use of social media can be a cause of obesity due to long social media time, light activities can result in poor eating patterns that will affect the risk of obesity in adolescents (A. Azzahra, 2022).

Based on research conducted by Hanafi & Hafid tahun 2019 showed that there was a relationship between physical activity (p=0.027) and fast food consumption (p=0.002) with the incidence of obesity in adolescents in Gorontalo Regency. In research conducted by Rachmania Eka Damayanti et al., (2019). showed that there is a significant relationship between sleep duration and the incidence of overweight and obesity in educational personnel in the Campus C environment of Airlangga University

In the research conducted Mayataqillah et al., tahun 2023 showed that there was a relationship between stress levels and the incidence of obesity in adolescents at SMA Negeri 1 East Bintan with a value of p = 0.027. Whereas in research conducted by A. Azzahra, (2022). shows that the intensity of social media use has a relationship with nutritional status in adolescents at SMAN 14 East Jakarta with a value of (p <0.05).

Based on the results of a preliminary study conducted at SMPN 1 Muaragembong, data on the number of students were 528 people. The results of data collection were 64 students who were obese. Some of them are caused by having a family history of obesity. Based on observations made, students still often buy snacks in the canteen. The majority of snacks available in the canteen are ready-to-eat foods such as fried foods, instant noodles, and light snacks such as chips and others. In addition, there are also many students who lack physical activity in their spare time such as just sitting around while playing gadgets.

Based on this background, the researcher aims to conduct a study to find out "What are the factors associated with the incidence of obesity in adolescents at SMPN 1 Muaragembong Bekasi in 2024."

RESEARCH METHODS

This study uses a quantitative method with a *cross sectional* study design. In this study design, researchers collect data at the same time to determine the independent variables and dependent variables in the population. This study was conducted to determine the factors associated with the incidence of obesity in adolescents at SMPN 1 Muaragembong Bekasi in 2024.

The population in this study were all students of SMPN 1 Muaragembong Bekasi who were in the obese category, totaling 64 students. The sampling technique used in this study was the *total sampling* technique, namely all populations used as research samples. The sample in this study was taken from a population of 64 students.

The instruments used in this study were informed consent sheet, weight and height scales, *Semi Quantitative Food Frequency Questionnaires* (SQ-FFQ), *International Physical Activity Questionnaires* (IPAQ), *Pittsburgh Sleep Quality Index* (PSQI) questionnaire, *Perceived Stress Scale (*PSS-10) questionnaire, and *Social Networking Time Use Scale* (SONTUS) questionnaire.

Data analysis used univariate and bivariate analysis. Bivariate analysis was performed using the *Chi square* test with a confidence level of 95% (α = 0.05) and *Odds Ratio* (OR).

RESEARCH RESULTS
Univariate Analysis

Table 1
Respondent Characteristics

Characteristics	Frequency (f)	Percentage (%)
Gender		
Male	17	26,6
Female	47	73,4
Age		
13	26	40,6
14	23	35,9
15	15	23,4

Table 1 shows that of the 64 respondents, 47 were female (73.4%) and 17 were male (26.6%). In the age group, respondents aged 13 years were 26 respondents (40.6%), 14 years were 23 respondents (35.9%) and 15 years were 15 respondents (23.4%).

Table 2
Incidence of Obesity

Incidence of Obesity	Frequency (f)	Percentage (%)
Obesity I	45	70,3
Obesity II	19	29,7

Table 2 shows that out of 64 respondents, 45 respondents (70.3%) were obese. While students who experienced obesity II were 19 respondents (29.7%).

Table 3
Fast Food Consumption

Fast Food Consumption	Frequency (f)	Percentage (%)
Often	43	67,2
Rare	21	32,8

Table 3 shows that out of 64 respondents, students who often consume fast food are 43 respondents (67.2%). While students who rarely consume fast food are 21 respondents (32.8%).
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Table 4
Physical Activity

Physical Activity	Frequency (f)	Percentage (%)
Lightweight	31	48,4
Weight	33	51,6

Table 4 shows that out of 64 respondents, 33 respondents (51.6%) had heavy physical activity. While students who do light physical activity are 31 respondents (48.4%).

