

## **Knowledge and Preventive Attitudes Toward Type 2 Diabetes Mellitus Among Health and Non-Health Students at Universitas Ahmad Dahlan**

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### **ABSTRACT**

Diabetes Mellitus (DM) is a disease that causes death, ranked sixth in the world, without age restrictions. According to WHO, the total number of DM sufferers has increased significantly and has become a global epidemic disease. According to the Ministry of Health (2018), the prevalence of DM reaches 8.5% in adults. Good knowledge about DM is a person's capital to regulate a healthy lifestyle. The purpose of this study was to determine the level of knowledge and attitudes towards diabetes prevention, especially type 2 diabetes, in health and non-health students at Ahmad Dahlan University. The method used in this research is analytic observational with a cross-sectional study approach. The subjects used were non-health students from Ahmad Dahlan University who met the inclusion criteria. Calculation of sample distribution using the proportional convenience sampling technique, while for the sampling technique using accidental sampling. Analysis Univariate showed that health students had a knowledge level in the good category 86.8% and a prevention attitude in the good category 75.0%, while non-health students had a knowledge level in the good category 73.8% and a prevention attitude in the good category 57.1%. Bivariate analysis using Spearman's rank obtained a p-value of  $0.04 < \alpha$  (0.05). Health students have an average knowledge level of 89.9% and 83.47% in prevention attitudes, while non-health students have 82.52% and 79.48% in prevention attitudes, respectively. The conclusion in this study was that the level of knowledge and attitude of preventing type 2 DM in health and non-health students was mostly in the good category. Bivariate analysis concluded that there was a relationship between the level of knowledge and attitude towards the prevention of type 2 DM.

**Keywords:** level of knowledge, attitude, type 2 diabetes mellitus, students

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## INTRODUCTION

Diabetes Mellitus (DM) is the sixth leading cause of death worldwide, regardless of age. The number of DM sufferers has increased significantly and has become a worldwide epidemic (Pratiwi, 2020). The International Diabetes Federation (2019) estimates that approximately 463 million people worldwide suffer from DM, 90% of whom are type 2. The IDF also predicts an increase in the number of DM sufferers in Indonesia aged 20-79 from 10.7 million in 2019 to 13.7 million in 2030 and 16.6 million in 2045.

The 2018 National Health Research (RISKESDAS) shows that the total number of DM sufferers in Indonesia has increased significantly over the past 15 years. The total number of adult DM cases in 2013 reached 6.9%, then jumped to 8.5% in 2018 (Kemenkes RI, 2018). The prevalence of diabetes mellitus (DM) in Yogyakarta, according to the 2018 RISKESDAS (National Health Research and Development Agency) data, was 4.79%, equivalent to 15,540 people. 71% of the population in Yogyakarta received standardized healthcare services, out of the target prevalence of 11,046, which reached 100% in 2019 (Kemenkes RI, 2018).

The data above demonstrates that the number of DM cases continues to increase year after year, increasing public awareness of the lack of knowledge and awareness regarding diabetes, particularly type 2 diabetes, which is caused by poor lifestyle habits. Research by Made (2019) indicates that lifestyle influences, diet, and physical activity are risk factors for type 2 diabetes. Individuals with light physical activity have a 2.68 times greater risk of developing type 2 diabetes compared to those with moderate to vigorous physical activity.

According to research by Maimunah and Rahman in 2020, it was concluded that there is a significant relationship between dietary patterns and the occurrence of type 2 diabetes. Someone with a poor diet has a risk of developing type 2 diabetes 3.8 times greater than someone with a good diet. Silalahi, in his 2019 study, mentioned a relationship between students' knowledge and efforts to prevent type 2 diabetes at Muhammadiyah 7 High School, Surabaya. This can be interpreted as how important knowledge related to diabetes mellitus is. According to Juniarti et al., (2014) a person's behavior begins with the subject knowing in advance about stimuli in the form of object material that is fully known and realized, which then gives rise to a more responsive response in the form of action towards the object or stimulus, so that knowledge is the initial process for someone to determine attitudes and behavior. So knowledge is directly proportional to a person's attitude. Good knowledge about diabetes mellitus, especially type 2, becomes a person's capital in managing a healthy lifestyle. Therefore, the research was conducted to determine the level of knowledge of health and non-health students at Ahmad Dahlan University regarding the attitude of preventing Type 2 DM to determine whether or not additional health information is needed for students as a step in reducing the occurrence of Type 2 Diabetes Mellitus among students.

