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The Relationship Between Fast Food Consumption and the Incidence of Prediabetes in Adolescents at SMA Negeri 1 Limboto

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ABSTRACT

Prediabetes is a condition before the occurrence of diabetes mellitus with blood sugar levels above the normal range but not yet meeting the requirements of diabetes mellitus which is a very serious global health problem. Prediabetes has attacked many young adults, adolescents to young children. This study aims to determine the relationship between fast food consumption and the incidence of prediabetes in adolescents at SMA Negeri 1 Limboto. The research design used in this study is a quantitative research with a cross sectional approach. The sample in this study was 203 respondents using the probability sampling technique using the Spearman Rank test. The results showed that fast food consumption in adolescents at SMA Negeri 1 Limboto was found in the category of rarely consuming fast food as many as 139 respondents and the incidence of prediabetes in the normal category (not prediabetes) of 184 respondents (90.6%). The results of the bivariate analysis showed that there were 7 respondents who rarely consumed fast food experienced prediabetes and 12 respondents who often consumed fast food experienced prediabetes with the results of the Spearman Rank test showing that there was a relationship between fast food consumption and the incidence of prediabetes in adolescents at SMA Negeri 1 Limboto with p value = 0.002 < 0.05. The advice from this study is that adolescents can maintain a healthy diet and lifestyle in order to prevent prediabetes.

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INTRODUCTION

Prediabetes is a condition before the occurrence of diabetes mellitus in which glucose levels in the blood are above the normal range but do not meet the requirements of diabetes mellitus (Meautya 2024). Research by Machmud et al. (2022), people with prediabetes are often found in people with family members who suffer from diabetes, metabolic syndrome, hypertension, and obesity. Prediabetes is a reversible condition. People with prediabetes have a very high risk of becoming type 2 diabetes mellitus. Prediabetes is considered the early phase of diabetes.

Based on the International Diabetes Federation (IDF) diabetes Atlas in 2019, there are several countries with the highest number of prediabetes patients. Indonesia occupies the third position with the most prediabetes cases with 27.7 million people, where the first position is occupied by China with 48.6 million people, second by the United States with 36.8 million people. From the results of the 2023 Indonesian Health Survey, there are three provinces with prediabetes prevalence based on a doctor's diagnosis at the age of >15 years, including DKI Jakarta (3.9%), Jogjakarta (3.6%), and East Kalimantan (3.1%).

Data on Prediabetes patients based on data from the Gorontalo Provincial Health Office, prediabetes cases in adolescents aged 10-17 years in 2024 in the period from January to September amounted to 872

cases diagnosed with prediabetes. In addition, based on data in the 2024 January-August period, Gorontalo Regency is ranked first with 23,146 diagnosed prediabetes cases and Limboto District is the highest in Gorontalo Regency with the highest number of patients at all prediabetes ages at 4,396 cases and for adolescents as many as 143 cases.

Prediabetes or better known as "adult one set diabetes" has now attacked many young adults, adolescents and young children. These variations can affect how much of a chance you get type 2 diabetes mellitus. However, this condition can be avoided by identifying from the beginning the blood glucose level of a person who has a risk factor for diabetes so that they can immediately take appropriate action (Purba et al., 2021).

According to Putra et al. (2021), the prevalence of adolescent prediabetes was found at the age of 15-17 years of age at 4.9% in Yogyakarta. Symptoms of prediabetes and type 2 diabetes mellitus have begun to be seen from the age of ≥15 years. The Ministry of Health explained that the age of ≥15 years is included in the target of preventing non-communicable diseases (Ministry of Health, 2021). In general, adolescence at 10-18 years old is a transitional phase from children to adults which is characterized by puberty. Adolescence is currently the most vulnerable group to prediabetes.

One of the many hormonal changes that can result in very important changes in growth and development during the adolescent phase is social changes that have various risk factors that can result in conditions of social change. The social changes that teenagers are experiencing today make them spend a lot of time with their peers, try new things, and always try to keep up with the trends that are happening. These behavioral changes, such as the behavior of consuming ready-to-eat food (fast food) which will affect the health of adolescents (Setianingrum, 2024).