Table 5
Sleep pattern

Sleep Pattern	Frequency (f)	Percentage (%)
Good	22	34,4
Bad	42	65,6

Table 5 shows that out of 64 respondents,22 respondents (34.4%) had good sleeping patterns. While students with poor sleep patterns were 42 respondents (65.5%).

Table 6
Stress Level

Stress Level	Frequency (f)	Percentage (%)
Lightweight	21	32,8
Weight	43	67.2

Table 6 shows that out of 64 respondents, 43 respondents (67.2%) had severe stress levels While students who have mild stress levels are 21 respondents (32.8%).

Table 7
Social Media Usage

Social Media Usage	Frequency (f)	Percentage (%)
Low	27	42,2
High	37	57,8

Table 7 shows that out of 64 respondents, 37 respondents (57.8%) were students with high social media usage. While students with low use of social media were 27 respondents (42.2%).

Bivariate Analysis

Based on table 8, it is known that respondents who consume fast food often with obesity I are 26 respondents (60.5%) and obesity II are 17 respondents (39.5%). While respondents who consume fast food rarely with obesity I as many as 19 respondents (90.5%) and obesity II as many as 2 respondents (9.5%).

The results of the analysis test with chi-square obtained a p-value of 0.030 (p≤0.05) which means that there is a significant relationship between fast food consumption and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024. The OR value is 0.161, which means that respondents with frequent fast food consumption have a 0.1 times greater risk of obesity II than respondents who consume fast food rarely.

Based on table 9, it is known that respondents who have light physical activity with obesity I are 27 respondents (87.1%) and obesity II are 4 respondents (12.9%). While respondents who had heavy physical activity with obesity I were18 respondents (54.5%) and obesity II were 15 respondents (45.5%).

The results of the analysis test with chi-square obtained a p-value of 0.010 (p≤0.05) which means that there is a significant relationship between physical activity and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024. The OR value is 5.625 which means that respondents with mild physical activity have a 5 times greater risk of developing obesity II than respondents who have heavy physical activity.

Table 8
Relationship between Fast Food Consumption and the Incidence of Obesity in Adolescents at SMPN 1 Muaragembong 2024

Fast Food Consumption	Incidence of Obesity				Total		P-Value	OR (95%CI)
	Obesity I		Obesity II					
	f	%	f	%	f	%		
Often	26	60,5	17	39,5	43	100	0,030	0,161
Rare	19	90,5	2	9,5	21	100		

Table 9
Relationship between Physical Activity and the Incidence of Obesity in Adolescents at SMPN 1 Muaragembong Bekasi Year 2024

Activities Physical	Incidence of Obesity				Total		P-Value	OR (95% CI)
	Obesity I		Obesity II					
	f	%	f	%	f	%		
Lightweight	27	87,1	4	12,9	31	100	0,010	5,625
Weight	18	54,5	15	45,5	33	100		

Table 10
Relationship between sleep patterns and obesity among adolescents at SMPN 1 Muaragembong Bekasi in 2024

Sleep Patterns	Incidence of Obesity				Total		P-Value
	Obesity I		Obesity II				
	f	%	f	%	f	%	
Good	19	86,4	3	13,6	22	100	0,081
Bad	26	61,9	16	38,1	42	100	

Based on table 10, it is known that respondents who have good sleep patterns with obesity I are 19 respondents (86.4%) and obesity II are 3 respondents (13.6%). While respondents who had poor sleep patterns with obesity I were 26 respondents (61.9%) and obesity II were 16 respondents (38.1%).

The results of the chi-square analysis test obtained a p-value of 0.081 (p>0.05) which means that there is no significant relationship between sleep patterns and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024.

Table 11
Relationship between stress levels and obesity among adolescents at SMPN 1 Muaragembong Bekasi 2024

Level Stress	Incidence of Obesity				Total		P-Value	OR (95% CI)
	Obesity I		Obesity II					
	f	%	f	%	f	%		
Lightweight	20	95,2	1	4,8	21	100	0,006	14,400
Weight	25	58,1	18	41,9	43	100		

Based on table 11, it is known that respondents who have mild stress levels with obesity I are 20 respondents (95.2%) and obesity II are 1 respondent (4.8%). While respondents who had severe stress levels with obesity I were 25 respondents (58.1%) and obesity II were 18 respondents (41.9%).

