

The Relationship Between Fast Food Consumption Patterns and Physical Activity on Overweight and Obesity, and a Review from an Islamic Perspective Among Adolescents at State High School 22 in Jakarta

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Abstract

Overweight and obesity in adolescents are health problems that continue to increase and are influenced by various factors, including fast food consumption patterns and physical activity. This study aims to analyze the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents at State Senior High School 22 Jakarta. The research used an analytical design with a cross-sectional approach. The research sample amounted to 128 students in grades X and XI who were selected using purposive sampling techniques. Data were collected through BMI measurements, Food Frequency Questionnaire (FFQ) questionnaires to measure fast food consumption patterns, and Physical Activity Questionnaire for Adolescents (PAQ-A) to measure physical activity. Data analysis was carried out using the Pearson Chi-Square test with a significance level of 0.05. The results showed that most of the respondents were in the overweight category (40.6%), had a fast food consumption pattern in the rare category (<3 times/week) of 68.8%, and physical activity in the medium category of 39.1%. The results of the bivariate test showed that there was a significant relationship between fast food consumption patterns and overweight and obesity ($p < 0.001$), and there was a significant relationship between physical activity and overweight and obesity ($p = 0.003$). The study concluded that the more frequent the consumption of fast food and the lower the physical activity, the higher the risk of overweight and obesity in adolescents. Therefore, promotive and preventive efforts are needed through nutrition education and increased physical activity in the school environment to prevent obesity in adolescents.

INTRODUCTION

Lifestyle changes have become one of the achievements of modernity experienced by urban communities and one of these lifestyle changes is a change in eating habits. This can be seen from the increasing number of families and community members who consume fast food (Rakhshani *et al.*, 2024). This phenomenon is also very visible in adolescent groups, who are in a critical transition period from childhood to adulthood, therefore, both individual and environmental factors affect health behaviors, social behaviors, and food choices such as fast food (Singh *et al.*, 2021). Fast food is a type of food that is easy to package, easy to serve, practical, processed with a simple process, and ready to eat in a relatively short time. These foods are generally produced with high technology and contain a lot of calories, fat, salt, and sugar, but are low in fiber, vitamins, corbic acid, calcium, and folate (Rahmalia & Karjoso, 2023).

In modern times, the pattern of consuming food outside the home is no longer just to meet needs, but has also become a lifestyle. Therefore, urban people make eating out an option because urban people are classified as busy people with all their activities, including teenagers who are one of the most consumers of ready-to-eat food (Ufrida & Harianto, 2022). Currently, there are a lot of traders who sell fast food. This fast food restaurant is very easy to find in every corner of the region, considering that teenagers are creatures who are actively interacting with their age, it is not uncommon for teenagers to be seen in fast food restaurants (Handayani *et al.*, 2021).

Consumption of fast food by adolescents is associated with family socioeconomic status. Adolescents with parents who have a prosperous socioeconomic status are more likely to consume fast food. One of the causes that affect this is the role of parents, for example, a mother who does not have time to prepare food at home due to busyness resulting in teenagers choosing fast food as an alternative (Zogara *et al.*, 2022). However, unhealthy diets such as fast food can cause an imbalance in nutritional intake and can pose a risk of obesity (Rahmalia & Karjoso, 2023). Being overweight in adolescents can also lead to serious health problems when they enter adulthood (Herlina *et al.*, 2021). Lifestyle and diet related to the increase in chronic diseases have become a major public health issue. The ease of availability of fast food rich in high salt and lack of physical activity have made young adults increasingly susceptible to various health-related problems (Kazi *et al.*, 2020). The consumption of ready-to-eat foods that are preferred by adolescents is one of the main risk factors that can lead to obesity and overweight (Arisandi, 2023).

In the last two decades, the prevalence of overweight and obesity in the world has more than doubled. The prevalence of obesity and overweight is more pronounced in western and more developed countries, compared to in developing countries that experience malnutrition and obesity simultaneously (Lafia *et al.*, 2022). Although overweight and obesity are considered to be problems in high-income countries, both are currently on the rise in low- and middle-income countries as a result of global free trade, economic growth, and urbanization that these countries are experiencing (Boutari & Mantzoros, 2022). Adolescents have very high nutritional needs, especially in lower-middle-income *Low Middle-Income Countries* (LMICs), adolescents are at risk of facing malnutrition problems (underweight, overweight, and micronutrient deficiencies). In many low- and middle-income countries, the prevalence of overweight and obesity has now exceeded the prevalence of underweight, showing similar circumstances to high-income countries and its association with the rapid development of the food environment in the region, as well as the increasing burden of non-communicable diseases globally (Keast *et al.*, 2018).

Overweight and obesity in adolescents are health problems that continue to increase both in the world and in Indonesia. This condition not only increases the risk of non-communicable diseases, such as type 2 diabetes mellitus and cardiovascular disease, but also has an impact on psychosocial aspects, such as low quality of life, stigma, discrimination, and decreased academic achievement (WHO, 2022). High fast food consumption patterns and low physical activity are the main factors that contribute to the occurrence of overweight and obesity in adolescents (Telisa *et al.*, 2020; Jannah *et al.*, 2024). Various studies show that adolescents with sedentary lifestyles and fast food habits have a higher risk of obesity (Asmarani *et al.*, 2018; Amrynia & Prameswari, 2022). Therefore, Senior High School Negeri 22 Jakarta was

chosen as the research location because it is located in an urban area with easy access to fast food and adolescent lifestyle characteristics that are considered representative of the condition of urban adolescents.

