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Description of Diabetes Mellitus Patients' Knowledge Regarding Type 2 Diabetes Mellitus Treatment at Royal Prima Hospital Medan

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ABSTRACT

Management of Type 2 Diabetes Mellitus (T2DM) as a chronic pathology highly depends on the synergy between pharmacological interventions and lifestyle modifications. Patient health literacy plays a crucial role in determining the effectiveness of glycemic control and the prevention of long-term complications. This research aims to map the patient knowledge profile while identifying the determinant factors influencing it at Royal Prima Hospital, Medan. Utilizing a descriptive quantitative design with a cross-sectional approach, this study involved 100 respondents recruited through an accidental sampling technique. The research instrument employed an adapted version of the DKQ-24 questionnaire. Univariate analysis results confirmed that the majority of respondents (79%) possessed adequate understanding regarding their treatment regimen. Based on the Chi-Square test, a significant correlation was found in the gender variable ($p = 0.044$), while other demographic and clinical variables showed no meaningful association. Furthermore, binary logistic regression testing demonstrated a lack of simultaneous influence from all independent variables on the level of patient knowledge.

INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic disease characterized by elevated blood glucose levels due to impaired insulin production or function (Lubis, 2025). Of all DM cases, approximately 90% are type 2 Diabetes Mellitus (T2DM), which generally appears in adulthood and is related to diet, lack of physical activity, obesity, and genetic factors (PERKENI, 2021). The number of diabetes sufferers is consistently increasing worldwide. Data from the International Diabetes Federation (IDF, 2021) reports that there were 537 million diabetes sufferers in 2021 and this figure is expected to increase to 643 million in 2030 and 783 million in 2045. The majority of sufferers, approximately 81%, are diabetic. The phenomenon of diabetes shows significant prevalence in middle- and low-income countries, including Indonesia. In 2021, complications from this disease caused the death of 6.7 million people globally. These statistics represent a worrying reality, with an estimated one death every five seconds caused by this condition (IDF, 2021). Diabetes Mellitus is a chronic metabolic condition characterized by high blood glucose levels and is a global health issue with the potential for serious long-term complications. Diabetes management requires continuous treatment supported by a thorough understanding of the disease and its treatments (Khairatunawa, 2025). The effectiveness of diabetes control depends not solely on drug performance but also on the patient's understanding of how the therapy works and its targets. Previous experimental studies have indicated the importance of an appropriate treatment approach and comprehensive insight into diabetes management to improve treatment outcomes. Therefore, knowledge about diabetes and its therapies is crucial for successful disease management (Erida et al., 2025).

Patient knowledge of treatment is a crucial factor in chronic disease management because it influences their attitudes and behaviors during therapy. Cognitive awareness of the importance of therapy is a key driver in improving adherence to treatment instructions. When a patient understands the rationale behind each medical procedure, their intrinsic motivation to adhere to medication schedules and dosages significantly increases, enabling them to manage their disease more optimally. Conversely, a lack of knowledge can lead to inappropriate medication use, discontinuation of therapy without consultation, and poor treatment success. Previous research has shown that drug education and counseling interventions play a significant role in improving patient knowledge and adherence to therapy. This confirms that improving patient knowledge is a crucial component in efforts to improve the success of chronic disease management (Erida et al., 2024).

A similar situation is seen in Indonesia. The Basic Health Research (Riskesdas, 2018) showed that the prevalence of diabetes, based on doctor's diagnosis, among the population aged 15 years and above was 2%, up from 1.5% in 2013. This figure, based on blood tests, increased from 6.9% in 2013 to 8.5% in 2018. Unfortunately, only a small percentage of sufferers are aware of their diabetes, resulting in many cases going undiagnosed (Ministry of Health, 2020).

Diabetes mellitus can cause complications acute or chronic. Common complications include hypoglycemia and diabetic ketoacidosis, while chronic complications include cardiovascular disease, nephropathy, retinopathy, and neuropathy. The impacts are not limited to physical health but also reduce quality of life, affect psychological well-being, and increase the economic burden on families and the national health system (Soelistijo et al., 2015; Hariani et al., 2020).

Management of T2DM requires a comprehensive approach that includes non-pharmacological therapies such as education, diet, exercise, and lifestyle changes, as well as pharmacological therapy with oral hypoglycemic drugs or insulin (Bangar et al., 2024). Treatment success is largely determined by the patient's knowledge of disease management. Patients with good knowledge tend to be more compliant with therapy, thus controlling blood glucose levels and reducing the risk of complications (Nugroho, 2018). Conversely, poor knowledge often leads patients to discontinue treatment without medical advice or fail to follow the therapy regimen correctly.