The results of the analysis test with chi-square obtained a pvalue of 0.006 (p≤0.05) which means that there is a significant relationship between stress levels and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024. The OR value is 14.400 which means that respondents with severe stress levels have a 14 times greater risk of experiencing obesity II than respondents who have mild stress levels.

Based on table 12, it is known that respondents who use low social media with obesity I were 24 respondents (88.9%) and obesity II were 3 respondents (11.1%). While respondents who used high social media with obesity I were 21 respondents (56.8%) and obesity II were 19 respondents (43.2%).

The results of the analysis test with chi-square obtained a p-value of 0.012 (p≤0.05) which means that there is a significant relationship between the use of social media and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024. The OR value is 6.095, which means that respondents with high social media use have a 6 times greater risk of experiencing obesity II than respondents with low social media use.

Table 12
Relationship between Social Media Use and the Incidence of Obesity in Adolescents at SMPN 1 Muaragembong Bekasi in 2024

Usage Social Media	Insidence of Obesity				Total		P-Value	OR (95%CI)
	Obesity I		Obesity II					
	f	%	f	%	f	%		
Lightweight	20	95,2	1	4,8	21	100	0,006	14,40
Weight	25	58,1	18	41,9	43	100		

DISCUSSION
Relationship between Fast Food Consumption and the Incidence of Obesity in Adolescents

Based on the results of the bivariate analysis test between *fast food* consumption and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024, the p-value is 0.030 (p≤0.05) which indicates that there is a relationship between fast food consumption and the incidence of obesity in adolescents with an OR value of 0.161, which means that respondents with frequent fast food consumption have a 0.1 times greater risk of obesity.

In line with research conducted by Marianingrum (2020) which shows that adolescents who often consume *fast food* affect the occurrence of obesity with p-value = 0.030. This study is also supported by the results of research by Sumiyati, et al (2022) which shows that there is a relationship between *fast food* consumption and the incidence of obesity in adolescents.

An unbalanced diet due to the high consumption of fast food encourages an increase in fat deposits, this is due to the content of fast food which contains about 40-50% fat. In addition, *fast food* also contains high calories, sugar, and sodium and low fiber. Thus, adolescents who often consume *fast food* will be at high risk for obesity and overnutrition that will continue into adulthood (Sugiatmi & Handayani, 2018).

According to Siti Qomariah et al., (2021) if you consume *fast food* excessively and rarely exercise, then within a few weeks the body will experience unhealthy weight gain. Fat obtained from eating *fast food* is not used properly by the body if it does not exercise. This fat is then stored and accumulated in the body which can lead to obesity.

According to the researcher's assumption, most adolescents in this study prefer to consume *fast food* or *fast food* rather than traditional food. This is due to various reasons such as better taste, ease of obtaining and obtaining these foods. In addition, the influence of the environment causes adolescents to prefer fast food over traditional food. Many teenagers spend their break time or lunch time buying these foods. Basically, *fast food is* not too detrimental to health as long as it is not used as a daily menu, and must be balanced with other foods such as foods high in protein, vegetables, fruit and can be balanced with physical activity carried out such as routine exercise

Relationship between Physical Activity and the incidence of Obesity in Adolescents

Based on the results of the bivariate analysis test between physical activity and the incidence of obesity, the p.value is 0.010 (p≤0.05) which shows that there is a relationship between physical activity and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024 with an OR value of 5.625 which means that respondents with mild physical activity have a 5 times greater risk of obesity.

In line with research conducted by Sembiring, et al., (2022) which shows that there is a significant relationship between physical activity and obesity with a p-value of 0.021. This study is also in line with research conducted by Wiwin (2023) which examines the relationship between physical activity and the incidence of obesity. The results showed that there was a significant relationship between physical activity and the incidence of obesity.

Physical activity is something that is recommended for everyone to maintain and improve body fitness. Light physical activity causes low energy output resulting in an imbalance between more energy input compared to energy output. The rest of the energy will be stored as fat and then become overweight until it continues to become obese(Fiantis, 2021).

