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Knowledge about Type Diabetes Mellitus : A Descriptive Study in Mujahidin High School Pontianak

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ABSTRACT

Introduction: Technological developments and exposure to social media content that promote unhealthy foods have contributed to an increase in cases of type 2 diabetes mellitus, especially among children and adolescents. Although no specific data is currently available regarding the incidence of type 2 diabetes mellitus in adolescents in Indonesia, there has been a significant rise in the prevalence of overweight adolescents. This study aims to describe the level of knowledge about type 2 diabetes mellitus among adolescents at SMA Mujahidin Pontianak.

Methods: This research employs a quantitative approach with descriptive research methods. The sampling technique used is stratified random sampling, involving a total of 245 students from grades X and XI at SMA Mujahidin Pontianak. The instrument used in this research was the DKQ-24 questionnaire, which was administered to the respondents. Data were analyzed using univariate analysis.

Results: The findings indicated that 76.7% (188 respondents) had a moderate level of knowledge about type 2 diabetes mellitus, 17.6% (46 respondents) had a low level of knowledge, and 15.7% (11 respondents) demonstrated a high level of knowledge.

Conclusion: The majority of students at SMA Mujahidin Pontianak possess a moderate level of knowledge about type 2 diabetes mellitus. The study recommends that schools collaborate with healthcare professionals or health organizations to create informative materials, such as posters about type 2 diabetes mellitus, and to strengthen the school health program (UKS) to enhance students' knowledge and awareness.

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1. INTRODUCTION

Technological developments and exposure to social media that promote unhealthy foods have influenced changes in people's lifestyles, especially in their eating patterns. These changes have contributed to the increased cases of type 2 diabetes mellitus. This disease is characterized by a lack of insulin secretion, insulin resistance, and increased glucose production in the liver (Islaeli et al., 2019 dalam Jiwantoro et al, 2020). Type 2 diabetes mellitus now affects not only adults but also children and adolescents due to unhealthy eating patterns. The prevalence of diabetes increases with age. About half of all diabetes cases occur in individuals aged 55 and over (Subiyanto, 2018).

According to Riskesdas Indonesia 2018 data, the consumption of sweet foods and beverages is high among teenagers, with 87.9% for sweet foods and 91.4% for sweet drinks (Kementerian Kesehatan Republik Indonesia). Although there is no specific data on the incidence of type 2 diabetes mellitus in

Indonesian adolescents, the prevalence of overweight in adolescents has significantly increased (Pulungan et al., 2018).

The city of Pontianak, known for its many coffee shops, also increases the risk of diabetes in teenagers due to high sugar and calorie consumption. The prevalence of type 2 diabetes mellitus in West Kalimantan, based on doctors' diagnoses, is 1.1% (Riskesdas Kalbar, 2018). Pontianak recorded 14,218 diabetes cases in 2023, with South Pontianak showing the highest rate at 24.50%. This area, where many coffee shops are located near shopping centers, schools, and residential areas, includes Pontianak Mujahidin High School.

Interviews with two students revealed that Mujahidin High School students frequently visit coffee shops, but there has been no socialization or education about diabetes mellitus at the school. Adolescents are particularly vulnerable to two key risk factors for type 2 diabetes mellitus: lack of physical activity and obesity (Kolahdooz et al., 2018 dalam Mansyah, 2021). Although teenagers generally have a good understanding of diabetes (Fiqi & Zulmansyah, 2021), reduced physical activity and technological advances increase their risk of developing the disease (Subiyanto, 2018).

Therefore, it is essential to increase teenagers' knowledge about type 2 diabetes mellitus. Early education can help with early detection and contribute to reducing the incidence rate of the disease at a young age. Based on these observations and data, this study aims to describe the level of knowledge of adolescents about type 2 diabetes mellitus at SMA Mujahidin Pontianak.

2. METHODS

Study Design

This research employed a quantitative study design with a descriptive approach. Quantitative research involves the collection and analysis of numerical data to answer research questions. The descriptive approach focuses on describing observed phenomena without investigating relationships or comparisons between variables. It helps in understanding the characteristics and distribution of the observed variables within the population under study (Sugiyono, 2019).