Furthermore, patient knowledge regarding type 2 diabetes mellitus treatment is crucial for long-term success. Good knowledge enables patients to understand the goals of treatment, the correct use of medications, and the importance of adherence to prescribed therapy. Lack of knowledge can lead to medication errors, discontinuation of therapy without medical consultation, and an increased risk of complications. Therefore, research on the knowledge of type 2 diabetes mellitus patients regarding treatment is necessary to provide a basis for planning more effective and sustainable educational interventions.

Research by Putri et al. (2020) shows that patients with type 2 diabetes mellitus still have moderate to low knowledge about treatment, particularly regarding medication use and preventing side effects. This study emphasizes the importance of healthcare professionals in providing ongoing patient education.

In their study at a regional hospital, Sari and Wibowo (2021) found that patients with good knowledge tended to be more compliant with antidiabetic medication use than those with poor knowledge. However, this study did not specifically describe the distribution of patient knowledge based on demographic characteristics. Another study by Lestari et al. (2022) reported that routine education provided during follow-up visits had a positive effect on improving patient understanding of pharmacological and non-pharmacological therapies for type 2 diabetes mellitus. However, this study focused more on the effectiveness of education and did not describe patients' knowledge levels descriptively.

Based on the results of a review of previous research, it is known that the level of knowledge of Diabetes Mellitus patients varies and tends to be low. However, most previous studies have not specifically discussed patient knowledge regarding type 2 Diabetes Mellitus treatment, especially in patients undergoing treatment at referral hospitals. Furthermore, research examining patient knowledge based on demographic characteristics is still limited, especially at Royal Prima Hospital Medan. Therefore, this study was conducted to fill this gap by describing the level of knowledge of type 2 Diabetes Mellitus patients regarding treatment at Royal Prima Hospital Medan.

The Indonesian government has implemented various efforts to control diabetes, including the Chronic Disease Management Program (Prolanis) run by the National Health Insurance (BPJS Kesehatan), which emphasizes education, health monitoring, and routine checkups for diabetes sufferers. Furthermore, the Indonesian Endocrinology Association (PERKENI) has developed national guidelines that serve as a reference for diabetes management in Indonesia. However, the effectiveness of these programs depends heavily on the level of understanding of patients as service recipients.

Royal Prima Medan Hospital is a teaching and referral hospital in Medan City, treating a large number of patients with chronic diseases, including type 2 diabetes mellitus (T2DM). This high patient volume makes it an ideal location to assess patient knowledge regarding treatment. To date, data on T2DM patients' knowledge of treatment at this hospital remains limited, making this study crucial as a basis for improving patient education strategies at the hospital level.

METHOD

This study used a quantitative descriptive design with a cross-sectional approach to describe the level of knowledge of type 2 Diabetes Mellitus patients regarding treatment. Data collection was carried out at a specific point in time to obtain a picture of the respondents' actual knowledge level. The study was conducted at Royal Prima Hospital Medan during the period September–October 2025, after obtaining official permission from the hospital. The study population included all type 2 Diabetes Mellitus patients undergoing treatment at the hospital. A sample of 100 respondents was selected using a purposive sampling technique based on inclusion and exclusion criteria, including patients diagnosed with type 2 DM, currently undergoing treatment, aged ≥34 years, willing to be respondents, and able to complete the questionnaire completely.

Researchers used a questionnaire as a primary data collection instrument, divided into two main sections. The first section covered the respondents' demographic and clinical profiles, while the second focused on evaluating patients' understanding of type 2 Diabetes Mellitus therapy using the Diabetes Knowledge Questionnaire (DKQ-24). Instrument distribution was carried out conventionally after respondents were educated about the urgency of the research and provided written informed consent. Data management was carried out systematically, starting with file completeness verification (editing), variable coding, data tabulation (entry), and data cleaning to ensure validity before analysis using statistical software.

Data processing began with univariate analysis to describe the demographic profile of respondents and a descriptive overview of patient knowledge levels. To test the relationship between independent variables such as age, gender, educational background, occupational status, and duration of diabetes diagnosis and knowledge levels, researchers applied the Chi-Square statistical test. Furthermore, multivariate analysis using binary logistic regression was used to identify the simultaneous influence of all independent variables. All stages of this research were carried out in strict adherence to health ethics protocols, including obtaining informed consent, protecting subject privacy, and implementing the principles of beneficence and protection from harm (non-maleficence).

