Open Global Scientific Journal 03 (01): 38-47 2024

Contents lists available at openscie.com

Open Global Scientific Journal

Journal homepage: https://openglobalsci.com

Eating Habits, Lifestyle and Friends Associated with the Incidence of Adolescent Overnutrition at Bengkulu

Gibrina Rizki[1], Tonny Cortis Maigoda[1], Yenni Okfrianti[1], Tetes Wahyu Witradharma[1], Ayu Pravita Sari[1], Hari Hariadi[2]

[1] Department of Nutrition, Polytechnic of Health Ministry of Bengkulu, Indonesia
[2] Research Center of Appropriate Technology, National Research and Innovation Agency, Indonesia

*Correspondence E-mail: tony@poltekkesbengkulu.ac.id

ARTICLE INFO

Article History:
Received 12 July 2024
Revised 8 August 2024
Accepted 10 August 2024
Published 13 August 2024

Keywords:
Excess weight,
Night eating habits,
Peer influence,
Sedentary.

ABSTRACT

Adolescents today are increasingly at risk of becoming overweight, largely due to factors related to food consumption and lifestyle. This study aimed to determine the relationship between night eating habits, sedentary behavior, and peer influence with the incidence of overweight among adolescents at SMA Negeri 07 Bengkulu City in 2024. This research was conducted using an analytic observational design with a cross-sectional approach. The sample consisted of 54 grade XI students, selected through proportional stratified random sampling. Night eating habits were assessed using a 3x24-hour recall form supplemented with food photographs, sedentary behavior was measured using the Adolescent Sedentary Activity Questionnaire (ASAQ), and peer influence was evaluated through a structured questionnaire. Data were analyzed using univariate and bivariate techniques, processed with SPSS software, and assessed with the chi-square test at a significance level of $\alpha = 0.05$. The findings revealed that a significant proportion of respondents exhibited frequent night eating habits (44.4%, $p = 0.002$), high levels of sedentary behavior (44.4%, $p = 0.006$), and were significantly influenced by their peers (61.1%, $p = 0.004$). The study concludes that there is a significant association between night eating habits, sedentary behavior, and peer influence with the incidence of overweight among adolescents at SMA Negeri 07 Bengkulu City.

1. Introduction

Obesity is characterized by an abnormal or excessive accumulation of body fat that can negatively impact health. The primary cause of obesity is an imbalance between energy intake and expenditure, where excessive calorie consumption is not matched by adequate physical activity over time. This condition significantly increases the risk of metabolic disorders such as type 2 diabetes mellitus, dyslipidemia, hypertension, musculoskeletal diseases, and various cancers (Hastuti, 2022).

Excess weight has become a critical public health challenge and a global epidemic. According to a study published in The Lancet, the number of obese children and adolescents increased tenfold from 11 million in 1975 to 124 million in 2016. The factors contributing to adolescent obesity are multifactorial, including excessive macronutrient intake, frequent consumption of fast food, insufficient physical activity, and genetic predispositions, all of which can disrupt energy balance and lead to obesity (Telisa, 2020).

Night eating syndrome, characterized by excessive food consumption after dinner, is particularly concerning among adolescents. Approximately 29.2% of adolescents experience night hyperphagia, consuming ≥25% of their total daily calories after dinner, with 6.2% consuming ≥50% of their daily calories during this time. Adolescents aged 15-18 years are especially vulnerable to night eating syndrome and other abnormal eating behaviors. Poor eating habits combined with inactivity at night contribute to the accumulation of fat in subcutaneous and other tissues, increasing the risk of obesity (Firmanurrochim *et al*., 2021).