The more often you consume fast food, the greater the chance of prediabetes. Fast food is a type of food that is easy to serve, practical, easy to package, and processed in a simple way (Zogara et al., 2022). Referring to the Ministry of Health, food categories at risk of prediabetes include sweet, salty, and fatty foods/drinks, burnt foods, processed meat foods with preservatives, flavorings, carbonated drinks, and instant foods (Fitriani, 2022).

The results of the initial observation were held on October 27, 2024 at SMA Negeri 1 Limboto. Through interviews with several students, it was found that students often buy fast food that is around their school. The results of interviews with 10 respondents said that they did not know that consuming fast food excessively and continuously was included in the factors that occurred in prediabetes. It was also found that all respondents totaling 10 students often consumed food around their school in the form of pop ice, instant noodles, fried foods, and so on. 6 respondents preferred pop ice, ice cream, meatballs, and fried foods that were consumed >1x/day, 3 respondents liked processed sausages, sweet foods and drinks, siomay consumed >1x/day, and 1 person was found to consume instant noodles >4x/week

Based on the above background, the researcher is interested in finding out the relationship between fast food consumption and the incidence of prediabetes in adolescents at SMA Negeri 1 Limboto.

RESEARCH METHODS

This research was carried out at SMA Negeri 1 Limboto on January 9-January 22, 2025. This research is a quantitative research. This study uses descriptive correlative with cross sectional design. The sample used in this study amounted to 203 samples using probability sampling techniques. The instruments used in this study were a demographic data questionnaire that included the respondent's initials, age, gender, living status, and socioeconomic characteristics of the respondent parents as well as the family history of people with diabetes mellitus, an observation sheet that included the respondent's initials, the respondent's blood sugar results, and a fast food frequency questionnaire listing 10 types of foods that included fast food.

RESEARCH RESULTS

Respondent Characteristics

Frequency Distribution by Age

In this study, the distribution of respondents based on age is as follows:

Table 1 Distribution of Respondent Frequencies by Age of Students

Yes	Age	(n)	(%)
1.	Middle Teens (13-16 years old) Late Teens (17-21 Years)	149	73,4
2.		54	26,6
	Total	203	100%

Based on table 1 above, it was found that of the 203 respondents studied, the majority of respondents were in their middle teens (13-16 years) as many as 149 respondents (73.4%)

Frequency Distribution by Gender

In this study, the distribution of respondents by gender is as follows:

Table 2 Frequency Distribution of Respondents by Gender

Yes	Gender	(n)	(%)
1.	Man	82	40,4
2.	Woman	121	59,6
Total		203	100%

Based on table 2 above, it was found that of the 203 respondents studied, 121 respondents (59.6%) were dominated by female respondents

Frequency Distribution by Residence Status

In this study, the distribution of respondents based on residence status is as follows:

Table 3 Distribution of Respondent Frequencies by Residence Status

Yes	Residency Status	(n)	(%)
1.	Parents	183	90,15
2.	Guardian	13	6,40
3.	Stay Alone	7	3,45
Total		203	100%

Based on table 3 above, it was found that of the 203 respondents studied, most of the respondents lived with their parents, namely 183 respondents (90.15%).

Frequency Distribution by Parent's Last Education

In this study, the distribution of respondents based on the last education of parents is as follows:

Table 4. Distribution of Respondent Frequencies by Parents' Last Education

Yes	Education Last	(n)	(%)
1.	SD	7	3,45
2.	JUNIOR	15	7,39
3.	High School/Vocational School	91	44,83
4.	College	90	44,33
Total		203	100%

Based on table 4, it was found that of the 203 respondents whose parents were dominated by high school/vocational school equivalent, 91 respondents (44.83%).

Frequency Distribution by Parental Income

In this study, the distribution of respondents based on the last education of parents is as follows:

Table 5 Distribution of Respondent Frequencies by Parent/Guardian Income

Yes	Income	(n)	(%)
1.	Above UMP	118	58,1
2.	Under UMP	85	41,9
Total		203	100%

Based on table 5, it was found that out of 203 respondents, the majority of respondents' parents' income was above the UMP. Currently, the UMP for Gorontalo Province is Rp. 3,221,731. Judging from the income of the parents, the income above the UMP was 118 respondents (58.1%).