According to Sembiring et al., (2022), adolescents spend more time doing activities in a sitting and lying position such as watching television, doing assignments, playing games or just spending time relaxing, even on holidays adolescents can spend 10-12 hours doing various activities in a sitting and lying position in a day.

According to the researcher's assumption, most respondents spend time at school or at home just sitting and sleeping so it appears that the lack of

physical activity that respondents do per day. Then the current technological advances are also one of the influences on the decline in physical activity in a person. Simple examples such as cellphones, traveling by vehicle which causes a decrease in physical activity in a person. In addition, most respondents do not do household chores at home. In addition, the more sophisticated tools owned to help with household chores so that less energy is expended.

Relationship of Sleep Patterns with the Incidence of Obesity in Adolescents

Based on the results of the bivariate analysis test between sleep patterns and the incidence of obesity, the p.value is 0.081 (p>0.05) which indicates that there is no relationship between sleep patterns and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024.

The results of this study are in line with the results of research conducted by Alfiah (2020) which shows that there is no relationship between sleep patterns and the incidence of obesity in adolescents with a p-value of 0.401. The results of the analysis obtained most of the respondents had poor sleep patterns (82.5%). From this research it can be seen that adolescents who are obese mostly have poor sleep patterns. Poor sleep patterns in the majority of obese adolescents are caused by several factors, namely sleeping hours≤7 hours a day, frequent nighttime awakenings, the habit of staying up late and difficulty starting sleep at night.

This research is also in line with research conducted by Wulandari et al., (2016) which shows that there is no relationship between sleep duration and obesity in adolescents at SMA Negeri 4 Kendari with a p-value (0.654) > 0.05. In a study conducted by Wulandari (2016) of 89 respondents with poor sleep duration as many as 51 respondents (57.3%) and sufficient sleep duration as many as 38 respondents (42.7%). Obese adolescents tend to have poor sleep patterns, this is due to adolescence experiencing puberty so they tend to have the habit of sleeping late at night or the emergence of the habit of staying up late for various reasons such as doing schoolwork, playing online games, using social media, even just chatting or smsan with close friends.

Based on the results of further research, it was found that the cause of sleep deprivation in obese adolescents was caused by the sleep disturbances they felt, causing adolescents to wake up frequently in the middle of the night and find it difficult to fall asleep again. Whereas in adolescents who are not obese, the cause of lack of sleep is because they have a habit of staying up late with the various activities they do. Both groups of respondents have certain reasons why they experience short sleep duration but this does not affect them to eat in the middle of the night even though they feel hungry. This is due to laziness to go to the kitchen or get out of bed so they endure the hunger they feel (Alfiah, 2020).

Although the results of the research conducted did not find a relationship between sleep duration and obesity in adolescents, sleep duration, especially in sleep deprivation, is likely to be a risk factor for obesity in adolescents with the role of various hormones in the body. According to Tasya (2017) there are confounding factors such as diet, diet, genetic factors and so on that are not analyzed which can affect the results of the study. The use of the PSQI questionnaire as an instrument is reliable but cannot be used as an accurate diagnostic tool. To obtain more precise sleep quality results, non-invasive methods such as actigraphy can be used to monitor human rest and activity cycles (Tasya, 2017).

According to the researcher's assumption,obese adolescents tend to have poor sleep patterns, this is due to adolescence experiencing puberty so they tend to have the habit of sleeping late at night or the emergence of the habit of staying up late for various reasons such as doing schoolwork, playing online games, using social media. The results showed that adolescents with obesity mostly had poor sleep patterns, but there were several confounding factors that were not studied, namely genetic factors, diet, psychological factors, and socioeconomics. Thus causing the results of the study to be less accurate.

Relationship between Stress Levels and the Incidence of Obesity in Adolescents

Based on the results of the bivariate analysis test between stress levels and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024, the p-value is 0.006 (p≤0.05) which indicates that there is a relationship between stress levels and the incidence of obesity in adolescents with an OR value of 14.400, which means that respondents with severe stress levels have a 14 times greater risk of obesity.

In line with research conducted by Mayataqillah (2023) shows that there is a significant relationship between stress levels and the incidence of obesity with a p value of 0.027. This research is also supported by the results of research Firmanurochim., dkk (2021) which shows that there is a significant relationship between stress levels and the incidence of obesity in adolescent girls with a p-

value of 0.016.