## MATERIALS AND METHOD

### Materials

The research tool was a questionnaire containing demographic data, knowledge, and attitudes towards preventing type 2 diabetes, which had undergone validity testing (using point biserial correlation) and reliability (using Cronbach's alpha, the results showed that the questionnaire was reliable).

The research variables consist of the independent variable, namely the level of knowledge, and the dependent variable, namely preventive attitudes. The research procedure includes the preparation stage (literature study, proposal preparation, permits, and ethical clearance), the implementation stage (questionnaire distribution and completion by respondents), and the completion stage (data management, analysis, and report preparation).

## Methods

The study was conducted using an analytical observational method using a cross-sectional study approach, aiming to see the relationship between the level of knowledge of Ahmad Dahlan University students and their attitudes towards preventing type 2 Diabetes Mellitus. The study population was active health (Pharmacy and Public Health) and non-health (Biology Education and Guidance and Counseling) students from the 2018–2020 intake. The sample was calculated using the Slovin formula with a result of 100 people, then added 10% so that the total number became 110 respondents, who were selected using proportional convenience sampling techniques and taken using accidental sampling.

## Data Analysis

### Univariate Analysis

Univariate analysis is a type of analysis used for a single variable to determine the frequency distribution of the research variables (Siyoto Sandu and Sodik, 2015). The frequency distributions in the study included study program, year of enrollment, gender, level of knowledge, and attitudes toward type 2 diabetes prevention.

### Bivariate analysis

Bivariate analysis is an analysis conducted on two variables suspected of having a relationship (Notoatmodjo, 2018). This analysis aims to determine the relationship between the two variables, namely the independent variable and the dependent variable, namely the level of knowledge and attitudes regarding type 2 diabetes prevention, using the Spearman Rank Correlation Test (Spearman Rho). The Spearman Rank Correlation Test is used to measure the level or strength of the relationship between two ordinal variables (Hidayat, 2014).

According to Ambarwati (2019), the interpretation of the Spearman Rank Test results can be seen in Table 1:

**Table 1. Interpretation of the Spearman Rank Correlation Test**

No.	Parameter	Value	Interpretation
1	Correlation strength	0,0 - 0,20	Very weak relationship
		0,20 - 0,40	Weak but definite relationship
		0,40 - 0,60	relationship
		0,6 - 0,80	Quite significant relationship
		0,80 - 1,00	Strong relationship
2	P-value	$p < 0,05$	There is a meaningful correlation between the two tested variables
		$p > 0,05$	There is no significant correlation between the

*Judul manuskrip (Penulis pertama)*

			two tested variables.
3	Direction of correlation	+ (Positive)	In the same direction, the greater the value of one variable, the greater the value of the other variable
		- (Negative)	In the opposite direction, the greater the value of one variable, the smaller the value of the other variable.

## RESULT AND DISCUSSION

### Respondent Demographics

The research results showed that the majority of respondents were female (79.10%), which is understandable considering that in the chosen study programs, particularly Pharmacy and Public Health, the number of female students is indeed higher than that of male students. The distribution of respondents by study program showed a balanced proportion between Pharmacy and Public Health students (30.90 each), while the largest number of non-health students came from Guidance and Counseling (22.74%), followed by Biology Education (15.46%).

In terms of year of enrollment, the majority of respondents were from the class of 2018 (55.45%), who were generally in their final semester, thus assuming a more mature academic understanding than the classes of 2019 and 2020. Meanwhile, the majority of respondents were between 21 and 22 years old, the productive age range for final-year students who generally possess a more critical mindset.

This demographic condition is important in the research because academic background, year of enrollment, and learning experience can influence the level of knowledge as well as shape the respondents' attitudes towards preventing type 2 Diabetes Mellitus. With the dominance of health students, it is hoped that the research results will be able to provide a real picture of the comparison of knowledge and attitudes between students who receive formal health education and those who come from non-health fields.