Frequency Distribution based on Family History of Diabetic Mellitus

In this study, the distribution of respondents based on the family history of people with diabetes mellitus is as follows:

Table 6 Frequency Distribution by Family History of Diabetic Mellitus

Yes	**Family History DM**	**(n)**	**(%)**
1.	Exist	72	35,5
2.	None	131	64,5
Total		203	100%

Univariate Analysis

Frequency Distribution based on Fast Food Consumption

In this study, the distribution of respondents based on fast food consumption is as follows:

Table 7 Frequency Distribution of Respondents by Fast Food Consumption

Yes	**Frequency of Consumption *Fast Food***	**(n)**	**(%)**
1.	Infrequently	139	68,5
2.	Often	64	31,5
Total		203	100%

Based on table 7 above, it can be seen that out of 203 respondents, the majority of respondents rarely consume fast food. A total of 139 respondents (68.5%) rarely consumed fast food and as many as 64 respondents (31.5%) often consumed fast food.

Frequency Distribution by Prediabetes Incidence

In this study, the distribution of respondents based on the history of prediabetes incidence is as follows:

Table 8 Distribution of Respondent Frequencies by Prediabetes Incidence

Yes	**Incidence of Prediabetes**	**(n)**	**(%)**
1.	Prediabetes	19	9,4
2.	Usual	184	90,6
Total		203	100%

Based on table 8 obtained from 203 respondents, more respondents were 184 respondents (90.6%) and prediabetes was 19 respondents (9.4%).

Bivariate Analysis

In this study, the relationship between fast food consumption and the incidence of prediabetes is as follows:

Table 9 Relationship between Fast Food Consumption and Prediabetes Incidence in Adolescents at SMA Negeri 1 Limboto

Yes	**Fast Food *Consumption***	**Incidence of Prediabetes**				**Total**	
		Prediabetes		Usual			
		N	%	N	%	N	%
1.	Infrequently	7	5	132	95	139	68,5
2.	Often	12	18,8	52	81,3	64	31,5
Total		19	23,8	184	176,3	203	100
Spearman *Rank Test Results p value* 0.002 < 0.05 *Correlation Coefficient* -0.219							

Based on table 9, it can be seen that of the 139 respondents (68.5%) who rarely consume fast food , 7 respondents (5%) had prediabetes incidence results in the prediabetes category and 132 respondents (95%) in the normal category. Meanwhile, of the 64 respondents, 12 respondents (18.8%) were found to have prediabetes in the prediabetes category and 52 respondents (81.3%) in the normal category.

Based on the Spearman Rank statistical test, the p value = 0.002 was obtained. So 0.002 < 0.05 stated that there was a significant relationship between fast food consumption and the incidence of prediabetes in adolescents at SMA Negeri 1 Limboto.

DISCUSSION

Fast Food Consumption in Adolescents at SMA Negeri 1 Limboto

The results of the study on fast food consumption in adolescents at SMA Negeri 1 Limboto showed that the majority of respondents rarely consumed fast food as many as 139 respondents (68.5%). This is seen from the respondents' questionnaire answers which show that the frequency of rarely consuming fast food is the most in sausage snacks with a total of 5 respondents (2.5%).

According to Fairuz (2024), sausages are one of the processed meats. Sausages are high in fat and salt. The excessive salt content contained in this sausage is risky to the body. The results of this study are in line with Tijow's (2024) research which showed that respondents rarely consumed fast food as many as 38 respondents (56.7%) out of 76 respondents. This is because respondents have awareness toconsume nutritious food and some have financial limitations because the price of sausages is quite expensive for teenagers.

In addition, judging from the characteristics of respondents based on gender, it was dominated by women as many as 121 respondents (59.6%) and men as many as 82 respondents (40.4%), with the result that they rarely consumed fast food mostly by women with a total of 87 respondents (62.5%) compared to men as many as 52 respondents (37.4%). These results show that women tend to be more numerous in this study. The thing that affects women who rarely consume fast food is because from the results of the study it was found that most of the respondents have been provided with food cooked at home by their parents so that they rarely consume snacks in the canteen.

This is in line with the research of Setianingrum (2024), in which 85 respondents (94.4%) were dominated by women. In addition, judging from the age of the respondents, the majority of whom were middle adolescents (13-16 years old) as many as 149 respondents (73.4%) with the results of the study that rarely consumed fast food as many as 101 respondents (72.6%). According to Rosalini (2024), adolescence is a vulnerable age in terms of nutrition because adolescents need high nutrients to support physical growth and changes in lifestyle and eating habits.

