



The Relationship Between Adolescents' Knowledge Level About Dietary Patterns and Risk Factors for Diabetes Mellitus

Winda Anggraini¹, Dina Carolina Hapsari², Ratna Ningsih³, Titi Sulastris⁴, Tri Endah Pangastuti⁵

¹ Program Studi Sarjana Keperawatan, Fakultas Ilmu Keperawatan, Poltekkes Kemenkes Jakarta III Jl. Arteri JORR Jatiwarna 17415, Indonesia

² Program Studi Sarjana Keperawatan, Fakultas Ilmu Keperawatan, Poltekkes Kemenkes Jakarta III Jl. Arteri JORR Jatiwarna 17415, Indonesia

³ Program Studi Profesi Ners, Fakultas Ilmu Keperawatan, Poltekkes Kemenkes Jakarta III Jl. Arteri JORR Jatiwarna 17415, Indonesia

⁴ Program Studi Sarjana Keperawatan, Fakultas Ilmu Keperawatan, Poltekkes Kemenkes Jakarta III Jl. Arteri JORR Jatiwarna 17415, Indonesia

⁵ Program Studi Profesi Ners, Fakultas Ilmu Keperawatan, Poltekkes Kemenkes Jakarta III Jl. Arteri JORR Jatiwarna 17415, Indonesia

Winndaa03152@gmail.com, dinakanza.dc@gmail.com, ratnasumardi94@gmail.com, titi.sulastris64@gmail.com, triendahpangastuti@gmail.com

Corresponding Author : dinakanza.dc@gmail.com

Article Information ABSTRACT

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Background: Adolescence is a critical stage in the process of life development. Most adolescents have an unbalanced diet because they often eat snacks or snacks that are low in nutrition. Diabetes mellitus is not only at risk of occurring in adulthood, but also at risk of occurring in adolescence. **Research Objective:** To determine the relationship between adolescents' knowledge level about diet and risk factors for diabetes mellitus. **Research Method:** Quantitative research with *Cross Sectional* research design. Sampling was done using *cluster sampling* with a sample of 106 respondents. This study used a questionnaire and was analyzed using *the chi square test*. **Research Results:** The results of the study showed that there was a significant relationship between the level of adolescent knowledge about diet and the risk factor for diabetes mellitus (*p value* = 0.019). **Conclusion:** There is a significant relationship between teenagers' knowledge about health education on diet and the risk factors for diabetes mellitus.

Introduction

Children experience stages of growth and development through the process of human development, which includes infancy (0-1 years), toddlers (1-3 years),

preschool children (4-6 years), school-age children (6-12 years) to adolescents (12-18 years). In the developmental stage, adolescents often face various health problems, most adolescents have an unbalanced diet because they often

consume low-nutrient snacks or snacks (4) In teenagers, the desire to try something new in snacks, both food and drinks, can lead to an unstructured eating pattern, which increases the risk of diabetes in teenagers (7).

Diabetes mellitus (DM) is currently one of the global health threats. The prevalence of type 2 diabetes continues to rise globally: currently, approximately 589 million adults (aged 20–79) are living with diabetes, and this figure is projected to surge to 853 million by 2050. Southeast Asia and the Western Pacific record the highest number of cases, while Africa shows the fastest growth. (10) The International Diabetes Federation's (IDF) predictions also show that in 2019 2030 there will be an increase in the number of DM patients from 10.7 million to 13.7 million by 2030 (9).

The results showed that the increased prevalence of type 2 diabetes mellitus in children and adolescents increased in some countries, although not as much as the incidence in adults and the elderly. The prevalence of diabetes in children has increased 70 times compared to 2010. Cases of diabetes in children reach 2 per 100,000 people. with the largest age group being 10–14 Of all child diabetes cases, 5–10% are type 2 IDAI recorded 1,645 children with diabetes mellitus in 13 major cities (Jakarta, Bandung, Surabaya, Medan, Makassar, etc.) and 60% of the patients are girls (9).

In Indonesia, as many as 1,645 children have type one diabetes mellitus (DM 1) (10). Cases of type one diabetes mellitus in children increased by 70 times from 2010 to 2023. According to the 2023 SKI results report, the trend of Diabetes Mellitus (DM) in the population aged ≥ 15 years based on doctor's diagnosis has increased (the 2018 risked result of 2.0% increased to 2.2%) (10). With a high risk of excessive sugar consumption, adolescents' level of knowledge about

healthy eating plays an important role in the prevention of diabetes mellitus. Low understanding of sugar consumption limits and their impact on health. Adolescents' knowledge of healthy eating, including an understanding of sugar consumption limits and their health risks, is a key factor in the prevention of diabetes mellitus (2).