Data from the World Health Organization (2018) indicates that approximately 2 million deaths annually are attributable to sedentary behavior. Moreover, 60 to 85% of people globally, in both developed and developing countries, lead sedentary lifestyles, with four out of five adolescents (aged 11-17 years) failing to engage in sufficient physical activity. Sedentary behavior includes activities with minimal energy expenditure, defined as less than 1.5 METs. Research by Halamalding *et al.* (2019) shows that overweight and obese adolescents tend to engage in passive activities such as watching television, using gadgets, playing video games, or lying down while listening to music. This aligns with findings that stunted adolescents with a sedentary lifestyle of more than 5 hours per day have a 2.9 times greater risk of becoming obese compared to those with less than 5 hours per day of sedentary behavior. The reduction in physical activity, due to technological conveniences, leads to energy being stored as fat, ultimately causing obesity (Bokau *et al*., 2023).

It has been observed that overweight or obese children differ from healthy-weight peers in their eating behaviors and habits. They are more likely to consume higher amounts of fat and lower carbohydrates, engage in more sedentary activities (such as watching TV or playing video games), and participate less in moderate to vigorous physical activities, all of which contribute to fat accumulation (Gomes, 2014).

Social environmental factors, particularly peer influence, also play a significant role in the development of excess weight. Adolescents often spend a considerable amount of time with their peers, which can impact their eating behaviors, leading to unhealthy food choices and disordered eating patterns, thereby increasing their body mass index (Fatmawati & Wahyudi, 2021).

To date, there has been limited research analyzing the simultaneous relationship between night eating habits, sedentary behavior, and peer influence on adolescent obesity. Therefore, this study aims to explore these relationships comprehensively.

2. Methods

This study is analytical observational research, employing a cross-sectional design. A cross-sectional design is a social research methodology that examines multiple cases simultaneously, involving several variables to identify patterns of association. The research was conducted at SMA

Negeri 07 Bengkulu City in May 2024 (Senio High School). Sampling was carried out using a simple random sampling technique. The study population consisted of all grade's XI students, totaling 434 adolescents, from which a sample of 54 respondents was selected.

Data collection was conducted through direct interviews with respondents. Night eating habits were assessed using a 3x24-hour recall form with food photographs, sedentary behavior was measured using the Adolescent Sedentary Activity Questionnaire (ASAQ) (Hardy et al., 2007), and peer influence was evaluated using a questionnaire adapted from Anderson *et al.* (2016). The incidence of excess body weight in adolescents was determined by measuring height and weight using a microtoise and weighing scales, with body mass index-for-age (BMI-for-age) as the reference metric. The data were presented in descriptive tables.

Large sampel that requiredin research This study uses the formula (Lemeshow *et al*., 1990):

$$n = \frac{N.z^2 1-a/2\,.p.q}{d^2\,(\,N-1\,)+z^2\,1-a/2\,.p.q}$$

$$n = \frac{434.\,(1{,}96)^2.\,0{,}2\,(1-02\,)}{(0{,}1)^2\,(\,434-1)+\,1{,}96^2.\,0{,}2\,(1-0{,}2\,)}$$

$$n = \frac{434.3.85.\,0{,}2\,.\,0{,}8}{0{,}01\,.\,(433)+3{,}85\,.\,0{,}2\,.\,0{,}8}$$

$$n = \frac{267}{4{,}94}$$

n = 54 Respondents

Description:
n = number of samples
P = Estimated proportion (0.2) q = 1-p
d = Absolute precision (10%)
Z 21 -α Statistic Z (Z = 1.96 for α = 0.05) N
= Population size (434)

Based on the formula above, the sample for this study was 54 respondents.

3. Results and Dicussion

3.1 Respondent characteristics, night eating habits, sedentary and incidence of adolescent overweight

The results of the research conducted obtained data description night eating habits, sedentary and peer influence with the incidence of excess weight in adolescents at SMA Negeri 07 Bengkulu City.