Judging from the living status, respondents who rarely consume fast food are the majority of respondents living with their parents as many as 126 respondents (90.64%) out of 183 respondents (90.15%) and come from families with the last education of parents in high school/vocational school as many as 69 respondents (49.64%) with income above UMP as many as 73 respondents (52.51%). These results show that even though parents' income is above UMP, infrequent fast food consumption is influenced by parents' awareness of their children's nutrition by cooking their own meals for their children to eat at school.

In Manik (2024), explaining that parents' education level can affect the food consumed by their children, especially fast food, parents can provide information and choose healthy food for their children. This is because parents are role models for their children in choosing healthy food. The higher the education of parents, the better the knowledge about nutrition. This is in line with Zogara's research (2022), which shows that high education levels are more dominant as many as 206 respondents (59%) compared to low education.

However, a small percentage of respondents who often consume fast food as many as 64 respondents (31.5%) with research results of women as many as 34 respondents often consume fast food and men as many as 30 respondents. This is seen from the questionnaire answers which show that the frequency of frequent consumption of fast food is found in fried snacks as many as 143 respondents (70.4%) with a frequency of consumption >1x/day (always).

According to Rahma (2021), fast food is very affordable, fast in its presentation, stimulates the appetite, but has high fat, sugar, and salt and is low in fiber and vitamins, contains high calories and oil content which if consumed in excess will disrupt the metabolic system in the body and contribute to prediabetes. Where fried foods fall into this category. Judging from the socio-economic of his parents, even though they have a high income and education background, the type of food that is often consumed is fried food. The factor that affects the high frequency of consumption is because of his family's finances whose income is above the UMP and the influence of the social environment such as good taste and peer influence are reasons for consuming fast food.

In Andriani's (2023) research, invitations from friends can be the cause of high fast food consumption in adolescents. Even though the teenager understands the dangers of fast food for the body. This is in line

with the research of Yuandari (2024), the results of his research were obtained that the majority of the frequency of fast food consumption was the majority of respondents rarely consume fast food, namely 31 respondents (59.6%). This is due to the availability of fast food in the school environment, both in the school canteen and around the school.

Incidence of Prediabetes in Adolescents at SMA Negeri 1 Limboto

The results of the study on the incidence of prediabetes in adolescents at SMA Negeri 1 Limboto showed the results of normal blood sugar levels, namely 184 respondents (90.6%). Respondents with blood sugar <140 mg/dl were said to be normal (not prediabetic). In Basir & Arsad (2025) research, it was said that prediabetes is a condition of blood sugar in the body that has increased but has not yet reached diabetes mellitus. If not treated properly, it will develop into type 2 diabetes mellitus. Based on the PERKENI criteria in Subiyanto (2019), it is explained that there are 3 tests that can be done to enter the prediabetes criteria, namely Fasting Blood Sugar (GDP) 100-125 mg/dl, Blood Sugar 2 hours Post Prandial or Oral Glucose Tolerance Test (TTOG) 140-199 mg/dl, and HbA1c examination 5.7-6.4%. The results of this study are in line with the research conducted by Amila (2024), the results of the study were dominated by respondents with normal blood sugar results, namely 74 respondents (88.10%).

In addition, judging from the characteristics of respondents based on age, the majority of respondents were middle adolescents (13-16 years old), namely 149 respondents (73.4%) with normal results of 140 respondents in middle adolescents (76%) and 44 respondents in late adolescents (24%). According to Widianingrum's theory (2024), age is one of the factors that is closely related to the risk of diabetes mellitus. This may be due to factors such as changes in diet, as well as lifestyles that are far from healthy with age.

Based on gender, it can be seen that the majority of female respondents with a total of 121 respondents (63.1%) with a female normal blood sugar result of 109 respondents (59.2%). In the theory, Liberty (2023) explains that women have a 2,777 times greater risk of developing diabetes than men. This is because women have a higher body fat composition compared to men and physically women have a greater chance of increasing body mass index, which results in inhibited the transport of blood sugar into cells. This is in line with the Setianigrum (2024) study, which found that the age results in the study were more in late adolescence as many as 51 respondents (56.7%) and based on gender, more women as many as 85 respondents (94.4%).

