



Patients' knowledge and attitudes regarding the prevention of diabetes mellitus complications at the internal medicine polyclinic

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ABSTRACT

Background: Diabetes mellitus (DM) is a chronic disease requiring effective management to maintain quality of life. Preventing DM complications necessitates adequate knowledge and positive attitudes.

Purpose: This study aimed to determine the relationship between patients' knowledge and attitudes and efforts to prevent DM complications at the Internal Medicine Outpatient Clinic of Raden Mattaher RGH, Jambi.

Method: This cross-sectional study involved 84 DM patients selected through purposive sampling. Inclusion criteria were age ≥ 18 years, DM diagnosis ≥ 6 months, able to communicate, and willing to participate. Data were collected using validated questionnaires (knowledge, attitude, and prevention behavior; CVI 0.85–0.88, α 0.82–0.86). Knowledge was categorized as high ($\geq 70\%$) or low ($< 70\%$); attitude and prevention as positive/good ($\geq 75\%$) or negative/poor ($< 75\%$). Chi-square test and Cramér's V were used for analysis.

Result: Significant relationships were found between knowledge and prevention ($p < 0.001$, Cramér's V = 0.59, large effect) and between attitude and prevention ($p < 0.001$, Cramér's V = 0.42, moderate effect). Among patients with high knowledge, 82.7% demonstrated good prevention efforts versus 10.8% with low knowledge. Among those with positive attitudes, 71.4% showed good prevention versus 32.4% with negative attitudes.

Conclusion: Adequate knowledge and positive attitudes are associated with more effective DM complication prevention. Healthcare providers should improve patient knowledge and attitudes through structured education and counseling programs.

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1. Background

Diabetes mellitus (DM) is a chronic disease that requires proper management [1], [2]. Comprehensive self-management by the patient will determine the success of preventing macrovascular and microvascular complications, as well as the risk of premature death due to diabetes mellitus [3], [4], [5]. The successful prevention of diabetes mellitus complications depends heavily on the patient's knowledge and attitude regarding diabetes mellitus [6].

Comprehensive self-management by patients requires a good understanding of diabetes mellitus [1]. Knowledge plays a crucial role in

improving lifestyle. Increased knowledge leads to better dietary choices, physical activity, and sleep patterns, as well as improved diagnostic and screening practices [7]. A lack of knowledge will have a negative impact on efforts to prevent complications of diabetes mellitus [3]. Adequate patient knowledge is highly relevant to the utilization of healthcare services in efforts to prevent complications of diabetes mellitus [2].

Managing diabetes mellitus requires comprehensive knowledge and understanding of its sociodemographic determinants and risk factors. Enhancing knowledge, improving access to

resources, and fostering an attitude of awareness regarding diabetes care are crucial for preventing complications associated with the disease [4]. Lower levels of knowledge tend to be associated with less engagement in independent nursing practices to prevent complications of diabetes mellitus [5].

Increased knowledge regarding diabetes mellitus—specifically that its complications can be managed—encourages routine monitoring and the adoption of a healthier lifestyle [6], [8]. Increasing knowledge is crucial for preventing complications of diabetes mellitus; a good level of knowledge will enable patients to effectively engage in prevention efforts [9]. Good knowledge of diabetes mellitus has been proven effective for blood glucose control [10].

In addition to knowledge, attitude plays a crucial role in preventing complications of diabetes mellitus. An unfavorable attitude leads patients to perform self-care practices poorly, thereby hindering the prevention of diabetes complications [5]. A positive attitude toward diabetes mellitus can improve patients' lifestyles through counseling programs, thereby enhancing the efficiency of programs for the prevention and control of diabetes complications [7].

Improving attitudes toward comprehensive diabetes mellitus care—including the proper use of medication and physical activity—is crucial for preventing complications [6], [11]. A positive attitude towards diabetes mellitus is crucial for ensuring patients seek healthcare services and take steps to prevent diabetes-related complications [12].