Table 1. Overview of respondent characteristics, evening meal habits, sedentary and peer influence on adolescents at SMA Negeri 07 Bengkulu City

Respondent	Characteristics	Frequency	Percentage (%)
Gender	Male	28	51,9
	Female	26	48,1
Age	16 Years	27	50,0
	17 Years	27	50,0
Dinner Habits	Less	13	24,1
	Simply	17	31,5
	More	24	44,4
Sedentary	Low	16	29,6
	Medium	14	25,9
	High	24	44,4
Peer Influence	Unaffected	21	38,9
	Influenced	33	61,1
Excess Weight	Not Overweight	23	42,6
	Excess Weight	31	57,4

Source: 2024 Research Results

Tabel 1. It was found that 28 people (51.9%) of respondent were male, 27 people (50.0%) 17 yeears old, 24 people (44.4%) have high sedentary, 33 people (61.1%) were influenced by peers and 31 people (57.4%) were overweight.

Table 2. Relationship between Night Eating Habits and the Incidence of Adolescent Overweight at SMA Negeri 07 Bengkulu City in 2024

Dinner Habits	**Nutrition Status**				**Total**		***p-Value***
	Not Excessive		**Body Weight**				
	n	**%**	**n**	**%**	**n**	**%**	
Less	11	47.8	2	6.5	13	24.1	0.002
Simply	5	21.7	12	38.7	17	31.5	
More	7	30.4	17	54.8	24	44.4	
Total	23	100	31	100	54	100	

Source: 2024 Research Results

Table 2 shows that among the 24 respondents with the habit of consuming more than adequate intake at dinner, 17 individuals (54.8%) were found to be overweight. Conversely, among the 17 respondents who had dinner with an adequate intake, 12 individuals (38.7%) were overweight. Additionally, of the 11 respondents with dinner habits characterized by insufficient intake, 47.8% had a normal body weight.

Table 3. Relationship between Sedentary with the Incidence of Adolescent Overweight at SMA Negeri 07 Bengkulu City in 2024

Sedentary Weight	Nutrition Status				Total		*p-Value*
	Not Excessive		Body Weight Excess				
	n	**%**	**n**	**%**	**n**	**%**	
Low	12	22.2	4	7.4	16	30	0.006
Medium	5	9.2	9	17	14	26	
High	6	11.1	18	33.3	24	44	
Total	23	42.5	31	57.7	54	100	

Source: 2024 Research Results

Table 3 indicates that among the 24 respondents with high levels of sedentary activity, 18 individuals (33.3%) were overweight. In contrast, of the 14 respondents with moderate sedentary activity, 9 individuals (17%) were found to be overweight. Additionally, among the 12 respondents with low sedentary activity, 22.2% maintained a normal weight, without signs of excess weight.

Table 4. Relationship between Peer Influence and the Incidence of Adolescent Overweight at SMA Negeri 07 Bengkulu City in 2024

Peer Influence	Nutrition Status				Total		*p-Value*
	Not Overweight		Excess Weight				
	n	**%**	**n**	**%**	**n**	**%**	
Influenced	9	16.6	24	44.4 %	33	61,0	0.004
No Affected	14	26	7	13	21	39	
Total	23	42.6	31	57.4	54	100	

Source: 2024 Research Results

Table 4 shows that among the 33 respondents influenced by peers, 24 individuals (44.4%) were found to be overweight. In contrast, of the 21 respondents who were not influenced by peers, 14 individuals (26%) maintained a normal weight and were not classified as overweight.

3.2 Relationship between night eating habits and the incidence of excessive weight in adolescents at SMA Negeri 07 Bengkulu City

The results in Table 2 demonstrate a significant relationship between night eating habits and the incidence of excess weight in adolescents at SMA Negeri 07 Bengkulu City, with a p-value of 0.002, indicating statistical significance ($p < 0.05$). The study revealed that among the 54 respondents, those who habitually consumed more food at dinner (54.8%) were more likely to be overweight. In contrast, respondents with moderate or insufficient dinner intake showed a lower prevalence of excess weight. This correlation is attributed to the direct impact of food intake on body mass index (BMI). The 3x24 hour recall data highlighted those students with higher dinner intake often exceeded 25% of their daily caloric needs, with frequent snacking and fast food consumption contributing to weight gain. Adolescents with a higher caloric intake at dinner were more likely to have a BMI above the normal range (overweight).