However, a small percentage of respondents were found with prediabetes as many as 19 respondents (9.4%) with a total of 12 female respondents (63.1%) and 7 male respondents (36.8%). Prediabetes blood sugar results in this study were influenced by genetic factors and fast food consumption. In the results of the research on family history of people with diabetes mellitus, the results were obtained that there were 7 respondents (36.8%) who were prediabetic with a family history of diabetes mellitus. These results suggest that although the number of respondents with prediabetes is small, the presence of a family history of diabetes mellitus can be a significant risk factor for prediabetes.

This is in line with Liberty's (2023) theory explaining that parents who suffer from diabetes mellitus will tend to have the same offspring as well. This can happen because genetic factors have a carrier gene that can cause other families to suffer from diabetes mellitus.

The Relationship between Fast Food Consumption and the Incidence of Prediabetes in Adolescents at SMA Negeri 1 Limboto

The results of the bivariate analysis using the Rank Spearman test had a significance value of 0.002 (p value <0.05) with a correlation coefficient of -0.219 which means that there was a negative and weak relationship between fast food consumption and the incidence of prediabetes in adolescents at SMA Negeri 1 Limoto, so it was rejected and accepted. The results of this study found that out of 139 respondents with H_(0) H_1infrequent fast food consumption, there were 7 respondents (5%) who had prediabetes. Meanwhile, of the 64 respondents who consumed fast food frequently, there were 12 respondents (18.8%) with prediabetes.

A small part of the results of the study were obtained that they rarely consumed fast food and prediabetic blood sugar results as many as 7 respondents (5%). This is evidenced by the results of respondents who consume french fries and instant noodles at a frequency of 4-6x/week and for respondents who have prediabetes as evidenced by the results of blood sugar checks of 140-199 mg/dl.

From Kasidi's (2024) research, fast food is a food that is low in fiber, high in calories, fat, and carbohydrates which when consumed can result in an imbalance between nutrient intake and energy expenditure. Fast food is one of the risks of malnutrition and the cause of obesity that results in prediabetes. Excessive consumption of fast food almost every day can result in various health problems.

From the results of the study, 132 respondents (95%) rarely consumed fast food and normal blood sugar results. This is evidenced by the results of the questionnaire and the results of blood sugar checks on the respondents. That respondents were categorized as rare because respondents only consumed sausages, ice cream, and donuts in a frequency of 1x/year and respondents did not have prediabetes as evidenced by the

results of blood sugar tests <140 mg/dl. These results show that a correct and healthy diet, generally from respondents who rarely consume fast food and take part in controlling blood sugar levels.

Consumption of fast food that is slightly related to good nutritional intake such as eating foods that contain fiber, vitamins, protein, and minerals. In addition, according to Manik (2024), parents play an active role in providing nutritional intake and supervising their children in choosing food, so that children have healthy nutrition. Where parents can provide information about healthy food to their children, because parents are role models for their children in food selection.

The results of the study were that 12 respondents (18.8%) often consumed fast food and prediabetes. From the results of the questionnaire, it was explained that respondents often consumed the most fast food in fried snacks, candy, siomay, and meatballs with a consumption frequency of >1x/day. According to Rahma (2021), fast food is very affordable, fast in its presentation, stimulates the appetite, but has high fat, sugar, and salt and is low in fiber and vitamins, contains high calories and oil content which if consumed in excess will disrupt the metabolic system in the body and contribute to prediabetes.

This is in line with research conducted by Setianingrum (2024), which showed the results of 32 respondents who often consumed fast food and prediabetes (35.5%). This is because teenagers enter the royal age so that it leads to consuming various kinds of foods without looking at the low nutritional content, containing artificial dyes, preservatives, and sweeteners as well as flavor enhancers that over time can trigger degenerative diseases such as prediabetes. The results of the statistical test with chi-square can be concluded that there is a relationship between fast food consumption patterns and the incidence of prediabetes in adolescents with a p value = 0.040.

