

## The Relationship Between Fast Food Consumption Habits and Physical Activity on Body Mass Index (BMI) in Adolescents at SMAN 5 Kota Jambi

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### Abstract

**Background:** The prevalence of overweight and obesity among adolescents continues to increase, including in Jambi City. High consumption of fast food and low physical activity are suspected to contribute to this issue. This study aims to determine the relationship between fast food consumption habits and physical activity with body mass index (BMI) among adolescents at SMAN 5 Jambi City.

**Methods:** This research is an analytical observational study with a cross-sectional approach. A total of 98 respondents were selected using stratified random sampling. Data were collected using the Food Frequency Questionnaire (FFQ) for fast food consumption, the Global Physical Activity Questionnaire (GPAQ) for physical activity, and BMI measurements. Data analysis was conducted using the Spearman-Rank correlation test.

**Results:** The majority of respondents were female (75.51%) and aged 16 years (45.92%). Most respondents had a moderate level of fast food consumption (34.69%), high physical activity (51.02%), and normal BMI. The statistical analysis showed a significant relationship between fast food consumption and BMI ( $r = 0.32$ ;  $p = 0.001$ ) with a weak positive correlation. Meanwhile, no significant relationship was found between physical activity and BMI ( $r = -0.13$ ;  $p = 0.216$ ).

**Conclusion:** There is a significant relationship between fast food consumption and BMI, while no significant relationship was found between physical activity and BMI among adolescents at SMAN 5 Jambi City.

**Keywords:** Fast food, physical activity, body mass index, adolescents.

### Introduction

The percentage of overweight and obesity cases continues to increase each year. According to WHO data in 2022, more than 390 million children and adolescents aged 5–19 years were overweight, and 160 million were classified as obese(1). Based on the 2023 Indonesian Health Survey, the prevalence of obesity among adolescents in Indonesia reached 23.4%, which is higher than the 2018 Riskesdas data that reported a prevalence of 21.8%(2),(3). In Jambi Province, according to data from the Jambi City Health Office in 2023, there were 346 adolescents identified as having excess nutritional status and 133 cases of obesity, based on height-for-age measurements(4).

One of the contributing factors to this condition is a high intake of fast food combined with low levels of physical activity among adolescents. Fast food is generally high in calories, fat, and sodium, yet low in nutritional value. On the other hand, low physical activity leads to energy imbalance, which results in an increase in Body Mass Index (BMI)(5).

Adolescents are a vulnerable age group influenced by environmental factors, lifestyle, and dietary choices. Easy access to fast food and a high level of sedentary behavior such as excessive gadget use and lack of regular physical activity exacerbate the risk of obesity(6). Previous studies have shown that consuming fast food more than twice a week can increase the risk of being overweight by up to 8.7 times compared to those who rarely consume it(7). Meanwhile, low physical activity also contributes to energy imbalance in the body, which in turn affects BMI(8).

SMAN 5 Kota Jambi was selected as the study location due to its large student population and proximity to areas with high availability of fast food vendors. Preliminary interviews with students also revealed limited understanding of Body Mass Index (BMI) and a high frequency of fast food consumption. However, there is still a lack of local studies specifically examining the relationship between fast food consumption habits, physical activity, and BMI among adolescents in Jambi City.

Therefore, this study is important to provide empirical insights into the issue while contributing to the local body of literature in adolescent health. It also has practical implications for the nursing profession, particularly in the development of school-based health promotion programs such as balanced nutrition education and increased physical activity initiatives.

## **Methods**

This study was an analytical observational research with a cross-sectional approach conducted at SMAN 5 Kota Jambi in February 2025. The study population consisted of all tenth and eleventh grade students, with a total sample of 98 respondents selected using stratified random sampling based on the proportion of students per grade level. Data were collected using the Food Frequency Questionnaire (FFQ) to assess fast food consumption habits, and the Global Physical Activity Questionnaire (GPAQ) to measure levels of physical activity.

Body Mass Index (BMI) was calculated using the formula  $BMI = \text{weight (kg)}/\text{height}^2 \text{ (m}^2\text{)}$ , based on direct measurements of weight and height. Data were analyzed univariately to describe respondent characteristics and bivariately using the Spearman-Rank correlation test to examine the relationship between variables. Data processing was carried out using the Statistcy software. This study obtained ethical approval from the Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Jambi, and all respondents signed informed consent prior to participation.