This finding aligns with Firmanurochim's (2021) research, which also identified a significant relationship between night eating habits and obesity ($p = 0.003$). Poor eating habits, particularly at night, combined with low physical activity, lead to fat accumulation in subcutaneous tissue and other areas, contributing to obesity. Obesity occurs when caloric intake consistently exceeds caloric expenditure, with nighttime energy needs being lower due to a slower metabolism (Evan & Candrawati, 2017).

Nighttime snacking provides additional energy, often exceeding the body's requirements, leading to fat accumulation. Snacks are frequently high in energy-dense ingredients like processed fats, sugars, and salts, while the intake of nutrient-rich foods like fruits and vegetables remains low. Without adequate physical activity, this pattern increases the risk of obesity (Lisetyaninrum & Kuntarti, 2021).

Poor dietary habits, including low intake of essential nutrients and high consumption of fast food and sugary drinks, are major public health concerns. Such Westernized eating patterns in adolescents increase the risk of diet-related chronic diseases later in life (Musaiger & Al-Mannai, 2016). These unhealthy behaviors are often reinforced by social networks, including family and friends, where peer influence can significantly impact dietary choices, leading to overweight and obesity (Aguirre, 2023).

Common barriers to healthy eating include time constraints, the availability of unhealthy snacks, and the convenience and low cost of high-calorie foods. Conversely, factors that support healthy eating include increased nutritional education, meal planning, involvement in food preparation, and regular physical activity. Parental influence and social pressures from peers can both positively and negatively affect individual eating habits (Sogari *et al.*, 2018).

Overweight and obesity result primarily from a sustained positive energy balance, driven by excessive energy intake and reduced physical activity. Risk factors such as frequent snacking, limited access to fresh produce, emotional eating, and sedentary lifestyles contribute to weight gain. These conditions increase the risk of cardiometabolic diseases, such as cardiovascular disease and type 2 diabetes mellitus, and have significant mental health implications due to stigmatization and social isolation (Moschonis *et al.*, 2023).

The rapid social and economic development has led to the widespread availability of fast food, contributing to excessive energy intake among adolescents. The shift toward unhealthy diets, characterized by low fruit and vegetable consumption and high intake of sugary drinks and fast food, directly impacts BMI and contributes to the obesity epidemic (Xie *et al.*, 2019).

3.3 The Relationship of Sedentary with the Incidence of Excessive Weight in Adolescents at SMA Negeri 07 Bengkulu City

The results in Table 3 demonstrate a significant relationship between sedentary activity and the incidence of excess weight in adolescents at SMA Negeri 07 Bengkulu City, with a p-value of 0.006, indicating statistical significance ($p < 0.05$). Among the 54 respondents, those with high sedentary activity (33.3%) were more likely to be overweight. In contrast, respondents with moderate sedentary activity exhibited a lower prevalence of excess weight, with 5 out of 14 not being overweight. Similarly, all 12 respondents with low sedentary activity maintained a non-overweight status. This correlation is evident from the sedentary questionnaire, which showed that students with high sedentary activity, averaging more than 5 hours per day, often spent time watching TV, videos, and using gadgets for social media. Such minimal physical activity increases the risk of obesity, as adolescents with high sedentary habits tend to have a body mass index (BMI) above normal limit.

Sedentary lifestyles have a detrimental impact on health and have become a significant societal concern. A sedentary lifestyle encompasses behaviors that occur while sitting or lying down, requiring very low energy expenditure, such as watching television, playing electronic games, and using computers or smartphones for leisure. The convenience of modern technology has led to a decline in physical activity, contributing to a sedentary lifestyle that can result in weight gain and obesity (Asyera *et al.*, 2021).