Population, Samples, and Sampling

The population for this study comprised students in grades X and XI at SMA Mujahidin Pontianak, totaling 504 students, 270 in grade X and 234 in grade XI. The sample was determined using stratified random sampling, which divides the population into homogeneous groups and then randomly selects samples from each group. According to the Slovin formula, the initial sample size required was 223 students. To account for potential dropouts, the sample size was increased to 245. Sample selection was conducted using simple random sampling, where every student had an equal chance of being chosen. The inclusion criteria were students in grades X and XI, while the exclusion criteria included students absent during the research and those diagnosed with diabetes mellitus. The variable of interest was the knowledge of teenagers at SMA Mujahidin Pontianak regarding type 2 diabetes mellitus.

Instruments

The study utilized two questionnaires: the Demographic Questionnaire and the Knowledge Questionnaire. The Demographic Questionnaire collected information about respondents' characteristics, such as name initials, age, gender, class, family history of diabetes, and previous information about type 2 diabetes mellitus. The Knowledge Questionnaire assessed respondents' knowledge about type 2 diabetes mellitus using the Diabetes Knowledge Questionnaire (DKQ-24), developed by Garcia et al. (2001) and translated into Indonesian by Mutoharoh (2018). Responses were scored with 1 for "Correct" and 0 for "False" or "Don't Know".

To ensure the quality of the research instruments, validity and reliability tests were conducted. The DKQ-24 had a validity value of 0.88 (Gracia, 2001 dalam Mutoharoh, 2018), indicating its validity for measuring knowledge about type 2 diabetes mellitus. Reliability was confirmed with a Cronbach Alpha coefficient of 0.723, demonstrating good reliability for use in the Indonesian population (Mutoharoh, 2018). Thus, both questionnaires were validated and reliable for data collection.

Procedure

Data collection began with the preparation stage, where the researcher submitted an ethical application and received approval from the Ethical Review Division, Faculty of Medicine, Tanjungpura University with number 1692/UN22.9/PG/2024. The implementation involved coordination with SMA Mujahidin Pontianak and explaining the research objectives to the Curriculum Representative and Counseling Guidance teacher. Informed consent was obtained, and questionnaires were administered online via Google Forms, with guidance provided during completion. After completing the questionnaires, respondents received positive reinforcement. The collected data were processed through editing, coding, scoring, data entry, and cleaning to ensure validity.

Data Analysis

Data analysis employed univariate analysis to describe the characteristics of each variable. The respondents' knowledge level regarding type 2 diabetes mellitus was measured, with "True" answers scored as 1 and "False" or "Don't Know" answers scored as 0. To interpret the results of the analysis of respondents' level of knowledge, categorization, and interpretation adapted from Sugiono (2012) dalam (Ainurrahmah et al., 2022). Results were categorized as follows: 0% (none of the respondents), 1%-25% (very few), 26%-49% (almost half), 50% (half), 51%-75% (majority), 76%-99% (almost all), and 100% (all respondents). Data analysis was performed using SPSS (Statistical Package for the Social Sciences)

software. The researcher ensured that the analysis adhered to the methodology and accurately interpreted the respondents' knowledge levels.

3. RESULTS

Based on Table 1, it is known that the results of the level of knowledge about type 2 diabetes mellitus were divided into three categories, namely low, medium, and high. First, if we look at gender, The majority of female respondents show a significant proportion at the moderate knowledge level, with 41.2% demonstrating an intermediate understanding of diabetes. This contrasts with the low knowledge level (6.1%) and the high knowledge level (2%), indicating that most female respondents fall within the middle category. For male respondents, knowledge distribution is more balanced across all levels, with the moderate level being the most prominent at 35.5%, while the low and high levels are 11.4% and 3.7%, respectively. This suggests that male respondents have more evenly distributed knowledge across topics like DM complications, treatment, and prevention strategies.

Second, when looking at age, the 16-year-old respondents exhibit the highest percentage of moderate knowledge (40%), which indicates that this age group is more informed about diabetes. In comparison, 17-year-olds show 20% in the moderate category, while 15-year-olds generally have lower knowledge in all categories, highlighting a potential gap in diabetes awareness for younger students. Third, if we look at class, the majority of respondents came from X IPS with a significant level of moderate knowledge (25.7%). Meanwhile, in several other classes, the level of knowledge tends to be low or even non-existent.

Fourth, in terms of family history of diabetes mellitus, respondents who had this history tended to have a higher level of knowledge, especially at the moderate level (15.1%). However, those who do not have a family history tend to have a lower level of knowledge. Fifth, if you look at the information received about diabetes mellitus, the majority of respondents have no information about it, especially at low levels (17.1%). However, those who received information tended to have a better level of knowledge, especially at the medium level (6.5%).