Based on these conditions, this study was formulated to determine the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents at SMA Negeri 22 Jakarta. This study aims to describe the characteristics of respondents based on class, age, gender, pocket money, work and parental income, as well as analyze fast food consumption patterns and physical activity levels of adolescents. In addition, this study also aims to examine the relationship between fast food consumption patterns, physical activity, and the combination of the two with the incidence of overweight and obesity in adolescents.

The results of this research are expected to provide benefits for various parties. For adolescents, this study can increase knowledge about the importance of implementing a healthy diet and adequate physical activity as an effort to prevent overweight and obesity. For educational institutions, the results of the research are expected to be a source of information and reference in the preparation of health promotion programs in the school environment. Meanwhile, for researchers, this research is a means to develop the ability to conduct scientific research, meet one of the academic requirements to obtain a bachelor's degree in medicine, and contribute to the development of science in the field of public health

METHOD

Types of Research

This survey research was included in the type of survey research that is analytical. This survey research is used to explain a phenomenon or situation (Notoatmodjo, 2018), in this case it aims to examine the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents at State Senior High School 22 Jakarta. The research design used is *a cross sectional* study, which is a study to study the dynamics of the correlation between risk factors and effects through approaches, observations, or data collection at the same time (*point time approach*) (Notoatmodjo, 2018). The study on the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents at State Senior High School 22 Jakarta was measured in a certain period of time with the study subjects observed simultaneously at one time.

Population and Sample

The population of this study is all students of classes X and XI of State Senior High School 22 Jakarta which totals 482 students, consisting of 229 students of class X and 253 students of class XI. From this population, the sample was determined using the purposive sampling technique, which is the selection of respondents based on certain criteria according to the research objectives (Notoatmodjo, 2018). Respondents who met the inclusion criteria included students aged 15–18 years, willing to participate in the study by signing an informed consent, filling out a questionnaire through Google Form, and having a Body Mass Index (BMI) in the category of overweight (25.0–29.9 kg/m²), obesity I (30.0–39.9 kg/m²), or obesity II (≥ 40.0 kg/m²) as evidenced by weight and height measurements. Meanwhile, the exclusion criteria include students who are not present at the time of data collection, do not fill out questionnaires, or do not meet the BMI criteria that have been set. Thus, the sample size in this

study is determined based on the number of students who meet all inclusion criteria and are not included in the exclusion criteria.

Data Type

The type of data used in this study is primary data, which is data obtained directly from respondents through measurement and filling out questionnaires. According to Notoatmodjo (2018), primary data is data collected directly by researchers from research subjects through interviews, observations, questionnaires, or measurements. In this study, the primary data collected included Body Mass Index (BMI) data, fast food consumption patterns, and respondents' physical activity. BMI data was obtained through BMI measurement whether the respondent's weight status included the normal category, overweight, or obesity. Meanwhile, data on fast food consumption patterns was obtained through filling out the *Food Frequency Questionnaire (FFQ)*, while physical activity data was collected using the *Physical Activity Questionnaire for Adolescents (PAQ-A)* to measure the level of physical activity of teenagers at State Senior High School 22 Jakarta over the past 7 days.

How to Collect Data and Measure Data

Data collection is a process that is carried out systematically to obtain the data needed in research, either through interview techniques, questionnaires, direct observation, documentation, and measurement (Notoatmodjo, 2018). Data in this study was collected through several techniques, namely: 1) Data on overweight and obesity status was obtained through the calculation of Body Mass Index (BMI) values using the BMI formula = weight (kg) / height² (m²). 2) Data on fast food consumption were collected using the *Food Frequency Questionnaire (FFQ)* questionnaire (Rachmah *et al.*, 2021; Putri *et al.*, 2024; Kurniawati *et al.*, 2021) to assess the frequency of consumption of various types of food, including fast food. 3) Data on the level of physical activity of the respondents was obtained through the *Physical Activity Questionnaire for Adolescents (PAQ-A)* questionnaire (Andriyani *et al.*, 2024), which is an instrument to measure physical activity in adolescents and describe the level of physical activity over the last seven days. 4) The questionnaire is distributed in the form of a *Google Form* and given directly to the students who are respondents. Filling is carried out independently by the respondent under the supervision of the researcher to ensure the honesty and completeness of the answers. Before the filling begins, the researcher provides an explanation of the research objectives and ensures that each respondent understands the content and intent of each question in the questionnaire.

The questionnaire that has been filled out by the respondents is then collected and processed using *computer software* through several stages. The first stage is *editing*, which is an activity for checking the contents of a form or questionnaire to ensure the correctness of the form or questionnaire. Next, coding is carried out, which is converting data in the form of sentences or letters into numerical or numerical data. The next stage is *data entry* or *processing*, which is entering the answers of each respondent in the form of "code" (numbers or letters) entered into a computer program or "*software*". Finally, data cleaning is carried out, which is a re-check of the data to see for possible code errors, incomplete data, and so on, then repairs or corrections are made (Notoatmodjo, 2018).

Data Analysis

The data analysis in this study was carried out computerized using Software Package for the Social Sciences (SPSS) version 31.0 and consisted of univariate analysis and bivariate

analysis. Univariate analysis was used to describe the characteristics of each research variable in the form of frequency and percentage distribution (Notoatmodjo, 2018), while bivariate analysis was used to determine the relationship between independent variables, namely fast food consumption patterns and physical activity, and dependent variables, namely overweight and obesity in adolescents at State Senior High School 22 Jakarta. The statistical test used is the Pearson Chi-Square, while if the test requirements are not met, the alternative Spearman test is used. The decision making was based on the significance level of $\alpha = 0.05$, so that if the p value < 0.05 , then H_1 was accepted which showed a relationship between fast food consumption patterns and physical activity with overweight and obesity in adolescents at State Senior High School 22 Jakarta.