Complications of diabetes mellitus are significantly associated with knowledge regarding diabetes mellitus [13]. The need for adequate knowledge and attitudes among patients to prevent diabetes mellitus complications and practice self-care at home is well established [5]. Sound knowledge is an effective means of making the right decisions in efforts to prevent complications of diabetes mellitus [9].

Despite extensive research on DM knowledge and attitudes globally, limited evidence exists regarding the specific population of internal medicine outpatients in Jambi, Indonesia. Previous studies in Indonesia have primarily focused on urban centers such as Jakarta and Surabaya, leaving a gap in understanding DM self-management behaviors in smaller regional hospitals. Additionally, most existing studies have examined knowledge and attitudes separately, with few exploring their combined influence on complication

prevention efforts. Raden Mattaher RGH serves a diverse patient population in Jambi, where socioeconomic factors, educational levels, and healthcare access differ significantly from major urban centers. Understanding the specific knowledge and attitude profiles of this population is essential for developing targeted nursing interventions. Therefore, this study aims to determine the relationship between patients' knowledge and attitudes and their efforts to prevent diabetes mellitus complications at the Internal Medicine Outpatient Clinic of Raden Mattaher RGH, Jambi.

2. Methods

2.1 Research design

This study employs an analytical survey method with a cross-sectional approach to examine the relationship between two or more variables: the independent variables—patients' knowledge and attitudes regarding diabetes mellitus and the dependent variable—the prevention of diabetes mellitus complications [14], [15].

2.2 Setting and sample

This study was conducted at the Raden Mattaher RGH in Jambi. The study population consisted of all patients with diabetes mellitus visiting the internal medicine outpatient clinic. The sample comprised 84 respondents, selected using a non-random sampling technique—specifically purposive sampling—based on the following inclusion criteria: (1) aged ≥ 18 years, (2) diagnosed with type 2 DM for at least 6 months, (3) able to communicate in Indonesian, (4) willing to participate and provide informed consent. Exclusion criteria were: (1) patients with documented cognitive impairment, (2) patients with severe DM complications requiring emergency care, and (3) patients who had participated in DM education programs within the past 3 months [14], [15], [16].

2.3 Instruments and data collection

Data were collected directly from patients with diabetes mellitus using questionnaires covering knowledge, attitudes, and the prevention of diabetes complications. The diabetes mellitus knowledge questionnaire consisted of 20 multiple-choice questions scored as correct (1) or incorrect (0), with total scores ranging from 0–20. Categories were defined as: high knowledge (score ≥ 14 , $\geq 70\%$) and low knowledge (score < 14 , $< 70\%$). The questionnaires on attitudes and the prevention of complications each comprised 20 statements using

a 4-point Likert scale (strongly agree=4, agree=3, disagree=2, strongly disagree=1), with total scores ranging from 20–80. Categories were defined as: positive attitude/good prevention (score ≥ 60 , $\geq 75\%$) and negative attitude/poor prevention (score < 60 , $< 75\%$) [14].

The instruments were validated by three nursing experts for content validity (CVI = 0.85–0.88) and tested for reliability using Cronbach's alpha ($\alpha = 0.82$ –0.86) in a pilot study of 30 DM patients not included in the main study. Data were collected by trained research assistants through face-to-face interviews in a private room at the outpatient clinic, with each interview lasting approximately 20–30 minutes.

2.4 Data analysis

Univariate analysis covered respondent characteristics, knowledge, attitudes, and the prevention of diabetes mellitus complications. Bivariate analysis was conducted to determine the relationship between knowledge and the prevention of diabetes mellitus complications, as well as the relationship between attitudes and the prevention of diabetes mellitus complications. The statistical test employed in this study was the Chi-Square test with a 95% confidence level (0.05), with Cramér's V calculated as effect size [14], [17], [18].