The results of the study also found that 52 respondents (81.3%) who often consumed fast food and normal results. This can be seen from the questionnaire answers which show that the frequency of frequent fast food consumption is in the types of meatballs, siomay, pop ice, and sweets with a frequency of 1x/day and is evidenced by the results of blood sugar checks <140 mg/dl. According to Octaviani & Safitriani (2022), fast food can be classified as food that is very popular with the wider community, ranging from children to the elderly, both snacks and main foods. Fast food is also known as junk food. According to the WHO in 2016 junk food contains large amounts of fat, salt, sugar, calories, vitamins, minerals and fiber. Moreover, fast food has an unbalanced nutritional content due to its uncontrolled cooking process.

This is in line with the research of Widhiasrini (2018), showing the results of 24 respondents who often consume fast food and normal blood sugar results (77.4%). Frequent consumption of fast food in both adolescents and adults with a frequency of more than 2 times a week, can increase the risk of developing prediabetes. This is because insulin resistance can trigger increased blood sugar levels caused by decreased glucose absorption in body cells, so that glucose accumulates in the blood.

CONCLUSION

Fast food consumption among adolescents at SMA Negeri 1 Limboto was found in the category of rarely consuming fast food as many as 139 respondents (68.5%) and with the frequent category as many as 64 respondents (31.5%)

The incidence of prediabetes in adolescents at SMA Negeri 1 Limboto in the prediabetes category was 19 respondents (9.4%) and in the normal category 184 respondents (90.6%)

Based on the Spearman Rank test, the results were obtained that there was a relationship between fast food consumption and the incidence of prediabetes in adolescents at SMA Negeri 1 Limboto with a p value of 0.002 (p value <0.05) and a Correlation Coefficient value = -0.219 which showed a weak negative between the two variables. This means indicating an opposite relationship between the variable of fast food consumption and the variable of prediabetes incidence.

SUGGESTION

Based on research that has been conducted by researchers, most of the respondents have normal blood sugar levels. However, some respondents with fast food consumption >1x/day in several types of fast food. It is recommended that schools can limit canteens to sell fast food, canteens can sell a variety of healthy foods and can cooperate with the health authorities, namely health centers to conduct periodic sugar checks. Schools can also do healthy gymnastics or other physical activities that can prevent prediabetes in their students.

It is hoped that students can maintain a healthy diet and lifestyle in order to prevent prediabetes and other diseases.

In this study, it is hoped that the next researcher will conduct influence research by paying attention to the factors that affect fast food and prediabetes, and can measure blood sugar using a laboratory.

REFERENCES

Activity) to Lower Blood Sugar Levels in Prediabetic Patients. Sambulu Gana: Journal of Community Service, 4(1), 1-6.

Bumulo, F., (2024) The Relationship between Junk Food Consumption and the Incidence of Obesity in Elementary School-Age Children at SDN 7 Tilongkabila, Bone Bolango Regency

Bohara, S. S., Thapa, K., Bhatt, L. D., Dhami, S. S., & Wagle, S. (2021). Determinants of Junk Food Comsumption Among Adolescents in Pokhara Valley, Nepal. Frontiers in Nutrition, 8(April), 1-9. https://doi.org/10.3389/fnut.2021.644650

Datau, A. R. A., (2020) Analysis of Fast Food Consumption Habits and the Amount of Pocket Money on the Incidence of Obesity in Students of SMA Negeri 1 Gorontalo

Farahdiba, Amalia, and Sofiyahtrii (2023) Textbooks: Adolescent Reproductive Health. Makassar: Guepedia

Fitriani, N. S., Wurjanto, A., & Yuliawati, S. (2022) The Relationship between Knowledge Level and Influence of Social Media and Food Consumption Behavior at Risk of Diabetes Mellitus in Diponegoro University Students. Journal of Community Health Epidemiology, 7(1), 404-410

Haskas, Y., & Abrar, E. A. (2023). The picture of type 2 diabetes mellitus disparity is reviewed from sociodemographic factors. JIMPK: Student Scientific Journal & Nursing Research, 3(6), 263-269.

Haque, I.T.El. (2024) Strengthening Legal Protection for School Children's Health for Healthy Snack Food with Justice (N. Duniawati (ed)). CV. Adanu Abimata

Hardani. (2020). (Print I, March 2020). CV. Pustaka Ilmu Group Yogyakarta

Isroani, F., Mahmud, M. P. S., Qurtubi, P., Pebriana, M., Karim, M. R., & Yuwansyah, M. P. Y. (2023) Developmental Psychology (A. Rahmawati (ed)). Medical Scholar Partners

Juliana, S., Marpaung, P. H., and Lestari, G. (2021) Manograph; Socio-Economic Conditions of Sinabung Refugee Farmers. Cipta Media Nusantara

Ministry of Health of the Republic of Indonesia. 2021. Indonesian Health Profile 2020. Jakarta: Ministry of Health of the Republic of Indonesia.