### Univariate Analysis

#### 1. Level of Knowledge about Diabetes Mellitus

The level of knowledge about type 2 DM measured in this study includes knowledge about the definition, signs and symptoms, risk factors and ways to prevent type 2 DM. Knowledge level is the independent variable in this study, measured by the respondents' correct answers to the DM knowledge questionnaire. Knowledge level is categorized into three categories. "Good" refers to a score of >75% of the total score, or if the respondent correctly answered 12-15 questions. "Fair" refers to a score of 55-75% of the total score, or if the respondent correctly answered 9-11 questions. "Poor" refers to a score of <55% of the total score, or if the respondent correctly answered 0-8 questions. The following table 2 is the questionnaire on knowledge level of type 2 diabetes mellitus:

**Table 2. Questionnaire on Knowledge Level of Type 2 Diabetes Mellitus**

<b>No.</b>	<b>Pernyataan</b>	<b>Benar</b>	<b>Salah</b>
1	Penyakit diabetes melitus disebut juga penyakit kencing manis.		
2	Diabetes merupakan melitus suatu gangguan metabolisme karbohidrat, protein, dan lemak.		
3	Kadar gula darah puasa dikatakan normal jika nilainya kurang dari 126 mg/dL		
4	Perempuan lebih mudah terkena diabetes dibandingkan laki-laki.		
5	Seseorang yang berumur di atas 45 tahun lebih beresiko terkena penyakit diabetes.		
6	Seseorang yang memiliki riwayat tekanan darah tinggi (Hipertensi) lebih beresiko terkena penyakit diabetes.		
7	Penyakit diabetes melitus tipe 2 disebabkan karena kurangnya hormon insulin dalam tubuh.		
8	Salah satu gejala diabetes melitus adalah sering buang air kecil.		
9	Faktor keturunan dari keluarga merupakan salah satu penyebab penyakit diabetes melitus.		
10	Kelebihan berat badan (obesitas) merupakan salah satu faktor penyebab diabetes melitus.		
11	Penglihatan kabur, mulut kering, dan berat badan menurun drastis merupakan gejala-gejala penyakit diabetes melitus		
12	Seseorang berbadan kurus tidak akan beresiko terkena diabetes melitus		
13	Seseorang yang sering bergaul dengan penderita diabetes melitus akan berisiko tertular penyakit diabetes melitus.		
14	Merokok dan minum beralkohol merupakan salah satu faktor resiko atau faktor yang dapat memperburuk kondisi penderita diabetes melitus.		
15	Penyebab terjadinya penyakit diabetes karena terlalu banyak mengkonsumsi makan yang tinggi karbohidrat seperti tepung-tepungan karena dapat menyebabkan penyakit diabetes.		

The majority of health students had good knowledge (86.8%), while non-health students also had a high percentage (73.8%), although the figure was lower. This indicates that knowledge regarding type 2 diabetes is quite good in both groups, with health students excelling due to their academic background.

The results of this study align with those of Hutabarat (2021), who indicated that the majority of respondents had good knowledge. Students are considered to have completed the highest level of education. According to Pratiwi (2020), the higher a person's education level, the faster they absorb information. The high incidence of diabetes is due to low levels of knowledge and education. Knowledge is paramount in shaping behavior. Knowledge, including the definition, signs and symptoms, risk factors, and prevention methods for

diabetes, is crucial for preventing diabetes, especially type 2 diabetes. One source of knowledge students acquire is through learning during lectures.

## 2. Type 2 Diabetes Mellitus Prevention Attitude

Attitude is the dependent variable in this study, which is measured from respondents' responses: strongly agree (SS), agree (S), doubtful (3), disagree (TS), and strongly disagree (STS). This preventive attitude is categorized into 3 categories. The preventive attitude category is good if the value is good. respondents obtained >75% of the highest score (score 38-50), attitude category Prevention is sufficient if the value obtained by the respondent is 56-75% of the score. highest (score 28-37), and the prevention attitude category is less if the value Respondents obtained >55% of the highest score (score 0-27). The questionnaire can be seen in Table 3:

**Table 3. Type 2 Diabetes Mellitus Prevention Attitude Questionnaire**

No.	Pernyataan	STS	TS	R	S	SS
1	Saya harus menjaga berat badan ideal.					
2	Saya akan olahraga secara teratur, 3x seminggu minimal 30 menit seperti jalan, jogging, berenang, dan bersepeda.					
3	Saya akan menjaga pola makan sehat dan seimbang dengan makanan yang rendah gula dan tinggi serat.					
4	Saya harus melakukan pemeriksaan gula darah secara rutin ke tempat pelayanan kesehatan.					
5	Saya harus melakukan pemeriksaan tekanan darah secara rutin ke tempat pelayanan kesehatan.					
6	Untuk tetap sehat, saya tidak perlu berolahraga karena telah mengkonsumsi vitamin dan suplemen secara teratur.					
7	Saya akan mengurangi mengkonsumsi makanan dengan kandungan karbohidrat tinggi seperti tepung-tepungan karena dapat menyebabkan penyakit diabetes.					
8	Saya akan mengurangi konsumsi makanan tinggi lemak jenuh (contohnya mentega) dan lemak trans (contohnya susu dan keju) karena merupakan penyebab penyakit diabetes.					
9	Saya akan mengurangi mengkonsumsi makanan cepat saji karena dapat memicu penyakit diabetes.					
10	Saya akan mengurangi minuman manis seperti sirup, dan teh manis karena dapat memicu penyakit diabetes.					