Based on Table 2, out of the 245 respondents involved in this research, only 19 people, or approximately 7.8%, reported that they had received information about diabetes mellitus. The majority of those who had received such information cited various sources. The most common source was TikTok, with 8 respondents (42.11%) obtaining their knowledge through this platform. Additionally, 4 respondents (21.05%) mentioned that they learned about diabetes through other unspecified social media platforms. Educational settings also played a role, with 2 respondents (10.53%) citing school subjects as their source. Similarly, Twitter/X was mentioned by 2 respondents (10.53%), while

Table 1. Distribution of respondents' demographic characteristics and knowledge levels.

Respondent Characteristics	Level of Knowledge About Type 2 Diabetes Mellitus					
	Low		Moderate		High	
	n	%	n	%	n	%
Sex						
Male	28	11,4	87	35,5	9	3,7
Female	15	6,1	101	41,2	5	2
Age						
15 years	2	0,8	41	16,7	2	0,8
16 years	16	6,5	98	40	9	3,7
17 years	25	10,2	49	20	3	1,2
Class						
X Math-Science	4	1,6	57	23,3	2	0,8
X Social	3	1,2	63	25,7	1	0,4
XI Math-Science	1	0,4	43	17,6	11	4,5
XI Social	35	14,3	25	10,2	0	0,0
Family History with DM						
Yes	17	6.9	37	15.1	1	0.4
None	26	10.6	151	61.6	13	5.3
Information about DM						
Yes	1	0.4	16	6.5	2	0.8
No	42	17.1	172	70.2	12	4.9

Table 2. Source of Information About Diabetes Mellitus

Source of Information	n	%
School Subject	2	10,53
Tiktok	8	42,11
Twitter /X	2	10,53
Instagram	1	5,26
Social Media	4	21,05
Health professional	2	10,53
	19	100

Table 3. Aspects of Knowledge About Diabetes Mellitus

Knowledge Aspect	n	%
Causes	4	10,68
Diet	2	5,68
Anatomy and Physiology	1	3,71
Types of Diabetes	1	4,12
Signs and Symptoms	4	13,94
Risk Factors	1	3,42
Wound Healing Process	1	4,51
Pathophysiology	1	5,71
Diagnostic Testing	1	2,84
Management	6	20,73
Prognosis	1	2,95
	24	100

Instagram was referenced by 1 respondent (5.26%). Lastly, 2 respondents (10.53%) acquired information from health professionals, likely during visits to healthcare facilities. On the other hand, a significant portion of the respondents (226 people or 92.2%) stated that they had not received any information about diabetes mellitus.

This data highlights the importance of social media, particularly TikTok, as a major source of health information among the respondents. It also reveals that traditional sources such as schools and healthcare professionals are less frequently mentioned, which may point to a gap in formal health education. There is an evident need for more structured and reliable health information dissemination, especially considering that the majority of respondents have not been exposed to any form of diabetes education.

In this study, the knowledge aspects of 245 respondents were measured using the DKQ-24 questionnaire, which consists of 24 items. The analysis results show that the aspect with the highest score is management, which achieved 20.73% of the total score. Next, the aspect of knowledge regarding the signs and symptoms of diabetes recorded a percentage of 13.94%. The aspect of knowledge about the causes of diabetes also showed significant results, with a percentage of 10.68%.

On the other hand, the percentage for the aspect of knowledge about diet was 5.85%. Meanwhile, the percentages for the aspects of knowledge about diabetes types, anatomy and physiology, and pathophysiology were 4.12%, 3.71%, and 5.71%, respectively. The aspects of risk factors and prognosis had lower percentages, with each obtaining 3.42% and 2.95%, respectively. The aspect concerning the healing process also yielded a percentage of 4.51%. Finally, diagnostic examination showed the lowest percentage at 2.84%.

4. DISCUSSION

Knowledge Level Based on Age

This study found that students aged 16 made up the largest portion of the sample, with 123 out of 245 respondents being 16 years old. Furthermore, students in this age group also dominated the medium knowledge category, with 98 of the 188 respondents falling into this category. At this age, students are more likely to access information on health topics, such as diabetes mellitus, from both school and their surroundings. This is consistent with Santrock (2013), as cited in Qifti, Malini, & Yetti (2020), which suggest that adolescence is a period of biological, cognitive, and emotional development.