This study aligns with Pradifa's (2023) research, which found a significant relationship between nutritional status and sedentary behavior. The most common sedentary activities among adolescents were watching television, videos, and using computers or smartphones for pleasure. Previous studies have shown that spending 3-4 hours a day watching television increases the risk of obesity by 2.31 times. Eating while watching television further increases food intake and reduces energy expenditure, both of which contribute to obesity. Similarly, prolonged online gaming has been associated with low physical activity and a higher BMI, as it involves minimal movement (Pradifa & Kurniasari, 2023).

The findings are also consistent with Sofiany's (2021) research, which reported that a majority of adolescents (52.3%) engaged in high levels of sedentary behavior, exceeding 5 hours per day, primarily in the form of screen time activities. These activities, such as watching TV, videos, and using social media, require little energy expenditure, leading to the accumulation of energy intake as fat tissue and subsequently increasing the risk of excess weight (De Winter *et al.*, 2018).

In general, changes in the prevalence of overweight and obesity are driven by suboptimal diet and physical inactivity. However, recent evidence suggests that weight gain may also be influenced by lifestyle factors such as increased screen time and reduced physical activity. Activities like sleep and cognitive tasks, which have minimal impact on energy expenditure, can be considered sedentary (Hardy & Okeley, 2007).

Peers can play a crucial role in increasing physical activity among adolescents by providing motivation. However, overweight adolescents may struggle to engage in physical activity if they face difficulties adapting to peer activities. In such cases, their weight loss may depend primarily on adherence to dietary recommendations, which might not be sufficient for significant long-term weight loss (Bijukumar & Mathew, 2018). Replacing sedentary time with light physical activity can reduce the risk of cardiometabolic diseases and mortality (Collings *et al.*, 2022). The primary causes of obesity are an energy imbalance between calories consumed and calories expended, with insufficient physical activity to offset the caloric intake being a major contributing factor (Dos Santos *et al.*, 2019).

3.4 Relationship between Peer Influence and the Incidence of Excessive Weight in Adolescents at SMA Negeri 07 Bengkulu City

The results presented in the table indicate a significant relationship between night eating habits and excess weight in adolescents at SMA Negeri 07 Bengkulu City, with a p-value of 0.004, demonstrating statistical significance ($p < 0.05$). This study reveals that of the 54 respondents influenced by their peers, 24 (44.4%) were found to be overweight. In contrast, among the 21 respondents who were less influenced by peers, 14 (26%) maintained a normal weight. The influence of peers appears to play a critical role, as high school students who are more socially connected with their friends tend to adopt similar eating and snacking habits, both in and out of school. This often includes a tendency to follow peer trends, such as consuming popular, high-calorie foods. Peer influence may also manifest in the frequent consumption of high-fat or sugary foods, especially during social gatherings where fast food is commonly ordered, thereby impacting overall eating habits. Adolescents are particularly prone to mimicking their friends' eating behaviors to strengthen social bonds, which can lead to unhealthy eating patterns, such as increased consumption of junk food or sugary drinks (Yarah & Benita, 2021).

The statistical analysis conducted in this study at SMA Negeri 07 Bengkulu City confirms a significant relationship between peer influence and excess weight, as reflected in the peer influence questionnaire scores, where the average adolescent scored above 60% on peer influence metrics.

These findings are consistent with Sartika's (2021) research, which also identified a significant relationship between peer influence and nutritional status in adolescents, with a p-value of 0.000. Sartika's study suggests that the stronger the influence of peers, the higher the BMI-for-age (IMT/U), indicating that peer groups play a crucial role in shaping eating patterns that can affect nutritional status (Sartika *et al.*, 2021).

During adolescence, the transition toward greater independence leads to changes in interests, behaviors, and routines. One notable change is the increased time spent with peers outside the home, often involving shared meals. These social eating occasions, whether at school or elsewhere, can lead to the adoption of unhealthy food choices, contributing to weight gain (Sartika *et al.*, 2021).