RESULTS AND DISCUSSION

Univariate Analysis

Univariate analysis was carried out to describe the results of the study consisting of the frequency and percentage distribution of each research variable, as well as an overview of fast food consumption patterns, physical activity, and overweight and obesity status in adolescents at State Senior High School 22 Jakarta. The data processed were obtained from the results of filling out the *Food Frequency Questionnaire* (FFQ) to measure fast food consumption patterns and the *Physical Activity Questionnaire for Adolescents* (PAQ-A) to measure physical activity, as well as anthropometric measurements in the form of Body Mass Index (BMI) to determine the overweight and obesity status of respondents. Based on the results of the research, the following results were obtained:

Frequency Distribution Based on Overweight & Obesity

Table 1. Descriptive Statistics of Weight, Height & BMI

Descriptive Statistics	N	Minimum	Maximum	Red	Std. Deviation
Body Weight (kg)	128	52,60	106,30	71,71	11,57
Height (cm)	128	150	175	161,41	6,73
Body Mass Index (kg/m ²)	128	23,11	36,59	27,47	3,89

Source: Primary data processed by the author based on anthropometric measurements (2026)

The results of the study based on anthropometric measurements can be seen in Table 1, from 128 respondents showed that the maximum body weight of the respondents was 106.30 kg, while the minimum body weight of the respondents was 52.60 kg, with a mean value of 71.71 kg and a standard deviation of ± 11.57 . Meanwhile, the maximum height of the respondents was 175 cm, while the minimum height was 150 cm, with a mean of 161.41 cm and a standard deviation of ± 6.73 . The results of the calculation of the Body Mass Index (BMI) showed that the maximum respondent BMI value was 36.59 kg/m², while the minimum respondent BMI was 23.11 kg/m², with a mean of 27.47 kg/m² and a standard deviation of ± 3.89 .

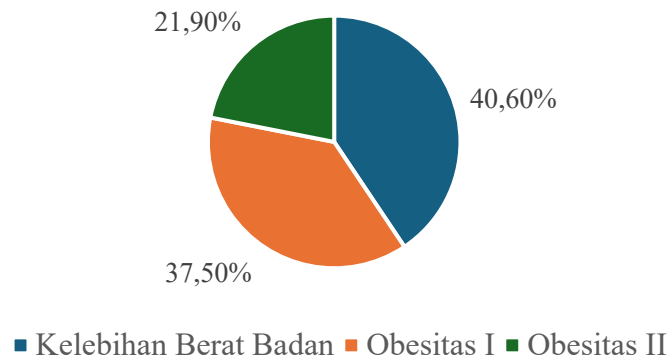


Figure 1. Diagram Frequency Distribution by Frequency Overweight & Obesity
Source: Primary data processed by the author based on BMI measurements (2026)

The results of the study in figure 1, distribution of overweight and obesity show that the overweight category is the group with the largest number of respondents, which is 52 people (40.6%). Furthermore, the Obesity I category ranks second with a total of 48 respondents (37.5%), while the Obesity II category consists of 28 respondents (21.9%).

Frequency Distribution Based on Fast Food Consumption Patterns

Based on the results of the study, the consumption patterns of fast food in respondents were measured using *the Food Frequency Questionnaire* (FFQ) instrument consisting of 26 types of local and modern fast food to assess the frequency and consumption habits of respondents in a certain period, the following results were obtained:

Table 2. Distribution of Types of Fast Food Consumed by Respondents

Types of Food	Consumption Patterns					Mean
	Frequency					
	≥3x/Week	1-2x/Week	1-3x/Month	Never	Total	
Tempe Mendoan	41	41	45	1	128	1.31
Sop Mie	37	52	38	1	128	1.28
Martabak Egg	45	29	53	1	128	1.34
Meatball	39	36	51	2	128	1.29
Chicken Noodles	46	47	34	1	128	1.35
Siomay	45	25	57	1	128	1.34
Burger	44	54	28	2	128	1.33
Batagor	40	39	45	4	128	1.28
Seblak	53	31	43	1	128	1.41
Cilung	41	58	26	3	128	1.30
Cilor	40	42	45	1	128	1.30
Toast	37	37	54	0	128	1.29
Martabak Manis	39	44	45	0	128	1.30
Ketoprak	44	26	57	1	128	1.34

Bubur Ayam	38	61	28	1	128	1.29
Kwetiaw Goreng	45	35	48	0	128	1.35
French Fries	39	40	48	1	128	1.30
Fried Chicken	49	33	45	1	128	1.38
Donuts	52	28	48	0	128	1.41
Fried Noodles	50	46	30	2	128	1.38
Fried Rice	47	32	49	0	128	1.37
Spaghetti	38	51	38	1	128	1.29
Sandwich	42	43	42	1	128	1.32
Steak	41	55	29	3	128	1.30
Dimsum	47	37	44	0	128	1.37
Pizza	43	49	35	1	128	1.33

Source: Primary data processed by the author based on FFQ questionnaire results (2026)

Based on Table 2, it can be seen that the types of food that the respondents most often consumed, namely, seblak and donuts which have a mean of 1.41 and the least consumed by the respondents, namely sop mie and batagor with an average (mean) of 1.28.