This is in line with the theory that explains that when a person is under stress, eating behavior will increase and contribute to obesity or overweight.

Psychological stress is often associated with increased food consumption especially in consuming high-fat foods. Stress can increase body weight because it increases blood cortisol levels, activates fat-storing enzymes and signals hunger to the brain. (Firmanurochim et al., 2021).

A survey conducted by the APA (*Association of Psychology America*) reported that as many as 39% overeat in response to stress. When a pers oexperiences stress, CRF (*Corticotropin-releasing factor) is* sent from the hypothalamus to the pituitary gland which sends signals to the adrenal glands through Adreno corticotropic hormone.

The adrenal glands above the kidneys then secrete the hormone cortisol resulting in an increase in cortisol hormone. High levels of the hormone cortisol will stimulate the body to secrete the hormones insulin, leptin, and the neuropeptide Y (NPY) system which will make the brain arouse hunger so that the desire to eat more than usual arises, and can increase fat accumulation, especially in the abdomen. (Mayataqillah et al., 2023).

According to researchers' assumptions, some of the main problems of stress that occur in adolescents are caused by problems at school such as problems with teachers, problems with friends, academic difficulties and interpersonal problems such as conflicts with parents, siblings, or peers. When stressed, a person can eat more than usual and choose foods that are high in calories,sugar, and fat so that these circumstances will trigger obesity.

Relationship of Social Media Use with the Incidence of Obesity in Adolescents

Based on the results of the bivariate analysis test between the use of social media and the incidence of obesity, the p.value is 0.012 (p≤0.05) which indicates that there is a relationship between the use of social media and the incidence of obesity in adolescents at SMPN 1 Muaragembong in 2024 with an OR value of 6.095, which means that respondents with high social media use have a 6 times greater risk of obesity

In line with research conducted by Fransiska et al (2019) regarding the intensity of social media use, exercise habits and obesity in adolescents, it shows that individuals with low exercise habits are those with high social media use intensity of 44.4%. The results of this study also show that there is a significant relationship between the intensity of social media use and exercise habits with a value of p = 0.000, the higher the intensity of social media use the lower the exercise habits and the greater the risk of obesity.

The results of this study are also in line with research conducted by A. Azzahra, (2022) which shows that there is a relationship between the intensity of social media use and nutritional status in adolescents. This is because social media is an activity that spends high sitting time. Adolescents who have high sitting habits were recorded as obese by 87.3%. Long social media time, light activities can result in poor eating patterns that will affect the risk of obesity in adolescents.

The use of social media can affect individual lifestyles, especially in children and adolescents who tend to have a lot of time to use social media. The influence of this lifestyle leads to decreased physical activity, changes in diet, increased energy intake will contribute to the development of obesity worldwide. High use of social media media will be dominated by sedentary activities to access social media, so that the time used to do physical activity will be reduced, the higher the risk of obesity (Audrya Gharrieni et al., 2023)

The existence of android applications is very close to adolescents because it is easy to use anywhere and anytime so that the intensity of accessing social media in adolescents is around 1 hour more in 1 day more time is used to view social media, this will reduce the physical activity of adolescents because in 1 hour they only sit / lie down when accessing social media(Dinengsih & Hakim, 2020)

According to the researcher's assumption, adolescents are increasingly lazy and rarely take the time to do physical activity due to increased use of social media due to high sitting time. In addition, the use of social media affects the amount of social media addiction experienced by adolescents so that it affects sedentary behavior in adolescents. This high sedentary behavior affects adolescents' eating patterns to be irregular, low calorie intake, lack of energy expended and low physical activity, so that it can trigger obesity in adolescents.

CONCLUSIONS

There is a significant relationship between fast food consumption, physical activity, stress level, and social media use) with the incidence of obesity in adolescents at SMPN 1 Muaragembong and there is no significant relationship between sleep patterns and the incidence of obesity in adolescents at SMPN 1 Muaragembong Bekasi in 2024.

SUGGESTION

It is hoped that a health program can be held for obese patients through UKS or counseling guidance such as: a healthy diet for adolescents, doing morning exercises, conducting routine leisurely walks with all students and teachers in order to foster awareness of healthy living.

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