Kasidi, D. K., & Harwanto, F. (2024). The Relationship between Fast Food Consumption and the Incidence of Obesity in Adolescents in Indonesia: Literature Review. Prepotif: Journal of Public Health, 8(2), 4313-4323.

Kumar, P., Srivastava, S., Mishra, P.S., & Mooss, E. T. K. (2021) Prevalence of prediabetes/type 2 diabetes among adolescents (10-19 years) and its association with different measures of overweight/obesity in India: a gendered perspective. BMC Endocrine Disorders, 21(1), 1-12. https://doi.org/10.1186/s12902-021-00802-w

Liberty, I. A., Septadina, I. S., Pariyana, Maharani, D. (2022) A Study of Prediabetes Risk Factors in Urban Communities without a Family History of Type 2 Diabetes. Title: Growing Up in Madagascar

Machmud, R. F., Elliyanti, A. S., Decroli, E., & Yerizel, E. (2022). From Gen to Public Health. CV. Bintang Semesta Media.

Manik, T. P. (2024). Overview of Socio-Economy and Fast Food Consumption in Obese Adolescents at SMA Negeri 5 Pekanbaru (Doctoral dissertation, Polytechnic of the Ministry of Health, Riau).

Meautya, S., & Alvira, M. (2024). Article overview. Journal of Medika Nusantara, 2(3), 210–217.

Mumena, W. A., Ateek, A. A., Alamri, R. K., Alobaid, S. A., Alshallali, S. H., Afifi, S. Y., Aljohani, G. A., & Kutbi, H. A. (2022). Fast-Food Consumption, Dietary Quality, and Dietary Intake of Adolescents in Saudi Arabia. International Journal of Environmental Research and Public Health, 19(22). https://doi.org/10.3390/ijerph192215083

Mona, D., Suryani, I., & Gunawan (2023) Socioeconomic Status of Parents as a Risk Factor for Early Childhood Caries. Indramayu: Adanu Abimata

Nursalam (2020) Nursing Science Research Methodology (P.P. Lestari (ed.); Edition 5). Salemba Medika

Octaviani, Z. A., Safitriani, I. (2022). Factors related to fast food consumption behavior in high school students. Health Bulletin: Scientific Publications in the Health Sector, 6(1), 121–137.

Pangestu, F. D., Agustina, V., & Nugroho, K. P. A. (2022). Parenting, Nutritional Status, Nutrient Intake and Its Relationship with the Incidence of Overweight in Satya Wacana Salatiga Christian Elementary School Children. Amerta Nutrition,5(3)

PERKENI (2019). Guidelines for the Management and Prevention of Type 2 Diabetes Mellitus in Indonesia 2019. Indonesian Endocrinology Society

Putri, A., Anggraini, D., et al (2023). Overview of Prediabetes Risk Factor Control Behavior in Students in Senior High School. Malahayati Health Student Journal, 3(9), 2597-2604. Doi: https://doi.org/10.33024/mahesa.v3i9.10835

Qomariah, S., Herlina, S., Sartika, W., & Juwita, S. (2022). The Effect of Eating Frequency on the Incidence of Overnutrition in Adolescents in the Covid-19 Pandemic Era in Pekanbaru. Journal Center of Research Publication in Midwifery and Nursing, 6(1), 25–29. https://doi.org/10.36474/caring.v6i1.211

Ratnasari, D. (2022) 'The Relationship between Family Support and Diabetes Diet Adherence in Type 2

Diabetes Mellitus Patients in the Patrang Health Center Working Area in 2022. Thesis. Pp. 289–299

Rachman, R. Y., Nanda, S. A., Larassasti, N. P. A., Rachsanzani, M., & Amalia, R. (2021). The Relationship of Parental Education to the Risk of Stunting in Toddlers: A Systematic Review. Tambusai Health Journal, 2(2), 61–70. https://doi.org/10.31004/jkt.v2i2.1790

Rahmawati, W. A., Arumsari, I., & Fitria. (2023). Obesogenic Environmental Characteristics in Determining Western Fast Food Consumption in Urban Adolescents in Bekasi City, Indonesia. Jakagi, 3(2), 1. https://doi.org/10.54771/jakagi.v3i2.696

Rosalini, W., Permana, R. A., Wulantika, N. K., & Zahro, S. F. (2024). Factors Affecting the Risk of Overnutrition in Adolescent Age Groups in Urban Areas. Professional Health Journal, 5(2), 492-497.