The results indicated that both health and non-health students demonstrated generally positive preventive attitudes toward type 2 diabetes mellitus (T2DM), although the proportion of good attitudes was higher among health students. Preventive behaviors included maintaining an ideal body weight to reduce insulin resistance (Soegondo et al., 2015), engaging in regular physical activity for at least 30 minutes three times per week such

as walking, jogging, swimming, or cycling (Tanrewali, 2019), adopting a balanced diet rich in fiber and low in sugar (PERKENI, 2018), and reducing the intake of refined carbohydrates (Werdani & Triyanti, 2014), saturated fats and trans fats (Werdani & Triyanti, 2014), fast food (Sitorus et al., 2020), and sweetened beverages (Keller et al., 2016). Routine health check-ups, including blood glucose monitoring (Selvia et al., 2021) and blood pressure measurement (Gunawan & Rahmawati, 2021), were also perceived as important preventive actions. These measures are essential in lowering the risks of obesity, insulin resistance, and hyperglycemia, which are key factors contributing to T2DM.

This finding is consistent with previous research by Pratiwi (2020), which reported that most respondents—particularly adolescents and young adults—demonstrated favorable attitudes toward T2DM prevention through healthy lifestyle practices. Knowledge, attitudes, and behaviors are interrelated, in which improved knowledge can positively influence attitudes and subsequently promote healthier behaviors. Therefore, strengthening health education and preventive campaigns among university students is crucial to fostering sustainable lifestyle changes and reducing the risk of T2DM in the future.

### **Bivariate analysis**

Bivariate analysis is an analysis of the relationship between variables using cross-tabulation. The aim is to examine the relationship between the independent variable, namely the level of knowledge about diabetes mellitus (DM), and the dependent variable, namely attitudes toward type 2 diabetes prevention, based on the distribution of cells.

The Spearman Rank test showed a significant relationship between the level of knowledge and attitudes toward type 2 diabetes prevention, with a p-value of 0.004 ( $<0.05$ ). The correlation strength was relatively weak ( $r = 0.272$ ), but the relationship found indicated that the greater the respondent's knowledge, the better their prevention attitudes.

This study's results support the research of Juniarti et al. (2014), which concluded that a person's behavior begins with the subject's prior knowledge of a stimulus in the form of a material object that they are fully aware of and aware of. This then leads to a more detailed response in the form of an action toward the object or stimulus. Therefore, knowledge is the initial process in determining attitudes and behavior. Knowledge can be acquired through education, internal, or external experience, making it a crucial factor in shaping one's behavior. Therefore, implementing prevention efforts requires a sound knowledge of type 2 diabetes mellitus (DM).

### **Differences in Respondents' Levels of Knowledge and Prevention Attitudes**

Comparative analysis showed that health students had higher average knowledge scores (89.9%) and preventive attitudes (83.47%) than non-health students, with average knowledge scores of 82.52% and preventive attitudes of 79.48%. This confirms that health students are better prepared in terms of knowledge and attitudes regarding type 2 diabetes prevention than non-health students.

According to research by Azwar (2013), a person's attitude is influenced by three factors: environment, experience, and education. Environmental factors include the home environment, school environment, and work environment. Experience is derived from a person's education or from observing others. Health students had a better level of knowledge regarding type 2 diabetes compared to non-health students. This is because health students receive better education and knowledge regarding health issues. Good knowledge is directly proportional to awareness of diabetes prevention attitudes. Therefore, it can be said that health students also have a better level of awareness regarding diabetes prevention attitudes,

especially for type 2 diabetes. However, based on data analysis, most non-health students also have good attitudes towards type 2 diabetes prevention.

## CONCLUSION

The findings indicate that students from health-related fields generally possess better knowledge and preventive attitudes toward type 2 diabetes mellitus compared to non-health students, reflecting the influence of academic background on health literacy. Nevertheless, the presence of students in both groups with only moderate or low levels of knowledge and attitudes highlights the need for broader health education interventions that extend beyond health faculties. Strengthening awareness programs and preventive campaigns across disciplines could foster healthier lifestyles among the wider student population, thereby contributing to the early prevention of diabetes mellitus type 2.

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