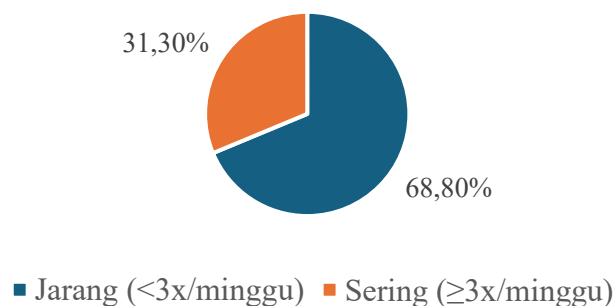


Figure 2. Diagram Frequency Distribution Based on Fast Food Consumption Patterns

Source: Primary data processed by the author based on PAQ-A questionnaire results (2026)

The results of the study in figure 2, the distribution of fast food consumption patterns in 128 respondents showed that most of the respondents were in the category of rarely consuming fast food, namely 88 respondents (68.8%). Meanwhile, respondents who are included in the category often consume fast food, namely with a frequency of three or more times in one week amounting to 40 respondents (31.3%).

Frequency Distribution Based on Physical Activity

Based on the results of the study, the distribution of respondents' physical activity was measured using *the Physical Activity Questionnaire for Adolescents* (PAQ-A) instrument. The PAQ-A instrument is used to assess adolescents' physical activity through various types of activities that are commonly carried out in daily life, the following results were obtained:

Table 3. Distribution of Respondents' Physical Activity Types

Activity Type	Physical Activity						Mean
	Frequency						
	Never	1-2x/ Sunday	3-4x/ Sunday	5-6x/ Sunday	>7x/Week	Total	
Badminton	93	28	3	3	1	128	1.76
Bela Diri (karate, silat, taekwondo)	91	29	7	1	0	128	1.82
Swimming	86	33	7	2	0	128	1.92
Jogging or running	10	80	25	7	6	128	3.51
Cycling	66	40	10	11	1	128	2.40
Football	62	47	12	4	3	128	2.41
Skateboarding	112	10	6	0	0	128	1.45
Walking for exercise	19	76	20	6	7	128	3.36
Basketball	82	31	11	2	2	128	1.98
Caste, Baseball, Softball	110	11	5	2	0	128	1.37
Futsal	92	26	5	3	2	128	1.77
Volleyball	74	39	11	3	1	128	2.14
Rowing/canoeing	126	2	0	0	0	128	1.25
Playing cats	125	2	1	0	0	128	1.27
Jump rope	78	34	13	0	3	128	2.09
Dancing	94	26	5	3	0	128	1.77
Play Hockey	125	3	0	0	0	128	1.26
Senam aerobics	85	35	7	1	0	128	1.96
Roller skating	111	15	2	0	0	128	1.41
Court Tennis	113	12	2	1	0	128	1.33
Table tennis	118	8	2	0	0	128	1.30

Source: Primary data processed by the author based on PAQ-A questionnaire results (2026)

Based on the results of filling out *the PAQ-A questionnaire*, it shows that jogging or running activity is a type of physical activity with the highest average value (*mean*) of 3.51. On the other hand, some physical activities have the lowest frequency level compared to other activities, namely rowing/canoeing showing an average (*mean*) of 1.25.

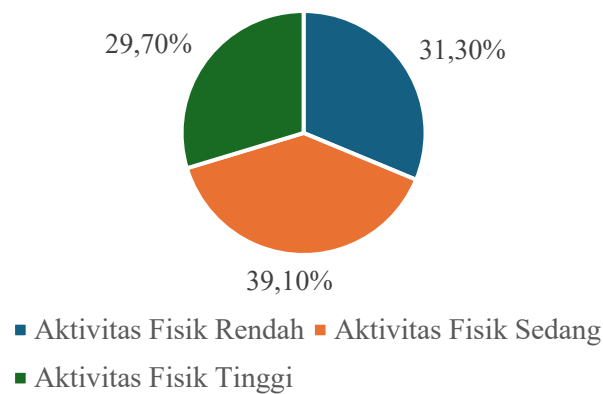


Figure 3. Diagram Frequency Distribution by Physical Activity

Source: Primary data processed by the author based on FFQ questionnaire results (2026)

The results of the study in figure 3, the distribution of the level of physical activity of the respondents showed that the moderate physical activity group was the category with the largest number of 50 respondents (39.1%). Furthermore, the low physical activity group amounted to 40 respondents (31.3%), while the high physical activity group consisted of 38 respondents (29.7%).

Bivariate Analysis

Bivariate analysis in this study was used to test the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents at State Senior High School 22 Jakarta. The statistic test used in this study is the Pearson *Chi-Square test*. According to Notoatmodjo (2020), the use of the *Chi-Square* test aims to test the relationship or association between two categorical variables in a study. Decision making is carried out based on significance (*p-value*), where if the *p-value* < 0.05, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, which means that there is a statistically significant relationship between the variables tested.