Level of Knowledge Based on Gender

The research at Mujahidin High School categorized respondents by gender, revealing that there were more male respondents (124) compared to females (121) out of the total 245 respondents. The analysis also showed that female students had higher levels of moderate knowledge than male students. This supports previous research by Wulandari et al., (2020), which suggested that women generally have better knowledge in health contexts. The difference may be due to women having more opportunities to engage in discussions and reading, contributing to their better understanding of health issues. This highlights the role of social and environmental factors in shaping knowledge and behavior regarding health.

Level of Knowledge Based on Class

Viewed from a class perspective, this research notes that a moderate level of knowledge dominates in class X, including the Mathematics and Natural Sciences major in that class, and also in class XI. This phenomenon can be explained by the learning focus that places more emphasis on health topics such as diabetes mellitus in the education curriculum, especially in the Mathematics and Natural Sciences department. The materials taught in the Mathematics and Natural Sciences department often contain information and concepts directly related to health, including diseases such as diabetes mellitus. Therefore, students who major in Mathematics and Natural Sciences tend to have wider access to information and knowledge about health, including diabetes mellitus. This gives students a deeper understanding of the importance of maintaining health and may also encourage them to seek out more information on the topic.

This is in line with the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 36 of 2018 which determines specialization subjects for the Mathematics and Natural Sciences major, namely mathematics, biology, physics, and chemistry. Meanwhile, for the Social Sciences major, there are geography, history, sociology, and economics (Kemdikbud RI, 2018). With a learning focus that emphasizes natural science and mathematics, Mathematics and Natural Sciences majors are inherently more likely to include health topics such as diabetes mellitus into their curriculum. Thus, the understanding of diabetes mellitus among students majoring in Mathematics and Natural Sciences can be considered broader and more detailed than students majoring in Social Sciences.

Level of Knowledge Based on Family History of Diabetes Mellitus

From the perspective of family history of diabetes, research findings show that respondents who do not have a family history of diabetes dominate the sample studied and the level of knowledge in the medium category is also dominated by those who do not have a family history of diabetes. This indicates that genetic factors do not significantly influence the level of knowledge about diabetes mellitus among Mujahidin High School students.

Support for this argument can be found in research conducted by Fatmawati, Hesty, & Madinah, (2021) those who found that genetic factors do play a role in a person's risk of developing diabetes, but the

level of knowledge about this disease is more influenced by other factors such as lifestyle and environment. Thus, although a family history of diabetes may provide a potential insight into genetic risk, factors such as lifestyle and environment also play an important role in shaping a student's level of knowledge about the disease.

Level of Knowledge Based on Information about Diabetes Mellitus

Based on the knowledge that respondents have regarding diabetes mellitus, research findings show that a moderate level of knowledge is more common among those who have never received information about this disease. This indicates a potential lack of education given to students regarding diabetes mellitus, resulting in their level of knowledge being only moderate. The cause may come from informal information they obtain, such as from family who may suffer from diabetes, or from friend-to-friend conversations. The researcher's assumption regarding this is that even though respondents did not receive formal information about diabetes, they still received information from informal sources that was sufficient to provide a basic understanding of the disease.

The importance of comprehensive education about diabetes mellitus is reinforced by the fact that respondents who received information about this disease mostly obtained it from biology lessons at school and also from social media such as TikTok, Twitter, and Instagram. According to research conducted Mokalu, Natalia, Masi, & Sirait, (2023), Social media can be a significant source of information for teenagers in gaining knowledge about health, including diabetes mellitus.

Based on research results, the majority of those who have received information about diabetes obtained this information through TikTok. This shows that TikTok is the source of information most used by students in this study. Researchers argue that the high percentage of students who get information about diabetes from TikTok shows that this social media platform has a wide reach and is effective in attracting the attention of the younger generation. TikTok, with its short video format and content that is often packaged in an engaging and easy-to-understand manner, has become a powerful tool for conveying health information. This is supported by Erwin et al., (2023) the show that TikTok has a global reach with more than one billion monthly active users, many of whom are teenagers and young adults. The study found that these platforms are effective in spreading information quickly and virally, but often without mechanisms to ensure the accuracy of the content.