Teenagers tend to follow fast food consumption trends. In everyday life, we often see teenagers prefer foods that are good on the tongue, even if they are expensive, or conversely, choose foods that are cheap and filling, even though they have a low nutritional content. Both of these patterns suggest that many adolescents do not have sufficient knowledge about healthy eating. They tend to choose foods based on taste or price, rather than based on the needs of their growing body. In fact, wrong eating habits from a young age can have serious impacts, ranging from obesity, indigestion, to metabolic diseases such as diabetes mellitus at a young age (13).

From previous research, the location we chose this time is wider since it involves 3 schools, so the sample is more varied, and the development of educational materials about diabetes is now increasing more. Based on the background described above, the author is interested in researching the relationship between adolescents' level of knowledge about diet and risk factors for diabetes mellitus.

Method

This study is a quantitative research with a *Cross Sectional* research design. The population in this study is students of SMAN 62, 31 and 22 Jakarta and sampling using a *predetermined cluster sampling* with inclusion and exclusion criteria amounted to 106 respondents. This research was conducted in the period of April – May 2025.

Data collection uses primary data by distributing questionnaires to respondents with appropriate inclusion and exclusion criteria. The researcher explained the purpose and objectives of the research to be carried out, after which if the respondent agrees, he will sign an *informed consent*. The research instrument used a questionnaire. The analysis used in the study was *chi-square* analysis in testing both variables. The research instrument was tested for validity and reliability on 30 respondents who matched the inclusion and exclusion criteria with a *croncbach alpha* > 0.6 (0.722 and 0.698). Hair et al. (2010) in *Multivariate Data Analysis* mentioned that a Cronbach's Alpha value of 0.60–0.70 indicates marginal reliability but is still acceptable in exploratory research. This research has passed the ethics review with the number No. DP.04.03/F.XIX.13/3530/2025 by the Ethics Committee of the Ministry of Health of Jakarta III.

Result and Discussion

Table 1. Frequency Distribution of Respondent Characteristics (n=106)

No	Characteristic	Frequency (n)	Percentage (%)
1	Age		
	14 - 17 Years	87	82,1 %
	18 - 21 Years	19	17,9 %
	Total	106	100 %
2	Gender		
	Man	41	38,7 %
	Woman	65	62,3 %
	Total	106	100 %
3	Class		
	X	53	50 %
	XI	53	50 %
	Total	106	100 %

The results of the analysis of respondent characteristics showed that the majority of adolescents aged 14-17 years were 87 adolescents (82.1%). Furthermore, the majority of adolescents are female, namely 65 respondents (62.3%) and adolescents who are male as many as 41 respondents (38.7%). And

there were 53 respondents in class X and XI (50.0%) respectively. At this age, it's a time when teenagers start showing development in their thinking, and they still think experimentally, so their thoughts at this age can lead to poor eating habits. Teenagers unknowingly don't think about a good diet and prefer to eat food without considering the nutrients it contains, especially those high in sugar.

In a study on the characteristics of high school teenagers with risk factors for diabetes mellitus in the city of Padang by Fauzi, et al., (2020) based on the results of the study, it can be concluded that the characteristics of respondents based on age are that almost half of the respondents are 16 years old who show the middle period in adolescence. The results of research by the Indonesian Health Survey show that symptoms of prediabetes have begun to appear at the age of 15 years (Ministry of Health of the Republic of Indonesia, 2023). The Ministry of Health said that the age of ≥15 years is included in the target of preventing non-communicable diseases.

Fathurohman (2020) in his research showed that women have a higher risk of diabetes mellitus than men. Hidayati & Pibriyanti (2022) also mentioned that girls have a 2.95 times greater risk of having high blood glucose base.

Table 2. Distribution Frequency, Dietary Knowledge Level, and Risk Factors for Diabetes Mellitus (n=106)

No	Variable	Frequency (n)	Percentage (%)
1	Diet Knowledge Level		
	Less	27	25,5 %
	Good	79	74,5 %
	Total	106	100 %
2	Risk Factors for Diabetes Mellitus		
	Fat	50	47,2%
	Low	56	52,8%
	Total	106	100%

The results of the analysis can be concluded that most of the level of dietary knowledge in adolescents is in the good category of 74.5%, and most of the risk factors for diabetes mellitus in adolescents who are at low risk of 52.8%. This is in accordance with Noto Atmojo, 2014, regarding knowledge levels, which are low, medium, and high, with percentages of low being 10-15%, medium 25-35%, and high 55-75%. Since this study only took 2 categories, the low and medium knowledge were combined into 10%-55%, and high or good knowledge into 55%-75%.