## Results

### Univariate Analysis

**Table 1. Respondent Characteristics by Grade Level, Gender, Age, and Monthly Allowance.**

<b>Respondent Characteristics</b>	<b>Frequency</b>	<b>%</b>
<b>Gender</b>		
Woman	74	75,51%
Man	24	24,49%
<b>Total</b>	<b>98</b>	<b>100%</b>
<b>Age</b>		
15	41	41,84%
16	45	45,92%
17	12	12,24%
<b>Total</b>	<b>98</b>	<b>100%</b>
<b>Pocket money/month (rupiah)</b>		
Low	60	61,22%
high	38	38,78%
<b>Total</b>	<b>98</b>	<b>100%</b>
<b>Class</b>		
X	53	54,08%
XI	45	45,92%
<b>Total</b>	<b>98</b>	<b>100%</b>

A total of 98 respondents participated in this study. The majority were female (75.51%) and 16 years old (45.92%). Most were tenth-grade students (54.08%) with varying monthly allowances, with the higher allowance group being more dominant.

**Table 2. Overview of Fast Food Consumption Habits, Physical Activity, and Body Mass Index (BMI) Among Adolescents at SMAN 5 Kota Jambi**

<b>Variabel independent</b>	<b>Category</b>			<b>Total</b>
	<b>Low</b>	<b>Medium</b>	<b>High</b>	
	<b>Frequency (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>	
Fast Food Consumption Habits	48 (48,98%)	34 (34,69%)	16 (16,33%)	98(100%)

Physical Activity	17 (17,35%)	31 (31,63%)	50 (51,02%)	98 (100%)	
Variabel dependent	Category				Total
	Wasting	Normal	Obesity	Overweight	
	<i>Frequency (%)</i>	<i>Frequency (%)</i>	<i>Frequency (%)</i>	<i>Frequency (%)</i>	
BMI	12 (12,24%)	62 (63,27%)	15 (15,31%)	9 (9,18%)	98(100%)

Based on the univariate analysis, 34.69% of respondents had moderate fast food consumption habits, and 51.02% had a high level of physical activity. The majority of respondents had a normal Body Mass Index (BMI).

### Bivariate Analysis

**Table 3. The Relationship Between Fast Food Consumption Habits and Body Mass Index (BMI) Among Adolescents at SMAN 5 Kota Jambi**

The analysis showed a significant positive correlation between fast food consumption habits and Body Mass Index (BMI) ( $r = 0.32$ ;  $p = 0.001$ ). The more frequently adolescents consumed fast food, the higher their BMI tended to be. Although most respondents in all consumption categories had a normal BMI, the proportions of overweight and obesity increased with higher fast food consumption frequency. This indicates that fast food eating habits contribute to an increased risk of overweight among adolescents.

**Table 4. The Relationship Between Physical Activity and Body Mass Index (BMI)**

Fast Food Consumption Habits	BMI										r	pValue
	Wasting		Normal		Obesity		overweight		Total			
Category	n	%	n	%	n	%	n	%	n	%	0.32	0,001
low	7	7,14	37	37,76	2	2,04	2	2,04	48	48,98		
Medium	5	5,1	16	16,33	7	7,14	6	6,12	34	34,69		
High	0	0	9	9,18	6	6,12	1	1,02	16	16,33		
Total	12	12,24	62	63,27	15	15,31	9	9,18	98	100		

**Among Adolescents at SMAN 5 Kota Jambi**

The analysis revealed a very weak negative correlation between physical activity and Body Mass Index (BMI) ( $r = -0.13$ ;  $p = 0.216$ ). This indicates that an increase in physical activity tends to slightly lower BMI; however, the relationship is not statistically significant. Most respondents across all physical activity categories had a normal BMI, but the variations in the proportions of obesity and overweight did not show a consistent pattern. This suggests that, in this study, physical activity was not meaningfully associated with changes in adolescent BMI.

## **Discussion**

### **Respondent Characteristics**

The majority of respondents in this study were female (75.51%), indicating a predominance of female participation. Most respondents were between 15 and 16 years old, with 16 being the most common age (45.92%), representing mid-adolescence a stage actively shaping lifestyle habits. A large proportion of respondents (61.22%) had low monthly allowances, reflecting a modest economic background that may influence both dietary patterns and physical activity. Respondents were fairly evenly distributed between grade X and XI, allowing for comparative analysis based on educational level.

### **Overview of Fast Food Consumption Habits Among Adolescents at SMAN 5 Kota Jambi**

Based on the research findings, the majority of respondents had a low level of fast food consumption (48.98%). This indicates that nearly half of the respondents tended to rarely consume fast food. Such low consumption habits may be influenced by several factors, including limited pocket money, awareness of a healthy lifestyle, family influence, or limited access to fast food outlets.