Researchers also warn about the risks associated with relying on social media as a primary source of health information. Unmonitored content and lack of fact verification can lead to the spread of false or misleading information. The research was conducted by Simanjuntak, Yuliati, Rizkillah, & Maulidina, (2022) identifying several essential risk factors associated with the use of social media as a source of health information. Among these is a lack of factual validation, where much of the content on TikTok is created by users without a medical background, so the information presented may not be accurate. The influence of algorithms is also a risk factor, as content that attracts more attention is often prioritized by algorithms, over medically accurate content. Additionally, information that is sensational or uses clickbait is more likely to go viral, even though it may be untrue or misleading.

Description of the Level of Knowledge of Adolescents about Type 2 Diabetes Mellitus

The results of the data analysis showed that almost all respondents, 188 people or around 76.7%, had a moderate level of knowledge regarding type 2 diabetes mellitus. This finding is consistent with previous research conducted by Fiqi & Zulmansyah (2021) Fiqi & Zulmansyah (2021), who found that the level of knowledge of public high school students in Bandung City regarding type 2 diabetes mellitus was in the medium category. However, it is important to explore specific areas of knowledge, such as prevention, symptoms, and management of type 2 DM, to provide a more comprehensive understanding.

These findings also indicate that there is a small portion of respondents, namely 43 people or around 17.6%, who have a low level of knowledge about type 2 diabetes mellitus. Further investigation into specific areas where this low knowledge is prevalent, such as awareness of risk factors or preventive measures, would be essential to identify gaps that require intervention. On the other hand, only a small number of respondents, namely 14 people or around 5.7%, who have a high level of knowledge about type 2 diabetes mellitus. This shows that there is a minority group who have obtained more in-depth information and knowledge about this disease, through biology lessons at school and also from social media such as TikTok, Twitter, and Instagram.

Based on the research results, it was found that respondents obtained information about diabetes mellitus from various sources, with TikTok being the most dominant source of information with a percentage of 42.11%. This shows the significant role of these social media platforms in disseminating health information to teenagers. Apart from TikTok, lessons at school also made a significant contribution with a percentage of 10.53%, indicating that the health education curriculum at school has provided students with a basic understanding of the disease. Apart from that, other sources of information including Twitter (10.53%) and health workers in hospitals (10.53%) also had a significant contribution. Instagram and social media, in general, have a lower contribution with percentages of 5.26% and 21.05% respectively.

From the results of this study, it appears that variations in the level of knowledge regarding type 2 diabetes mellitus exist among respondents. Even

though the majority have moderate knowledge, the presence of a small number of respondents with low and high levels of knowledge indicates the need to deepen understanding of this disease among the community, especially among teenagers who are the main target of health education. In fact, type 2 diabetes mellitus has become a global health problem that affects various age groups, including teenagers. Therefore, efforts to prevent and manage this disease must start with a strong understanding of risk factors, symptoms, and effective preventive measures.

In addition, a diverse approach to conveying information about diabetes mellitus is very important. This approach can include formal education at school, where material about diabetes mellitus can be delivered in a lesson curriculum that covers relevant fields of science such as biology or health. Apart from that, the use of social media is also an effective way to disseminate information about health to teenagers, because social media is one of the main sources of information for today's young generation. With this diverse approach, it is hoped that it can reach minority groups with different levels of knowledge more effectively, thereby increasing their awareness and understanding of type 2 diabetes mellitus and steps to prevent it.

In the context of health education in schools, it is important to pay attention to the role of the UKS Program or Trias UKS namely health education, health maintenance or services, and healthy living (Haryanto & Sony, 2023). Through Trias UKS, schools can provide the right platform to increase students' understanding of diseases such as type 2 diabetes mellitus. By involving students in structured and ongoing health education activities, both inside and outside the classroom, it is hoped that they can gain more knowledge. knowledgeable about the disease and how to prevent it. Therefore, this research also provides a strong basis for schools to strengthen and expand their UKS or Trias UKS Program. By actively involving students in activities that focus on increasing knowledge and awareness about type 2 diabetes mellitus, schools can become effective agents of change in efforts to prevent and manage this disease among adolescents. This research was successfully completed with knowledge of existing shortcomings and limitations. Data collection techniques are limited due to the difficulty of collecting respondents in one place at the same time, especially because of the daily test schedule. To overcome this, researchers can form teams to collect data from different classes simultaneously, broadening the scope and enabling data collection at the same time.