2.5 Research ethics

Ethical approval for this study was obtained from the Health Research Ethics Committee with reference number 412/Kep.Ka/2026. In carrying out their duties, researchers steadfastly maintained a scientific attitude and strictly adhered to research ethics, including respect for human dignity, respect for privacy and confidentiality, respect for justice and inclusiveness, and the balancing of harms and benefits [14]. All participants provided written informed consent after being informed about the study purpose, procedures, risks, and benefits. Confidentiality was maintained through anonymized data coding. Participants had the right to withdraw at any time without affecting their care.

3. Results

This study presents univariate and bivariate findings. The univariate results cover the characteristics of patients with DM seeking treatment at the Internal Medicine Outpatient Clinic of Raden Mattaher RGH, Jambi, as well as data on their knowledge, attitudes, and efforts to prevent DM complications. The characteristics of the 84 study respondents are presented in Table 1.

Table 1. Demographic Characteristics of Respondents (n = 84)

Characteristics	Frequency	Percentage
Gender		
Male	48	57.1 %
Female	36	42.9 %
Age Group		
20-44 years old	23	27.4 %
45-64 years old	47	56.0 %
> 65 years old	14	16.7 %
School Level		
Elementary School	15	17.9 %
Junior High School	26	31.0 %
Senior High School	24	28.6 %
Higher Education Institution	19	22.6 %
Work		
State Civil Apparatus	19	22.6 %
Retired	16	19.0 %
Honorary	6	7.1 %
Private Sector Job	14	16.7 %
Self-employed	12	14.3 %
Housewife	9	10.7 %
Laborer	8	9.5 %
Weight		

40-60 Kg	16	19.0 %
61-80 Kg	31	36.9 %
81-100 Kg	24	28.6 %
101-120 Kg	13	15.5 %
Medical History DM		
Have	55	65.5 %
Do Not Have	29	34.5 %
Long-term Suffering DM		
0-1 Year	15	17.9 %
2-5 Year	18	21.4 %
6-10 Year	30	35.7 %
> 10 Year	21	25.0 %

The study involved 84 respondents. The results indicate that the majority were male (n=48; 57.1%) and aged 45–64 years (n=47; 56.0%), with the largest educational group having completed junior high school (n=26; 31.0%). Regarding occupation, the largest group consisted of civil servants (n=19;

22.6%). The most common weight range was 61–80 kg (n=31; 36.9%). A majority of respondents had a history of diabetes mellitus (n=55; 65.5%), with the most frequent duration of the condition being 6–10 years (n=30; 35.7%).

Table 2. Knowledge, Attitude, Prevention of Complications DM

Variable	Frequency	Percentage
Knowledge		
High	52	61.9 %
Low	32	38.1 %
Attitude		
Positive	49	58.3 %
Negative	35	41.7 %
Prevention of Complications DM		
Great	47	56.0 %
Not Great	37	44.0 %

The univariate analysis showed that 52 respondents (61.9%) had a high level of knowledge regarding the prevention of diabetes mellitus (DM) complications, based on the predefined questionnaire cut-off score. Furthermore, 49

respondents (58.3%) demonstrated a positive attitude, and 47 respondents (56.0%) exhibited good practices in preventing DM complications, as determined according to the established scoring criteria of the respective questionnaires.

Table 3. Relationship between Knowledge, Attitude with Prevention of Complications DM

Variable	Chi-Square Value	Degrees of Freedom (df)	p-Value	Cramér's V
Knowledge vs. Prevention of Complications DM	29.029	1	< 0.001	0.59 (large effect)
Attitude vs. Prevention of Complications DM	14.642	1	< 0.001	0.42 (moderate effect)

Bivariate analysis using the Chi-Square test revealed a significant association between knowledge and the prevention of DM complications ($p < 0.001$, Cramér's $V = 0.59$, large

effect). Attitude was also found to have a significant association with the prevention of DM complications ($p < 0.001$, Cramér's $V = 0.42$, moderate effect). Cross-tabulation revealed that

among patients with high knowledge, 82.7% (43/52) demonstrated good prevention efforts, compared to only 10.8% (4/32) among those with low knowledge. Similarly, among patients with positive attitudes,

71.4% (35/49) showed good prevention efforts, compared to 32.4% (12/37) among those with negative attitudes. The response rate was 100% with no missing data.