Furthermore, 34.69% of respondents were categorized as having moderate fast food consumption, indicating they consumed fast food occasionally not too frequently, but not rarely either. This group may reflect adolescents who view fast food as part of a social lifestyle, such as when gathering with friends, yet still maintain moderate consumption.

Meanwhile, only 16.33% of respondents fell into the high consumption category. This relatively small number suggests that frequent fast food intake is not a common habit among the respondents. From a health perspective, this can be

considered a positive finding, as excessive fast food consumption may negatively impact adolescent health, especially during the growth and development stage.

This finding is consistent with the study by Anugrah and Indriasari(9), which reported that moderate fast food consumption was more prevalent (56.2%) than high consumption (43.8%). One contributing factor to increased fast food consumption among adolescents is the easy access and widespread availability of fast food vendors, especially in urban areas.

Based on the questionnaire analysis of 98 respondents, instant noodles were the most frequently consumed food item, with 34 respondents (11.84%) reporting regular consumption, followed by French fries, consumed by 16 respondents (5.54%). These respondents typically consumed instant noodles and snacks with a frequency of once per day. According to Astuti., dkk.,(10) adolescents who frequently consume various types of fast food tend to accumulate excess energy and fat in the body, which contributes to an increase in Body Mass Index (BMI). Instant noodles are noodle products formed into blocks, ready to be cooked, usually in a dried form and accompanied by seasoning and/or oil packets packaged separately. Before consumption, the dry noodle block is typically soaked in boiling water for a certain period and eaten after the provided seasoning is added.

One serving of instant noodles contains approximately 400 kcal, which is equivalent to about 20% of the daily energy requirement (2,000 kcal), with oil contributing around 170–200 kcal. Additionally, the oil content in instant noodles can reach up to 30% of the product's dry weight(11). According to Uswah(12), excessive consumption of instant noodles may lead to adverse health effects. The monosodium glutamate (MSG) found in the sodium content of instant noodles can potentially cause cell swelling and even neuronal death if consumed in large amounts. Furthermore, the high levels of simple carbohydrates, fats, and sodium in instant noodles may elevate blood sugar and blood pressure, and contribute to obesity. This habit is also associated with an increased risk of degenerative diseases such as diabetes mellitus and hypertension. Excessive intake of instant noodles may also trigger other serious health conditions(13).

### **Overview of Physical Activity Among Adolescents at SMAN 5 Kota Jambi**

The results of the study showed that the majority of respondents had a high level of physical activity (51.02%). This finding indicates that most adolescents in the study were physically active, which may reflect a healthy lifestyle and an awareness of the importance of physical fitness. High physical activity among adolescents may result from extracurricular involvement, regular exercise, or daily mobility such as walking or cycling to school.

The moderate category included 31.63% of respondents. Although less intensive than the high-activity group, this category still reflects participation in physical activities, albeit inconsistently or with lower intensity. Nonetheless, these respondents still demonstrated relatively active behaviors compared to those who are physically inactive.

High levels of physical activity are influenced by predisposing factors such as gender, with male adolescents more frequently engaged in intensive physical activities. In addition, enabling factors such as access to sports facilities and peer support also play a significant role. Male adolescents tend to have greater access to sports infrastructure and receive more social encouragement to participate in physical activities. On the other hand, many respondents exhibited low physical activity levels, as most of their time was spent sitting, watching television or YouTube, playing games, using gadgets, lying down, and studying, with little time dedicated to exercise. This indicates a lack of attention to physical fitness. The majority of respondents also reported commuting to school using public transportation or motorcycles(14).

In addition, gender contributes to differences in activity levels, with male adolescents generally being more physically active than females. Race and ethnicity may also influence adolescents' participation in physical activity, due to cultural and lifestyle differences in adopting healthy behaviors. In the modern era, technology plays a significant role in reducing adolescents' physical activity levels, as increased use of gadgets and social media leads them to spend more time on sedentary activities such as art and dance rather than engaging in active physical movement(15).

Other factors that influence whether a person engages in regular physical activity include age, genetic predisposition, gender, as well as environmental conditions such as temperature and geography. Age affects an individual's activity level, with younger individuals tending to be more active than older age groups, who often experience decreased energy and mobility(16).