Similarly, Fatmawati's (2021) research on junior high school students found a significant relationship between peer influence and overweight status, with a p-value of 0.028. The study suggests that peer influence contributes to overweight status in adolescents, as they tend to spend more time with their peers, which affects their food consumption habits and, consequently, their nutritional status (Fatmawati & Wahyudi, 2021).

Obesity development is influenced by various factors, including social networks, shared environmental factors, and social influences like peer pressure to consume unhealthy foods (Micha, 2020). Adolescents often fail to meet recommended dietary guidelines, opting instead for sugary drinks, fast food, and limited intake of fruits and vegetables. Moreover, they are likely to reinforce unhealthy eating habits among their friends (Anderson *et al.*, 2016).

Peer influence may also differ by gender, as societal expectations about body image vary. For instance, while thinness is often emphasized for females, muscularity is idealized for males. Consequently, peer influence may have different effects on weight status between genders, with women possibly experiencing more social and cultural pressure to manage their weight (Li & Guo, 2021).

Overall, weight status is shaped by a variety of factors, including social influences from family and friends. These influences play a crucial role in determining eating and exercise behaviors during childhood and adolescence. Given the strong social bonds during adolescence, peer relationships can significantly impact health behaviors and weight status (Pimbo & Valente, 2022).

4. Conclusions

The results of this study indicate that a significant proportion of respondents exhibit the habit of consuming excessive food during dinner, likely due to the common tendency among adolescents to stay up late and consume fast food at night. Field interviews reveal that nearly all respondents engage in high levels of sedentary activity, with a considerable amount of time spent on social media, playing video games, and watching videos on platforms like YouTube. Additionally, the data suggest that peer influence plays a substantial role in shaping adolescents' eating and snacking habits, particularly when it comes to consuming foods that are currently popular. This study identifies a significant relationship between these behavioral patterns and the prevalence of excess weight among the adolescent population.

5. References

Aguirre, M. de J. X., Drumond Andrade, F. C., Aguirre, M. A. C., Justino, J. R., & Maciel, B. L. L. (2023). Social network, food patterns, physical activity, and associations with overweight and obesity in adolescents from a school in rural Brazil. *Nutrients*, 15.

Anderson Steeves, E., Jones-Smith, J., Hopkins, L., & Gittelsohn, J. (2016). Perceived social support from friends and parents for eating behavior and diet quality among low-income, urban, minority youth. *Journal of Nutrition Education and Behavior*, 48, 304-310.

Asyera br Sinulingga, P., Sri Andayani, L., & Lubis, Z. (2021). Relationship between knowledge and sedentary behavior with obesity risk in adolescents in Medan City. *Journal of Health Science*, 2, 655-661.

Bijukumar, D. R., McGeehan, C., & Mathew, M. T. (2018). Influence of peers and friends on overweight/obese youths' physical activity. *Physiological Behavior*, 176, 139-148.

Bokau, M. S., Telew, A. A. J., & Pajung, C. B. (2023). The relationship between sedentary behavior and obesity in students at GMIM Koka Elementary School. *Lentera Multidisciplinary Studies*, 1, 155-164.

Chaput, J. P., & Tremblay, A. (2020). Obesity and physical inactivity: the relevance of reconsidering the notion of sedentariness. *Obesity Facts*, 2, 249-254.

Collings, P. J., et al. (2022). Device-measured physical activity and sedentary time in a national sample of Luxembourg residents: The ORISCAV-LUX 2 study. *International Journal of Behavioral Nutrition and Physical Activity*, 19, 1-15.

Dos Santos, V. O. A., et al. (2019). Effects of high-intensity interval and moderate-intensity continuous exercise on physical activity and sedentary behavior levels in inactive obese males: A crossover trial. *Journal of Sports Science and Medicine*, 18, 390-398.

Evan, W., Wiyono, J., & Candrawati, E. (2017). The relationship between diet and the incidence of obesity in students at Tribhuwana Tunggadewi University Malang. *Nursing News (Meriden)*, 2, 708-717.