This can be explained because most of the knowledge known to adolescents can come from education, both formal and informal, personal and other experiences, the environment, and mass media (11). One of the underlying reasons for this is the ease of adolescents' access to information related to diabetes mellitus and diet.

In the risk factors for diabetes mellitus, which include age, obesity, genetics, gender, diet, print and electronic media can also intensively affect diabetes mellitus in teenagers. Teenagers' knowledge about eating habits can influence someone's eating behavior. Teens who have good knowledge are also expected to have optimal eating patterns (12)

Research conducted by Wahyudi et al., (2024) sugar consumption patterns through sweet foods, namely donuts, bomboloni, and the like, which are the most popular choices by 54 respondents with a percentage of 39.4%. Teenagers usually choose to follow the trend by eating fast food and sugary drinks. The more you eat sugary foods and fast food, the higher the risk of diabetes.

Based on a study conducted by Latifah & Nugroho, an Odds Ratio (OR) value of 3.826 indicates that individuals with symptoms of stress have a 3.826 times greater risk of experiencing

increased blood sugar levels as a risk factor for diabetes mellitus compared to individuals who do not experience symptoms of stress (14). Because stress is one of the factors that can aggravate blood sugar conditions in adolescents, it is very important that adolescents can do good stress management.

Tabel 3. The Relationship between Dietary Knowledge Level and Risk Factors for Diabetes Mellitus (n=106)

Risk Factors for Diabetes Mellitus

Diet Knowledge	Tall		Low		Total		P Value	OR (95% CI)
	N	%	N	%	N	%		
Less	18	66,7	9	33,3	27	100	0,019	2,938 (1,173-7,353)
Good	32,5	40	4	59	79	10		
Tota	50	47	5	52	10	10		
The								

The results of the analysis showed that the level of knowledge of the diet category was low with risk factors for high-risk diabetes mellitus as many as 18 respondents (66.7%), the level of knowledge of the diet category was good for the risk factors of low-risk diabetes mellitus as many as 47 respondents (59.5%).

Based on bivariate analysis using *chi-square*, the p-value is $0.019 < 0.05$, it can be concluded that H_a is accepted and H_0 is rejected so that it can be concluded that there is a significant relationship between the level of dietary knowledge and the risk factors for diabetes mellitus in adolescents at SMAN 62 Jakarta. The analysis of the Odds Ratio (OR) value, which is 2.938, means that respondents with a low level of dietary knowledge have a 2.9 times greater chance of experiencing a high-risk risk of diabetes mellitus compared to adolescents who have a good level of dietary knowledge.

The results of this study are in line with research conducted by Ummah, et al., (2024) which stated that there is a significant relationship between diet and the risk of developing diabetes mellitus in adolescents with a *p value* of $0.004 < 0.05$. In a study conducted by Enjelia, et al., (2024) which stated that there is a relationship between the level of knowledge and dietary behavior as a risk factor for DM in grade X students at SMA Negeri 4 Palangka Raya with a *p value* = $0.000 < 0.05$. Another study that is also in line with this study, Nida Lutfiawati (2021), stated that there is a relationship between the level of knowledge of diet and the risk factors for Diabetes Militus at SMAN 14 in Tangerang district with a *p-value* of $0.000 < 0.05$.

According to Notoatmodjo (2021), adolescents' knowledge of diet can affect a person's eating habits. Adolescents who have good knowledge are also expected to have an optimal diet. Knowledge is defined as the result of human sensing through the senses possessed (ears, ears, nose, taste and touch). Providing information or an explanation about an object will increase one's knowledge, knowledge will make a person have awareness so that a person will behave according to the knowledge he already has. Adequate knowledge also helps him identify the risk of health problems early such as the risk of diabetes mellitus related to a diet that balances the consumption of sugar without excessive. Diet and blood sugar control are strongly associated with the risk of developing diabetes mellitus

Conclusion

The conclusion of this research is that most respondents are 14-17 years old, which is adolescent age, the majority of adolescents are female, and there are 53 respondents in grade 10 and 11 of high school. The results show that there is a significant relationship between adolescents' knowledge about diet and the

risk factors for diabetes, and on average, adolescents with better knowledge tend to have a lower risk of diabetes.

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