RESULTS AND DISCUSSION

Relationship between Age and Patient Knowledge

Based on Table 1, the chi-square test results show a p-value of 0.374 (p>0.05), indicating no relationship between age and patient knowledge. Therefore, differences in age groups do not affect patient knowledge about diabetes. This finding differs from Ahmad's (2019) study, which found that younger people tend to have better knowledge due to more frequent access to digital information.

Table 1. Relationship between Age and Patient Knowledge

Age	Lack of Knowledge n (%)	Good Knowledge n (%)	Total n (%)	*p-value*
34-45	3 (23,1)	10 (76,9)	13 (100)	0,374
46-55	9 (28,1)	23 (71,9)	32 (100)	
56-65	8 (20,5)	31 (79,5)	39 (100)	
>65	1 (6,3)	15 (93,8)	16 (100)	
Total	**21 (21,0)**	**79 (79,0)**	**100 (100)**	

Relationship Between Gender and Patient Knowledge

Data in Table 2 present Chi-square test findings with a p-value = 0.044, which is below the significance threshold of 0.05. These results confirm a statistically significant relationship between gender and the level of patient understanding regarding diabetes.

Further analysis demonstrated a considerable disparity in knowledge, where female respondents showed a more favorable health literacy profile than males. This phenomenon is supported by Angel (2022), who highlighted that women tend to be more proactive in accessing medical information channels and have higher participation rates in health education programs.

Table 2. Relationship between Gender and Patient Knowledge

Gender	Lack of Knowledge n (%)	Good Knowledge n (%)	Total n (%)	*p-value*
Man	4 (10,5)	34 (89,5)	38 (100)	0,044
Woman	17 (27,4)	45 (72,6)	62 (100)	
Total	**21 (21,0)**	**79 (79,0)**	**100 (100)**	

Relationship Between Educational Level and Patient Knowledge

Statistical analysis using the Chi-square test produced a value of p = 0.308, which clearly exceeded the significance threshold of 0.05. These findings indicate that formal educational level did not make a statistically significant contribution to the depth of respondents' knowledge regarding diabetes.

This result shows a discrepancy compared with the study conducted by Dafriani (2023). Although Dafriani argued that higher education is generally directly proportional to the capacity to understand medical information, data from this study demonstrated that patients with lower educational backgrounds still had the opportunity to possess good knowledge, possibly through access to other non-formal information sources.

Table 3. Relationship Between Educational Level and Patient Knowledge

Education Level	Poor Knowledge n (%)	Good Knowledge n (%)	Total n (%)	p-value
Elementary School	1 (5.9)	16 (94.1)	17 (100)	
Junior High School	4 (18.2)	18 (81.8)	22 (100)	
Senior High School/Vocational	11 (25.0)	33 (75.0)	44 (100)	0.308
Higher Education	5 (29.4)	12 (70.6)	17 (100)	
Total	**21 (21.0)**	**79 (79.0)**	**100 (100)**	

Relationship Between Occupation and Patient Knowledge

Based on Table 4, the Chi-square test for occupation yielded a value of p = 0.751, indicating that occupation was not associated with knowledge. Type of occupation did not influence patient understanding regarding diabetes.

These findings are also consistent with the study by Dafriani (2023), which stated that the influence of occupation on patient knowledge is related to having more available time to seek and understand health information.

Table 4. Relationship Between Occupation and Knowledge Level

Occupation	Poor Knowledge n (%)	Good Knowledge n (%)	Total n (%)
Housewife/Retired	11 (25.0)	33 (75.0)	44 (100)
Merchant	0 (0.0)	6 (100)	6 (100)
Farmer	1 (14.3)	6 (85.7)	7 (100)
Entrepreneur	3 (20.0)	12 (80.0)	15 (100)
Security Officer	0 (0.0)	2 (100)	2 (100)
Factory Worker	0 (0.0)	5 (100)	5 (100)
Construction Worker	0 (0.0)	1 (100)	1 (100)
Teacher	2 (40.0)	3 (60.0)	5 (100)
Employee	1 (33.3)	2 (66.0)	3 (100)
Driver	0 (0.0)	2 (100)	2 (100)
Civil Servant	3 (30.0)	7 (70.0)	10 (100)
Total	**21 (21.0)**	**79 (79.0)**	**100 (100)**

Relationship Between Duration of Diabetes Mellitus and Patient Knowledge

Based on Table 5, the Chi-square test results for duration of Diabetes Mellitus showed a p-value = 0.839, indicating that duration of suffering from diabetes was not associated with patient knowledge.

Patients who had lived longer with diabetes did not necessarily possess better knowledge than those who had been newly diagnosed. These findings are also consistent with the study conducted by Shawahna (2021), which demonstrated that the duration of illness does not

automatically increase knowledge if education is not provided effectively.