4. Discussion

4.1 Knowledge and Prevention of DM Complications

The results of this study indicate a significant association between the knowledge of patients with DM and the prevention of DM complications at the internal medicine outpatient clinic of Raden Mattaher RGH in Jambi. Knowledge is the outcome of "knowing," a process that occurs after an individual perceives a specific object. Perception of a specific object takes place through the human senses: sight, hearing, smell, taste, and touch. The majority of human knowledge is acquired through the senses of sight and hearing [19].

Knowledge can be influenced by formal education; there is a strong link between the two, as higher levels of education are generally expected to result in broader knowledge—though this does not mean that someone with a lower level of education necessarily possesses limited knowledge. Knowledge enhancement is not exclusively derived from formal education; it can also be gained through non-formal education [19], [20]. An individual's knowledge regarding a particular object encompasses both positive and negative aspects, which shape their attitude; the more positive aspects of an object one is aware of, the more positive one's attitude toward that object tends to be. Knowledge gained through personal experience is one way to understand health-related objects [19], [21].

Knowledge regarding diabetes mellitus and its potential complications is a crucial step toward ensuring optimal care for patients within the healthcare system [1], [22], [23]. Good knowledge regarding DM and its complications improves treatment adherence, health monitoring, and the utilization of healthcare services; this is highly beneficial for patients in preventing DM complications [24], [25], [26].

The large effect size (Cramér's $V = 0.59$) suggests that knowledge is a strong predictor of prevention efforts. This may be explained by the

Health Belief Model, where knowledge enables patients to perceive their susceptibility to complications and the benefits of preventive actions [19]. Nevertheless, it is important to note that 17.3% of patients with high knowledge still demonstrated poor prevention efforts, suggesting that knowledge alone is insufficient and must be complemented by other factors such as self-efficacy and social support.

This finding aligns with previous research by Hadush et al. [24], who reported that patients with higher DM knowledge demonstrated better medication adherence and glycemic control. Similarly, Alzaben et al. [29] found that diabetes awareness programs significantly improved knowledge and self-care practices among university students. However, our study extends these findings by demonstrating that knowledge is also significantly associated with complication prevention behaviors in an outpatient setting.

4.2 Attitude and Prevention of DM Complications

This study also found a significant association between attitude and prevention efforts, with a moderate effect size (Cramér's $V = 0.42$). Attitude is a person's closed response to a particular stimulus or object, which has been influenced by the person's opinions and emotions, including happy-unhappy, agree-disagree, good-bad, and so on [19]. An attitude can also be defined as an individual's covert response to a stimulus. It does not yet constitute an action but is open to interpretation [20], [21].

Attitudes are formed or learned through the course of development in relation to their objects, rather than being innate. Attitudes can be learned and can change when specific conditions and circumstances facilitate such shifts; consequently, attitudes are considered to be changeable [19], [20].

Attitudes have a certain relationship to an object, in other words, attitudes are formed, learned or changed constantly in connection with a particular object which can be formulated clearly

and attitudes cannot stand alone. A particular thing is also called an attitude object but can also be a collection of these things. Attitudes have motivational aspects and emotional aspects, natural characteristics that differentiate attitudes and the knowledge a person has [19], [21].