Samingan, S., Azwalika, Z., & Octaviani, O. (2021). Determinants of Fast Food Consumption Behavior in Students at SMA Negeri X East Jakarta in 2020. Journal of Health Sciences, 11(2), 136-145.

Sartika, W., Herlina, S., Qomariah, S., & Juwita, S. (2022). The Effect of Pocket Money on the Events of Overnutrition In Youth Times Pandemic Covid-19. Journal of Healtcare Technology and Medicine, 8(1), 400–405

Setianingrum, S. A., & Handayani, D. Y. (2024). Analysis of Physical Activity Levels, Fast Food Consumption Patterns and BMI. Scientific Journal of Educational Vehicles, 10(3), 788–800.

Subiyanto, P. (2019) Nursing Care Textbook for Patients with Endocrine System Disorders (P. Dianawuri, Lucia, & A. Hesti (ed)). PT. New Library Press

Sugiyono (2017) Quantitative, Qualitative, and R&D Research Methods. Bandung: CV. Alphabet

Syukri, M., Nomiko, D., & Sari, I.P. (2022) Incidence of Prediabetes in Adult Age Group in Jambi City. Silampari Journal of Nursing, 6(1), 19-27. https://doi.org/10.31539/jks.v6i1.3846

Tijow, F. N., Mautang, T., & Telew, A. (2024). The Relationship between Physical Activity and Fast Food Consumption Habits with the Incidence of Overweight in Adolescents at SMK Kristen 1 Tomohon. Manado Health Scientific Journal, 3(2).

Ujud, S., Nur, T. D., Yusuf, Y., Saibi, N., & Ramli, M. R. (2023). Application of the Discovery Learning Model to Improve the Learning Outcomes of State High School Students 10 Ternate City Class X on Environmental Pollution Materials. Journal of Bioeducation, 6(2), 337–347. https://doi.org/10.33387/bioedu.v6i2.7305

Veriawan, A., Ismaya, E. A., Kuryanto, M., S. (2023). Analysis of the Form of Independence of Children Aged 6-8 Years Reviewed from the Employment Status of Parents as Factory Workers. Journal of Tambusai Education, 7(1), 1882–1890.

Widhiasrini, L. D. (2018) The Relationship between Fast Food Consumption, Physical Activity and Body Mass Index (BMI) with Fasting Blood Sugar Levels to Detect Prediabetes in Adolescents.

Widianingrum, R., Amalia, V. D., Diatri, D., & Narhadina, G. S. (2024). Screening for Prediabetes and Type 2 Diabetes Mellitus and Providing Material on Risk Factors for Diabetes Mellitus in Adolescents at SMA IT Harapan Bunda Semarang: Screening for Prediabetes and Type 2 Diabetes Mellitus and Providing Material on Risk Factors for Diabetes Mellitus in Adolescents at SMA IT Harapan Bunda Semarang. Med-Com Empowerment Journal, 1(2), 10-17.

Yuandari, E. (2025). Analysis of Parental Characteristics Factors on the Frequency of Fast Food Consumption in Adolescent Students of Grade XI SMAIT Ukhuwah Banjarmasin. Journal of Scientific Studies, 2745-5955, p-ISSN 2809-0543, 6(3), 558-570.

Yetmi, F., Harahap, F. S. D., & Lestari, W. (2021). Analysis of Factors Affecting Fast Food Consumption in Students at SMA Cerdas Bangsa, Deli Serdang Regency in 2020. Studia: Journal of Student Research Results, 6(1), 24-47.

Zogara, A. U., Black, M. S., & Pantaleon, M. G. (2022). Socioeconomic parents, pocket money, and social media are related to fast food consumption behavior in adolescents in Kupang City. Journal of Nutrition College, 11(4), 303-309. https://doi.org/10.14710/jnc.v11i4.35589