Analysis of Respondents' Knowledge Level about Diabetes Based on the DKQ-24 Questionnaire

In this study, the knowledge aspects of respondents regarding diabetes were measured using the DKQ-24 questionnaire, and the analysis results showed significant differences in understanding across various aspects. The highest score was achieved in the management aspect, with a percentage of 20.73%. This indicates that respondents have a better understanding of how to manage diabetes, which may be influenced by improved health education programs or personal experiences in managing this disease. A study by Kurniawati, Huriah, & Primanda (2019) also found that effective health education can enhance patients' knowledge and skills in managing diabetes. According to the author, a good understanding of management is crucial as it can influence adherence to treatment and a healthy lifestyle.

However, other knowledge aspects showed varying results. For instance, knowledge about the signs and symptoms of diabetes reached 13.94%, indicating that most respondents can recognize the early signs of diabetes. Nevertheless, there is still room to improve their understanding of more complex symptoms and changes that may occur as the disease progresses. According to the Hendrawan et al (2023), a good understanding of diabetes symptoms is essential for early detection and appropriate treatment. The author argues that increasing knowledge should remain a priority in health education programs, so respondents can identify the early signs of the disease and take necessary actions.

The aspect of knowledge regarding the causes of diabetes obtained a percentage of 10.68%, suggesting that although respondents have a basic understanding, they may not fully grasp the various factors that can lead to diabetes, including genetic, environmental, and lifestyle factors. A study by Hendrawan et al., (2023) indicated that awareness of risk factors for type 2 diabetes can help individuals take better preventive measures. According to the author, a deep understanding of the causes of diabetes is crucial, as it can influence the attitudes and preventive behaviors of individuals, especially among at-risk adolescents.

On the other hand, there are several aspects with relatively low scores, such as knowledge about diet (5.85%) and types of diabetes (4.12%). This indicates that respondents may lack understanding of the importance of diet in diabetes management, which is essential for preventing complications. According to Sofie & Sefrina (2022), good nutrition education can assist diabetes patients in choosing the right foods and managing their diets. The author believes that education about diet should be a primary focus in health interventions, as proper dietary patterns can help control blood sugar levels and prevent long-term complications.

The aspects of anatomical physiology (3.71%) and pathophysiology (5.71%) also show low understanding. Knowledge about the structure and function of the body, as well as disease processes, is crucial in the context of diabetes. Research by Saimi & Satriyadi (2024) emphasizes that knowledge of diabetes pathophysiology can encourage patients to be more proactive in managing their health. The author argues that educational interventions should include these aspects to help patients understand

how diabetes affects their bodies and the importance of maintaining overall health.

Meanwhile, the aspects of risk factors (3.42%) and prognosis (2.95%) have lower scores, indicating that respondents may not be fully aware of the risks they face or the long-term consequences of diabetes. This lack of understanding can affect their health decisions and awareness of the importance of prevention. According to Hendrawan et al (2023), awareness of diabetes risk factors is essential for disease prevention. Therefore, the author suggests that health education programs should enhance their focus on risk factors and prognosis to strengthen awareness among at-risk individuals.

The aspects of wound healing (4.51%) and diagnostic examinations (2.84%) also indicate a need for greater emphasis on education related to complications that may arise from diabetes and the importance of routine health monitoring. According to Hendrawan et al (2023), routine monitoring can reduce the risk of serious complications and improve overall health outcomes. The author believes that educating patients about the importance of routine check-ups and health monitoring is key to preventing complications and improving quality of life.

5. CONCLUSION

The research findings on the level of knowledge of adolescents regarding type 2 diabetes mellitus at Mujahidin Pontianak High School revealed that the majority of respondents were 16 years old, with more males than females. Most respondents were from class X and did not have a family history of diabetes mellitus. Additionally, a large proportion had never received prior information about diabetes. The majority of students had a moderate level of knowledge about type 2 diabetes mellitus, with a small percentage showing either low or high levels of knowledge.

Based on these results, it is recommended that schools develop specific educational programs tailored to increase awareness about diabetes. These programs should include interactive activities such as workshops, counseling sessions, and health campaigns that actively engage students. Schools can collaborate with healthcare professionals to ensure the content is accurate and relevant. Moreover, expanding the research to other schools in Pontianak would provide a more comprehensive understanding of adolescent knowledge and awareness of type 2 diabetes mellitus, which could inform citywide public health strategies.

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