The Relationship of Fast Food Consumption Patterns to Overweight and Obesity in Adolescents at State Senior High School 22 Jakarta

The analysis of the relationship between fast food consumption patterns and overweight and obesity status was carried out using a *crosstabulation* table measuring 2×3 and tested using *Pearson Chi-Square*. The complete results of the *crosstabulation analysis* along with bivariate testing are presented in the following table:

Table 4. The Relationship of Fast Food Consumption Patterns to Overweight and Obesity in Adolescents at State Senior High School Negeri 22 Jakarta

Fast Food Consumption Patterns	Overweight & Obesity						Total	<i>p-value</i>	
	Overweight		Obesity I		Obesitas II				
	F	%	F	%	F	%			
Rarely (<3x/week)	46	35,9%	26	20,3%	16	12,5%	88	68,8%	<0.001
Frequent (≥3x/week)	6	4,7%	22	17,2%	12	9,4%	40	31,3%	
Total	52	40,6%	48	37,5%	28	21,9%	128	100%	

Source: Primary data processed by the author using SPSS version 31.0 (2026)

Based on Table 4, it was found that respondents who rarely ate fast food, namely less than three times a week, the highest number of respondents were in the overweight category of 46 people (35.9%). Furthermore, the obesity category I was found in 26 respondents (20.3%), while the obesity category II was 16 respondents (12.5%). Meanwhile, in the group of respondents who often consume fast food, namely three or more times in one week in the overweight category, only 6 people (4.7%) in the overweight category, while the Obesity I category is 22 people (17.2%) and Obesity II is 12 people (9.4%).

The results of the *Pearson Chi-Square* test showed a statistical value of $p < 0.001$. In addition, all cells in the table have an *expected count* value of more than 5 so that the assumption of using the *Chi-Square* test has been met. Based on these results, the null hypothesis (H0) was rejected and the alternative hypothesis (H1) was accepted. Thus, it can be concluded that there is a statistically significant relationship between fast food consumption patterns and overweight and obesity status in adolescents at State Senior High School 22 Jakarta.

The Relationship of Physical Activity to Overweight and Obesity in Adolescents at State Senior High School 22 Jakarta

The analysis of the relationship between physical activity and overweight status and obesity was carried out using a *crosstabulation* table measuring 3×3 and tested using *Pearson Chi-Square*. This analysis was conducted to describe the distribution of BMI status in each category of respondents' physical activity levels. The complete results of the *crosstabulation analysis* along with bivariate testing are presented in the following table:

Table 5. Relationship of Physical Activity to Overweight and Obesity in Adolescents at State Senior High School 22 Jakarta

Physical Activity	Overweight & Obesity						Total		<i>p-value</i>
	Overweight		Obesity I		Obesitas II				
	F	%	F	%	F	%			
Low	7	5,5%	19	14,8%	14	10,9%	40	31,3%	0,003
Medium	27	21,1%	18	14,1%	5	3,9%	50	39,1%	
Height	18	14,1%	11	8,6%	9	7%	38	29,7%	
Total	52	40,7%	48	37,5%	28	21,8%	128	100%	

Source: Primary data processed by the author using SPSS version 31.0 (2026)

Based on Table 5, the group of respondents with low physical activity, the largest number of respondents was in the Obesity I category, which was 19 respondents (14.8%). Furthermore, the Obesity II category was 14 respondents (10.9%), while the overweight category only amounted to 7 respondents (5.5%). In the moderate physical activity group, the overweight category dominated with 27 respondents (21.1%), followed by Obesity I as many as 18 respondents (14.1%) and Obesity II as many as 5 respondents (3.9%). Meanwhile, in the high physical activity group, the highest number of respondents was in the overweight category with 18 respondents (14.1%), Obesity I with 11 respondents (8.6%), and Obesity II with 9 respondents (7.0%).

The results of the *Pearson Chi-Square* test showed a statistical value of $p = 0.003$. All cells in the cross table have an *expected count* value of more than 5 so that the requirements

for using the *Chi-Square* test have been met. Based on these results, the null hypothesis (H0) was rejected and the alternative hypothesis (H1) was accepted. Thus, it can be concluded that there is a statistically significant relationship between physical activity levels and overweight and obesity status in adolescents at State Senior High School 22 Jakarta.

Overweight and Obesity Among Respondents

Based on the results presented in Figure 4.9, among the 128 respondents, the overweight category represented the largest proportion (40.6%), followed by Obesity Class I (37.5%) and Obesity Class II (21.9%). The mean BMI, which was above the overweight threshold, indicates that, overall, the severity of excess body weight in the study population was relatively high and was not limited to the mild category. This finding is consistent with a study by Sarintohe *et al.* (2022) involving adolescents in Indonesian private schools, which reported that 36.3% of respondents were overweight, indicating that overweight remains a common nutritional problem among adolescents in Indonesia.

The high proportion of respondents classified as overweight and obese in this study is consistent with the findings of Fathonah (2025), who stated that overweight and obesity among adolescents have become increasingly prevalent health problems in Indonesia. The study identified several contributing factors, including unhealthy dietary behaviors and low levels of physical activity, which may increase the risk of overweight and obesity among adolescents. The findings of this study are also related to the national situation, as reported by the 2018 Basic Health Research (Riskesdas), which indicated the prevalence of overweight and obesity among adolescents. The high proportion of respondents classified as Obesity Class I and Obesity Class II in this study demonstrates that overweight and obesity among adolescents remain important health issues requiring serious attention.

Fast Food Consumption Patterns Among Respondents

Based on Table 4.2, which presents the types of fast food consumed in this study, *seblak* was found to be the most frequently consumed type of fast food. According to Yanti *et al.* (2023), the high consumption of *seblak* among adolescents may be attributed to its distinctive taste, relatively affordable price, and ease of availability in the surroundings of schools. The study also reported that wet *seblak*, particularly the complete *seblak* variety, was the most preferred variation among adolescents. This finding indicates that product characteristics are one of the factors contributing to the popularity of *seblak* among adolescents. According to Cahyorini *et al.* (2022), when foods with such characteristics are consumed continuously and become part of daily dietary patterns, they may increase energy intake, which can contribute to changes in nutritional status.