Fatmawati, I., & Wahyudi, C. T. (2021). Influence of peers with overweight status of adolescents in Junior High School in Pamulang District. Journal of Ilm. Health. Masy. Media Commun. Community Health. Society, 13, 41-45.

Firmanurochim, W., Romadhon, A., Nurhidayati, I. N., Dasuki, M. & Shoim, M. The relationship between night eating habits and stress levels with the incidence of obesity in adolescent girls. *Univ. Muhammadiyah Surakarta 290-298* (2021).

Gomes, T. N. atach., et al. (2014). Overweight and obesity in Portuguese children: Prevalence and correlates. *International Journal of Environmental Research and Public Health*, 11, 11398-11417.

Hamalding, H., Risna, R., & Susanti, S. R. (2019). Relationship between lifestyle and overweight and obesity in adolescent girls at SMA Negeri 11 Makassar. *Journal of Community Health Society*, 1, 1-6.

Hardy, L. L., Booth, M. L., & Okely, A. D. (2007). The reliability of the Adolescent Sedentary Activity Questionnaire (ASAQ). *Preventive Medicine (Baltimore)*, 45, 71-74.

Hastuti, P. (2022). Obesity and the role of genetic polymorphism: A review of genes as the risk of obesity. *Journal of Medical Science (Medical Science Periodical)*, 54, 181-201.

Li, Y., & Guo, G. (2021). Peer influence on obesity: Evidence from a natural experiment of a gene-environment interaction. *Social Science Research*, 93.

Li, Y., & Guo, G. (2021). Peer influence on obesity: Evidence from a natural experiment of a gene-environment interaction. Social Science Research, 93.

Lisetyaningrum, I., Pujasari, H., & Kuntarti. (2021). A cross-sectional analysis of snacking habits, eating habits, physical activity, and indicators of obesity among high school students in Jakarta, *Indonesia. Journal of Public Health Research*, 10.

Micha, R. (2020). Social influences on obesity: current knowledge, emerging methods, and directions for future research and practice. *Physiological Behavior*, 176, 100-106.

Moschonis, G., & Trakman, G. L. (2023). Overweight and Obesity: The Interplay of Eating Habits and Physical Activity.

Musaiger, A. O., Nabag, F. O., & Al-Mannai, M. (2016). Obesity, Dietary Habits, and Sedentary Behaviors among Adolescents in Sudan. *Food and Nutrition Bulletin*, 37, 65-72.

Piombo, S. E., Huh, J., & Valente, T. W. (2022). Adolescent body mass index and exposure to peers with overweight and obesity: A structural equation model approach to longitudinal network data. *Child Obesity*, 18, 445-453.

Pradifa, H., Fikri, A. M., & Kurniasari, R. (2023). The Relationship between Sedentary Lifestyle and Adolescent Nutritional Status during the Covid-19 Pandemic. Journal of Health Science Society, 12, 259-263.

Sartika, W., Herlina, S., Qomariah, S., & Juwita, S. (2021). Peers Affect the Incidence of Overnutrition in Adolescents in the Covid 19 Pandemic Era. *Midwifery Journal*, 1, 2746-7953.

Sogari, G., Velez-Argumedo, C., Gómez, M. I., & Mora, C. (2018). College students and eating habits: A study using an ecological model for healthy behavior. *Nutrients*, 10, 1-16.

Telisa, I., Hartati, Y., & Haripamilu, A. D. (2020). Risk Factors for Obesity in High School Adolescents. *Faletehan Health Journal*, 7, 124-131.

Xie, Q., et al. (2019). Effect of eating habits on obesity in adolescents: a study among Chinese college students. *Journal of International Medical Research*, 48.

Yarah, S., & Benita, M. (2021). The Relationship between Junk Food Consumption Information and the Role of Peers with the Incidence of Obesity in Adolescent Girls at Abulyatama High School, Aceh Besar Regency. *Journal of Aceh Medicine*, 5, 87-94.