### **Overview of Body Mass Index (BMI) Status Among Adolescents at SMAN 5 Kota Jambi**

The majority of respondents had a normal Body Mass Index (BMI) (63.27%), indicating generally good nutritional status. However, a considerable proportion of respondents still fell into non-ideal nutritional categories, including obesity (15.31%), wasting (12.24%), and overweight (9.18%). These findings reflect a dual burden of malnutrition both overnutrition and undernutrition which pose health risks for adolescents. Excessive fast food consumption and low physical activity contribute to overnutrition, while wasting may be caused by insufficient nutrient intake. Therefore, nutritional interventions and the promotion of healthy lifestyles are essential to prevent further increases in non-ideal nutritional status among adolescents.

Good nutritional status is achieved when the body receives an adequate intake of nutrients and is able to process them effectively, thereby supporting optimal physical growth, brain development, functional capacity, and overall health. Among adolescents, dietary habits are closely linked to energy and nutrient intake, which ultimately affects their nutritional status. A healthy nutritional status can be attained when the body obtains sufficient nutrients and utilizes them efficiently to support metabolic processes and maintain optimal health. Conversely, excessive intake of energy and nutrients may lead to overnutrition(17). This is supported by the findings of Nandila and Puspowati(18) who found a significant association between fast food consumption patterns and obesity-related nutritional status.

### **The Relationship Between Fast Food Consumption Habits and Body Mass Index (BMI) Among Adolescents at SMAN 5 Kota Jambi**

The results of the study indicate a significant relationship between fast food consumption habits and Body Mass Index (BMI) among adolescents, where an increase in the frequency of fast food intake tends to be followed by an increase in BMI. Although the majority of respondents still had a normal BMI, the proportions of overweight and obesity rose alongside higher fast food consumption. The positive correlation found ( $r = 0.32$ ;  $p = 0.001$ ) suggests that fast food intake is one of the contributing factors to excessive nutritional status.

These findings are supported by studies conducted by Sulistyowati et al.,(19), Sary dkk., (20), and Nadhiroh dkk., (21) which consistently reported that high fast food consumption is closely associated with increased nutritional status among adolescents. In contrast, Anugrah et al.,(22) found no significant relationship, suggesting that other factors such as physical activity, genetics, and environmental influences should also be taken into consideration.

Environmental factors, such as the presence of school canteens and easy access to fast food through online delivery services, play a significant role in shaping adolescents' dietary habits. Popular food choices such as fried chicken, grilled sausages, fried snacks, and sugary drinks are consumed regularly, around 3 to 5 times per week. This is in line with findings that fast food typically contains high calories, saturated fats, added sugars, and food additives, which, when consumed in excess, can contribute to weight gain and long-term health problems(23).

### **The Relationship Between Physical Activity and Body Mass Index (BMI) Among Adolescents at SMAN 5 Kota Jambi**

The results of the study showed that although the majority of respondents across all levels of physical activity had a normal Body Mass Index (BMI), the correlation between physical activity and BMI was very weak and negative ( $r = -0.13$ ) and not statistically significant ( $p = 0.216$ ). This finding indicates that physical activity alone is not sufficient to influence nutritional status if not accompanied by a healthy diet.

Respondents with high levels of physical activity did tend to have a greater proportion of normal BMI; however, overweight and obesity were still found among those with low to moderate physical activity. This aligns with the view that physical activity plays an important role in energy expenditure, but its effect on BMI is strongly influenced by energy intake and overall lifestyle.

This finding is not in line with Damayanti(14) who reported a significant relationship between physical activity and overweight status. However, it supports the findings of Janah and Nugroho(24) who found no meaningful association between the two variables. Therefore, efforts to prevent poor nutritional status among adolescents should consider a combination of physical activity, dietary patterns, and other lifestyle habits.

### **Conclusions**

Based on the results of the study on the relationship between fast food consumption habits and physical activity with Body Mass Index (BMI) among adolescents at SMAN 5 Kota Jambi, several key findings were obtained. The majority of respondents were female (75.51%), aged 16 years, enrolled in grade X, and had a monthly allowance exceeding IDR 500,000. Most adolescents had low levels of fast food consumption (48.98%) and high levels of physical activity (51.02%), particularly among male students. Statistical analysis revealed a significant relationship between fast food consumption and BMI ( $r = 0.32$ ;  $p = 0.001$ ), indicating that increased frequency of fast food consumption tends to be associated with higher BMI values. Conversely, no significant relationship was found between physical activity and BMI ( $r = -0.13$ ;  $p = 0.216$ ), although descriptively, those with higher physical activity levels tended to have a normal BMI. These findings suggest that fast food consumption is a more dominant factor influencing nutritional status than physical activity among adolescents in this school population.

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