The results presented in Figure 4.10 show that the majority of respondents (68.8%) were classified as infrequent fast food consumers (<3 times/week), whereas 31.3% of respondents were classified as frequent fast food consumers (≥ 3 times/week). This finding is consistent with the study by Nadimin *et al.* (2023) on fast food consumption habits among adolescents, which reported that fast food consumption was generally categorized as infrequent (56.5%). The relatively similar proportions indicate that fast food consumption patterns tend to be comparable, with the majority of adolescents still having low to moderate consumption frequencies. This finding is also supported by Imtihani and Noer (2023), who reported that the majority of adolescents consumed fast food infrequently (1–2 times per week), accounting for

83.2% of respondents. This indicates that fast food consumption had not yet become a daily habit among most adolescents.

Physical Activity Among Respondents

The results of the *PAQ-A* questionnaire presented in Table 4.3 showed that jogging or running was the type of physical activity with the highest frequency, with a mean score of ± 3.51 . This finding indicates that jogging or running was a relatively more frequently performed physical activity among adolescents compared with other types of physical activity. This result is consistent with the study by Zulfiandri (2024), which reported that jogging was the most commonly performed physical activity among adolescents, accounting for 74.5%. This finding is also supported by McSweeney *et al.* (2021), who stated that running is an easy and effective method for adolescents to meet daily physical activity recommendations. Therefore, the simple and accessible nature of jogging or running, along with its various health benefits, may contribute to its greater popularity and more frequent practice among adolescents compared with other activities.

Based on the results presented in Figure 4.11, moderate physical activity was the most prevalent category (39.1%), followed by low physical activity (31.3%) and high physical activity (29.7%). This finding is consistent with a study conducted by Lele *et al.* (2023) examining the relationship between physical activity, *screen time*, and nutritional status among female students at SMA Negeri 4 Manado. The study found that moderate physical activity was the most prevalent category, comprising 57 respondents (57%), followed by high physical activity among 30 respondents (30%) and low physical activity among 13 respondents (13%).

The Relationship of Fast Food Consumption Patterns to Overweight and Obesity in Adolescents at State Senior High School 22 Jakarta

The results of the study showed a statistically significant relationship between fast food consumption patterns and overweight and obesity status in adolescents at State Senior High School 22 Jakarta. Based on the results of the *Pearson Chi-Square* test, a *p* value of < 0.001 was obtained, which shows that there is a significant relationship between the two variables. The results of this study indicate that the frequency of fast food consumption is related to the level of overweight and obesity experienced by the respondents. Based on the results of cross-tabulation, it can be seen that respondents who consume fast food with frequent frequency, namely three or more times in one week, tend to be more in the Obesity I and Obesity II categories with a cumulative proportion of 26.6%. On the other hand, respondents who rarely ate fast food, i.e. less than three times a week, were more found in the overweight category by 35.9%. The findings show a tendency that the higher the frequency of fast food consumption, the higher the degree of overweight experienced by respondents.

The results of this study are in line with the theoretical concept of energy balance which explains that weight gain occurs when the amount of energy entering the body exceeds the energy expended. Fast food generally has a high energy content with a relatively large composition of fat, sugar, sodium, and calories, but has a low content of fiber, vitamins, and minerals (Rahmalia & Karjoso, 2023). If foods with these characteristics are consumed continuously and become part of the daily diet, there will be an increase in energy intake that can contribute to changes in nutritional status (Cahyorini *et al.*, 2022). According to Sherwood (2016), excess energy that the body does not use will be stored in the form of fat tissue, so that in the long term it can increase weight and trigger obesity.

In addition to its high calorie content, fast food also generally has a high level of appeal. The combination of fat, sugar, and simple carbohydrates causes fast food to have a more attractive taste so that it can increase the desire to consume food excessively (Sakasiswara *et al.*, 2024). This condition is also strengthened by the low fiber content in fast food which causes satiety to not last long. As a result, individuals tend to feel hungry more quickly and are compelled to eat larger amounts again. This is in line with the opinion of Thahir and Masnar (2021) who stated that a pattern of consumption of foods with high energy density can accelerate weight gain, while the consumption of high-fiber foods such as fruits and vegetables tends to help control weight.

When viewed from the context of the research environment, State Senior High School 22 Jakarta is located in an urban area that has fairly easy access to various types of fast food. Urban environments generally provide a wide selection of ready-to-eat foods that are easily accessible to teenagers, both in terms of location and price. According to Handayani *et al.* (2021), the existence of restaurants and fast food sellers in urban areas can increasingly affect people's consumption behavior, including adolescent groups. Such ease of access can increase the chances of teenagers buying and consuming fast food more often.

In addition to environmental factors, the economic characteristics of respondents also have the potential to affect fast food consumption patterns. The results of the study showed that most of the respondents had a daily allowance in the range of Rp10,000-Rp30,000. This amount is relatively sufficient to buy various types of fast food that are commonly sold around school environments and urban areas. Domika *et al.* (2021) explained that the larger the amount of pocket money that adolescents have, the greater the opportunity to buy food outside of basic necessities, including fast food. Thus, the amount of pocket money can be a supporting factor for the formation of fast food consumption habits in adolescents.