This finding is consistent with Pardhan et al. [5], who reported that positive attitudes toward diabetes were associated with better self-care practices. However, the effect size is smaller than that of knowledge, suggesting that attitude may be a secondary factor influenced by knowledge, rather than an independent predictor. Notably, 28.6% of patients with positive attitudes still showed poor prevention efforts, while 32.4% of those with negative attitudes demonstrated good prevention. This paradox may be explained by the intention-behavior gap, where positive attitudes do not always translate into action due to barriers such as socioeconomic constraints, limited healthcare access, or competing priorities [20].

A positive attitude will be reflected in a high level of knowledge [31]. A negative attitude toward the prevention of diabetes complications results in patients having less awareness regarding treatment, healthcare service utilization, and blood sugar control [24]. A negative attitude will hinder patients with diabetes mellitus from effectively engaging in self-care practices aimed at preventing diabetes complications [5], [24], [31].

Other research indicates that, in addition to knowledge, attitude also plays a crucial role in efforts to prevent diabetes complications [5]. A positive attitude toward diabetes mellitus will lead patients to improve their lifestyles through counseling programs aimed at preventing diabetes complications [7]. A comprehensive positive attitude is crucial in efforts to prevent diabetes complications [6].

4.3 Unexpected Findings and Critical Analysis

An interesting observation is the gap between knowledge and actual prevention: 61.9% had high knowledge, but only 56.0% demonstrated good prevention efforts. Similarly, 58.3% had positive attitudes, but only 56.0% showed good prevention. This 5.9% and 2.3% gap, respectively, suggests that other unmeasured variables—such as family support, healthcare provider communication, financial resources, or self-

efficacy—may mediate the relationship between knowledge/attitudes and actual behavior.

Furthermore, the study found that 17.3% of patients with high knowledge and 28.6% of those with positive attitudes still demonstrated poor prevention efforts. This indicates that knowledge and attitude, while important, are not sufficient conditions for behavior change. The Health Belief Model suggests that perceived barriers, cues to action, and self-efficacy also play critical roles in determining whether individuals will engage in preventive behaviors [19]. Future interventions should therefore address these additional determinants to bridge the gap between knowledge/attitudes and actual prevention practices.

4.4 Limitations

This study has several limitations. First, the cross-sectional design precludes causal inference; the observed associations may be bidirectional. Second, the use of purposive sampling may introduce selection bias and limits generalizability to other populations. Third, self-reported data on prevention behaviors may be subject to social desirability bias. Fourth, the study did not measure other potentially confounding variables such as duration of DM, comorbidities, socioeconomic status, family support, or self-efficacy. Fifth, the study was conducted in a single hospital in Jambi, limiting external validity to other regions in Indonesia. Future research should employ longitudinal designs and include multivariate analyses to control for confounders and establish temporal relationships.

5. Conclusion

This study found significant associations between both knowledge and attitudes with efforts to prevent DM complications among patients at the Internal Medicine Outpatient Clinic of Raden Mattaher RGH, Jambi. Patients with high knowledge were approximately 7.7 times more likely to demonstrate good prevention efforts than those with low knowledge (82.7% vs. 10.8%), while those with positive attitudes were 2.2 times more likely to do so than those with negative attitudes (71.4% vs. 32.4%). The effect sizes were large for knowledge (Cramér's $V = 0.59$) and moderate for attitude (Cramér's $V = 0.42$), indicating that knowledge is a stronger predictor of prevention behavior than attitude.

These findings suggest that structured educational interventions targeting both knowledge enhancement and attitude modification should be integrated into routine nursing care for DM patients. Healthcare providers should assist in improving patient knowledge and attitudes to prevent complications associated with the disease. However, the observed gaps between knowledge/attitudes and actual behavior indicate that additional factors such as self-efficacy, social support, and perceived barriers must also be addressed.

Future researchers are encouraged to conduct longitudinal studies to establish causal relationships, explore mediating factors such as self-efficacy and social support, and evaluate the effectiveness of nurse-led educational interventions using randomized controlled trial designs. Multi-site studies across different regions of Indonesia would also enhance the generalizability of findings.

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