Table 5. Relationship Between Duration of Diabetes Mellitus and Patient Knowledge Level

Duration of DM	Poor Knowledge n (%)	Good Knowledge n (%)	Total n (%)	p-value
<1 Year	5 (25.0)	15 (75.0)	20 (100)	0.839
1–5 Years	8 (21.6)	29 (78.4)	37 (100)	
>5 Years	8 (18.6)	35 (81.4)	43 (100)	
Total	**21 (21.0)**	**79 (79.0)**	**100 (100)**	

Omnibus Test of Logistic Regression Model

Through evaluation of the Omnibus test, the Chi-Square statistic obtained was 9.035 with degrees of freedom (df) = 5 and a significance value of 0.108. Since the resulting p-value exceeded the critical threshold of 0.05, it can be inferred that the logistic regression model developed was not collectively significant. This indicates that the integration of independent variables including age, gender, occupational status, educational background, and duration of diabetes diagnosis did not provide a substantial contribution to improving the predictive accuracy of the model regarding patient knowledge level. Simultaneously, the combination of these variables did not have a meaningful influence on respondents' knowledge.

Table 6. Omnibus Tests of Model Coefficients

Model	Chi-Square	df	p-value
Regression Model	9.035	5	0.108

Logistic Regression Model Summary

Based on the model summary in Table 7, the −2 Log Likelihood value was 93.757. This value indicates that the residual level or prediction error in this research model remained relatively significant.

Furthermore, the Cox & Snell R Square (0.086) and Nagelkerke R Square (0.135) values indicate that the ability of independent variables to explain variations in patient knowledge ranged only from 8.6% to 13.5%.

This leads to the conclusion that the contribution of independent variables in this model was highly limited, while most variations in patient knowledge were influenced by other external factors not included in the scope of this study.

Table 7. Model Summary

Step	-2 Log Likelihood	Cox & Snell R Square	Nagelkerke R Square
1	93.757a	0.086	0.135

Variables in the Equation

The results presented in Table 8 (Variables in the Equation) indicate that all independent variables, namely age, gender, occupation, educational level, and duration of diabetes, did not have a significant influence on patient knowledge because each variable had a significance value greater than 0.05.

Age obtained a p-value of 0.366, gender 0.117, occupation 0.541, educational level 0.088, and duration of diabetes had the highest p-value, namely 0.986.

These findings indicate that none of the variables could serve as predictors of patient knowledge level. In other words, neither demographic factors nor the duration of diabetes determined whether

patients possessed good or poor knowledge. These variables did not provide a meaningful contribution in explaining variations in respondents' knowledge.

Table 8. Variables in the Equation

Variable	B	S.E	Wald	Df	Sig.	Exp(B)
Age	.284	.314	.818	1	.366	1.328
Gender	-1.018	.649	2.458	1	.117	.361
Occupation	.066	.108	.373	1	.541	1.086
Educational Level	-.511	.299	2.908	1	.088	.600
Duration of DM	-.006	.372	.000	1	.986	.994
Constant	3.549	2.018	3.092	1	.079	34.789

Overview of Patient Knowledge Regarding Type 2 Diabetes Mellitus Treatment at Royal Prima Hospital Medan

The findings of this study indicate the predominance of adequate knowledge levels among the majority of patients with Type 2 Diabetes Mellitus, with a proportion reaching 79%. This figure reflects the success of educational programs at Royal Prima Hospital Medan in optimizing patient understanding regarding management of their therapy.

Through the Chi-Square test, it was identified that only the gender variable demonstrated statistical significance toward respondents' health literacy, while age, education, occupation, and duration of diagnosis did not show meaningful associations.

These findings provide a comparative perspective to the study by Erida et al. (2025) involving tuberculosis patients; the differences emphasize that the influence of knowledge is situational and depends on disease typology—between infectious diseases and chronic metabolic disorders.

The novelty of this study lies in the comprehensive mapping of diabetes knowledge profiles and the identification of demographic determinants that enrich the body of literature related to medical adherence in non-communicable diseases.

Good knowledge among most patients illustrates that they are capable of understanding fundamental treatment aspects, such as diabetes medication use, medication schedules, dietary control, and preventive measures against complications.

This finding aligns with the theory that knowledge is an important factor influencing attitudes and behaviors in health (Notoatmodjo, 2012). In addition, education provided by healthcare professionals, especially physicians and pharmacists, plays a major role in improving patient understanding of chronic diseases such as Diabetes Mellitus. The PERKENI (2021) guideline also emphasizes that education is a key component of DM management because patients must actively participate in long-term care.