In addition to economic and environmental aspects, fast food consumption behavior is also influenced by adolescent developmental characteristics. Adolescence is a transitional period characterized by biological, psychological, and social changes that can affect individual behavior, including food consumption patterns (Singh *et al.*, 2021). In urban adolescents, eating outside the home is no longer solely done to meet biological needs, but is also often part of lifestyle and social interaction (Ufrida & Harianto, 2022). Taste factors that are considered more attractive, practical presentation, and relatively affordable prices are the main reasons why fast food is more in demand by teenagers (Larasati *et al.*, 2021; Andriani *et al.*, 2021). If this behavior takes place repeatedly without being balanced with a balanced diet, then the risk of overweight and obesity can increase.

The results of this study also show compatibility with several previous studies. Research by Asmarani *et al.* (2018) in State Senior High School 1 Kendari students showed that the consumption of fast food more than three times a week is one of the risk factors for obesity. Research by Ummah *et al.* (2025) also found a significant relationship between the frequency of fast food consumption and the incidence of obesity in school children. Another study by Afriani *et al.* (2025) in adolescents at State Senior High School 5 Jambi City obtained results that fast food consumption has a significant relationship with BMI values ($r = 0.32$; $p = 0.001$), which suggests that the increase in the frequency of fast food consumption is related to the increase in BMI values. The similarity of results with various studies reinforces that fast food

consumption patterns are one of the factors that are consistently associated with the incidence of overweight and obesity in adolescents.

The findings of this study have important implications for efforts to prevent overweight and obesity in adolescents, especially in the school environment. Prevention programs need to be directed at changing consumption behavior through sustainable nutrition education. According to Ruslim *et al.* (2024), identification of risk factors for obesity, including unhealthy diet, is the first step in the preparation of an effective prevention program. The education provided not only focuses on knowledge about the content of fast food, but also needs to instill skills in choosing healthier foods and the ability to control consumption behavior. In addition, school support through the provision of nutritious food options in the canteen and supervision of food sales in the school environment are also strategies that can be carried out (Niara & Pertiwi, 2022).

Although most respondents generally fall into the category of rarely eating fast food, i.e. less than three times a week, this does not necessarily indicate that the group is free from the risk of being overweight or obese. The results of the cross-tabulation showed that respondents with the category of rarely consuming fast food were still found in the Obesity I category by 20.3% and Obesity II by 12.5%. These findings show that fast food consumption patterns are not the only factor influencing the occurrence of overweight and obesity. Various other factors such as physical activity, heredity factors, lifestyle habits, environmental conditions, and family socioeconomic factors can also contribute to weight gain (Riany *et al.*, 2021). Therefore, efforts to overcome the problem of overweight and obesity in adolescents need to be carried out through a comprehensive approach by considering various interrelated factors.

The Relationship of Physical Activity to Overweight and Obesity in Adolescents at State Senior High School 22 Jakarta

The results showed that there was a statistically significant relationship between physical activity levels and overweight and obesity status in adolescents at State Senior High School 22 Jakarta. Based on the results of the *Pearson Chi-Square test*, a value of $p = 0.003$ was obtained, which shows a significant relationship between the two research variables. These findings indicate that the level of physical activity that respondents do is related to the overweight and obesity status experienced. The results of the cross-tabulation showed that respondents with low levels of physical activity were more in the Obesity I category by 14.8% and Obesity II by 10.9%. In contrast, the group with moderate physical activity had the largest proportion in the overweight category, at 21.1%. This pattern shows a tendency that the lower the physical activity that adolescents do, the higher the likelihood of obesity with a greater degree.

The findings of this study can be explained through the concept of energy balance which states that physical activity has an important role in the body's energy expenditure. When physical activity decreases, the energy used by the body becomes less so that there is an imbalance between the energy that enters through food and the energy that the body expends (Sagita *et al.*, 2023). Under these conditions, excess energy will be stored as fat reserves in adipose tissue. If it lasts for a long time, the accumulation of fat can cause weight gain to trigger obesity (Sherwood, 2016).

In addition to playing a role in burning calories, physical activity also contributes to increasing muscle mass and body metabolism. Individuals who engage in regular physical activity generally have higher energy expenditure than individuals with low activity. Haryani

(2024) explained that physical activity has an inversely proportional relationship with the value of the Body Mass Index (BMI), where increased physical activity tends to be followed by more normal BMI conditions, while low physical activity can increase the risk of an increase in BMI. Therefore, physical activity is one of the important components in maintaining weight balance in adolescents.

The condition of low physical activity in adolescents today is also closely related to the increase in *sedentary lifestyle*. Adolescents tend to spend more time doing passive activities such as watching television, using mobile phones, playing *video games*, using laptops, or resting for long periods of time (Amrynia & Prameswari, 2022). Sedentary activity is an activity with very low energy expenditure, so it does not make a significant contribution to daily calorie burning. As a result, more time spent on passive activity can increase the risk of energy imbalance and body fat accumulation.

The rapid development of technology also affects changes in adolescent lifestyles. Ease of access to digital entertainment indirectly causes physical activity to decrease and sitting time to become longer (Arifani & Setiyaningrum, 2021). This condition not only has an impact on the increased risk of being overweight, but can also increase the likelihood of various non-communicable diseases at a younger age, such as type 2 diabetes mellitus and cardiovascular disease (Gifari *et al.*, 2020). Thus, low physical activity in adolescents not only has an impact on nutritional status, but also on long-term health conditions.

The results of this study are also supported by various previous studies that show that low physical activity is one of the important risk factors for obesity in adolescents. Research by Asmarani *et al.* (2018) in students of State Senior High School 1 Kendari showed that lack of physical activity is related to an increased risk of obesity. Research by Nisa *et al.* (2021) also reported a significant inverse relationship between physical activity levels and the incidence of overweight in adolescents. The higher the physical activity performed, the lower the likelihood of obesity. In addition, at the global level, the WHO (2022) identified lack of physical activity as one of the main risk factors for various health problems in the world.

WHO (2020) recommends that children and adolescents aged 5–17 years do moderate to vigorous physical activity for at least 60 minutes every day. However, the results of this study show that the proportion of respondents with low physical activity is still quite high, which is 31.3%. This condition shows that there are still quite a lot of adolescents who have not met the needs of daily physical activity according to the recommended recommendations.

Based on the results of measurements using the PAQ-A instrument, it is known that the physical activities that respondents often do are more in the form of relatively simple recreational activities such as jumping rope and rowing. On the other hand, activities that require special facilities, such as swimming, basketball, and table tennis, are relatively rare. This condition can indicate a limited number of facilities and access to certain sports facilities. According to Thahir and Masnar (2021), some of the obstacles that affect low physical activity include limited facilities, busyness, lack of places to exercise, and lack of support for the surrounding environment. These factors may have influenced the physical activity of the respondents in this study.

Another interesting finding in this study was seen in the moderate physical activity group which actually had a higher proportion of being overweight than the high physical activity group. The moderate activity group had an overweight proportion of 21.1%, while the high

activity group was 14.1%. This condition can be interpreted as that moderate physical activity may not be enough to balance high energy intake, especially if the respondents also have an unhealthy diet. In addition, another possibility is that respondents with the overweight condition have begun to increase their physical activity in an effort to control their weight before it progresses to obesity. This shows that the relationship between physical activity and BMI does not always take place simply and can be influenced by various other factors.

The findings of this study provide important implications in efforts to prevent overweight and obesity in adolescents. Increased physical activity needs to be a major part of school-based health programs. WHO (2020) states that physical activity has various health benefits, including improving body fitness, cardiorespiratory health, mental health, and weight control. Therefore, schools can play a role through various strategies such as increasing sports activities, increasing physical education allocations, providing adequate sports facilities, and forming student sports communities (Niara & Pertiwi, 2022). The school environment is a strategic place because it is able to reach teenagers widely and sustainably.

In addition to the role of schools, family support also has an important contribution in encouraging active living behaviors in adolescents. Parents have a role in facilitating, motivating, and forming children's physical activity habits from an early age (Zogara *et al.*, 2022). On the other hand, the excessive use of digital technology also needs to get attention through more prudent *screen time* management. Kazi *et al.* (2020) states that lack of physical activity can increase susceptibility to various health problems at a young age. Therefore, cooperation between schools, families, and the surrounding environment is needed in creating an active life culture in adolescents. The approach taken together is expected to help reduce the incidence of overweight and obesity so that it does not continue into adulthood.

Research Limitations

This research has been carried out in accordance with the methodological stages that have been designed, but in the implementation process there are several limitations that need to be considered so that the interpretation of the research results is carried out in a more proportional manner.

1. This study only involved respondents with the categories of overweight, obesity I, and obesity II so that there was no group of adolescents with normal nutritional status or thin as a comparison group.
2. The measurement of fast food consumption patterns is only based on the frequency of consumption of the infrequent and frequent categories, so it has not described the portion size, number of calories, and type of fast food consumed by the respondents in detail.
3. The *Food Frequency Questionnaire* (FFQ) and *Physical Activity Questionnaire for Adolescents* (PAQ-A) instruments used in this study have the characteristics of a relatively short measurement period and describe the habits of respondents over a certain period of time. Meanwhile, overweight and obesity status are conditions that are formed through the accumulation of behavior in the long term.
4. This research was conducted on students of State Senior High School 22 Jakarta who are in urban environments so that the results of the study are influenced by the characteristics of access to fast food, mobility patterns, and typical lifestyles.

5. This study has not included several behavioral factors that may have a strong influence on overweight and obesity in adolescents, especially sedentary behaviors such as the duration of mobile phone use, time watching, playing *games*, and the duration of using other digital media.

Despite these limitations, this study still contributes to explaining the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents. In addition, this study also provides a contextual overview of the behavioral health characteristics of high school adolescents in urban areas that can be the basis for the development of advanced research and the preparation of school-based health intervention programs.

CONCLUSION

Based on the results of a study on the relationship between fast food consumption patterns and physical activity on overweight and obesity in adolescents at State Senior High School 22 Jakarta, it can be concluded that there is a significant relationship between fast food consumption patterns and the incidence of overweight and obesity in adolescents. Adolescents who consumed fast food more often (≥ 3 times per week) tended to have a higher risk of obesity than adolescents who rarely consumed it. The results of the Pearson Chi-Square test showed a $p < 0.001$ value, which indicates a statistically significant relationship. In addition, this study also shows that there is a significant relationship between physical activity levels and the incidence of overweight and obesity in adolescents. Respondents with low physical activity had a higher tendency to be obese than respondents with moderate and high physical activity. The results of statistical analysis showed a value of $p = 0.003$, so physical activity is one of the important factors related to the nutritional status of adolescents. Thus, this study shows that fast food consumption patterns and physical activity are factors related to the incidence of overweight and obesity in adolescents at State Senior High School 22 Jakarta. Therefore, preventive efforts are needed through the implementation of a healthier diet, restrictions on fast food consumption, regular physical activity, and support from schools, families, and health workers in the implementation of health promotion programs to reduce the risk of overweight and obesity in adolescents.

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