Educational efforts in the hospital are likely implemented through routine counseling, pharmaceutical consultations, and verbal information delivery during every follow-up visit. This enables patients to receive repeated information so that their

knowledge increases and becomes more firmly retained over time.

The findings of this study are consistent with Elda (2018), who reported that most patients had good knowledge and that such knowledge influenced medication adherence. This demonstrates that knowledge serves as an important foundation for improving therapeutic effectiveness.

Similarly, Angel (2022) found that patients with a higher frequency of routine visits to healthcare facilities tended to possess better understanding regarding diet, antidiabetic medication, and the causes and control of blood glucose levels. Continuous education contributes to progressive improvement in patient understanding.

These findings are also consistent with Malini et al. (2019), who found that group education significantly improved self-care skills among Diabetes Mellitus patients. Systematic education allows patients to understand information more effectively.

However, previous studies by Raini (2015) and Ahmad (2019) indicated that most patients actually had low knowledge regarding diabetes. This differs from the findings of the present study, which demonstrated higher knowledge levels. These differences may be influenced by the quality of education in healthcare facilities, access to information, and differing population characteristics.

Thus, the overview of patient knowledge regarding Type 2 Diabetes Mellitus at Royal Prima Hospital Medan falls into the good category. Nevertheless, there are still some patients with insufficient knowledge who require special attention. Efforts to improve education, strengthen counseling, and apply personalized approaches in information delivery remain necessary to ensure all patients obtain optimal understanding.

Factors Influencing Patient Knowledge Regarding Type 2 Diabetes Mellitus Treatment

Based on the analysis results, only the gender variable showed a significant relationship with knowledge level ($p = 0.044$), while other variables did not demonstrate statistically meaningful influence.

Gender showed a significant relationship in which women possessed better knowledge compared with men. This finding is supported by Angel (2022), who stated that women are generally more active in seeking health information and more frequently participate in educational services than men.

Women are also more involved in household activities, including meal planning, allowing them to better understand dietary recommendations appropriate for Diabetes Mellitus patients. This experience contributes to higher knowledge regarding diabetes management.

In contrast, the age variable did not show a significant relationship ($p = 0.374$). These results indicate that health information can be understood by patients across different age categories.

These findings differ from Ahmad (2019), who found that younger individuals tended to possess better knowledge due to more frequent access to digital information.

The education variable also did not show a significant relationship ($p = 0.308$). These findings contradict the theory stating that education influences an individual's ability to absorb information. However, continuous education provided by healthcare professionals may eliminate these differences, allowing patients with lower educational backgrounds to still understand diabetes treatment.

Occupation was not associated with knowledge level ($p = 0.751$). This indicates that both active workers and retired individuals/housewives had equal

opportunities to access education and information related to diabetes.

The duration of suffering from Diabetes Mellitus also did not show a significant relationship with knowledge (p = 0.839). These findings contradict the common perception that the longer an individual experiences a chronic illness, the greater their knowledge becomes.

The study by Shawahna (2021) also demonstrated that the duration of illness does not automatically improve knowledge if education is not delivered effectively.

Multivariate analysis showed that all demographic variables explained only around 8.6% to 13.5% of the variation in patient knowledge. This indicates that other factors such as quality of education, family support, access to online information, and patient interaction with healthcare professionals may have a greater influence than demographic characteristics.

Overall, it can be concluded that demographic factors are not the primary determinants in shaping knowledge among patients with Type 2 Diabetes Mellitus. Only gender demonstrated a significant relationship, while other factors did not show meaningful influence.

Patient knowledge is more strongly influenced by continuous education, intensive counseling, and patients' ability to obtain accurate information.

CONCLUSIONS AND RECOMMENDATIONS

This study regarding the profile of patient knowledge among Type 2 Diabetes Mellitus patients at Royal Prima Hospital Medan concluded that the majority of respondents (79%) had adequate understanding regarding treatment procedures, while the remaining 21% were still categorized as having low knowledge.

Statistically, demographic factors such as age, educational level, occupational status, and duration of diagnosis did not show a significant correlation with patient health literacy levels; however, the gender variable was identified as having a meaningful relationship.

Based on these findings, it is recommended that the management of Royal Prima Hospital Medan optimize inclusive educational programs to ensure equitable distribution of information.

Healthcare professionals are expected to initiate more personalized and sustainable educational strategies, particularly for vulnerable groups with low knowledge levels.

For future literature development, integration of more diverse additional variables is necessary to provide a more holistic understanding of the dynamics of patient knowledge.

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