JURNAL KEPERAWATAN KOMPREHENSIF

OPEN ACCESS

Jurnal Keperawatan Komprehensif

(Comprehensive Nursing Journal)

A Journal of Nursing Values, Innovation, Collaboration, and Global Impact

Volume 11, Issue 4, October 2025

Published by STIKep PPNI Jawa Barat

ISSN 2354-8428, e-ISSN 2598-8727

Original Article

Knowledge of Disease Management and Complication Prevention Among Type 2 Diabetes Mellitus Patients in Tangerang District

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OPEN ACCESS

Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)

Volume 11 (4), 610-615
https://doi.org/10.33755/jkk.v11i3

Article info

Received : September 25, 2025
Revised : October 23, 2025
Accepted : October 26, 2025
Published : October 31, 2025

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Citation
Tammu, P. E., Irawan, R. I., Natalia, Z. S., & Saputri, A. (2025). Knowledge of disease management and complication prevention among type 2 diabetes mellitus patients in Tangerang District. Jurnal Keperawatan Komprehensif (*Comprehensive Nursing Journal*), 11(4), 610–615.

Website
https://journal.stikep-ppnijabar.ac.id/jkk

p-ISSN : 2354 8428
e-ISSN: 2598 8727

Abstract

Background: Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder with increasing prevalence. Patients' knowledge about T2DM is very important to prevent complications and improve quality of life.
Objectives: The aim of this study is to assess the level of knowledge of patients with T2DM at Puskesmas Curug.
Methods: The design of the study used a cross-sectional quantitative method with purposive sampling, and included 142 patients with T2DM who visited the Curug Health Center in February-April 2025. Data were collected using the Diabetes Knowledge Questionnaire (DKQ) consists of 24 items on three dimensions: baseline information, glycaemic control, and complications prevention.
Results: Results showed that 66.9% of patients had low level of knowledge, with most female respondents (69%).
Conclusions: The study concluded that the level of knowledge of patients with T2DM at Puskesmas Curug is still low. Specific educational programs need to be planned and implemented among the population for improvement in knowledge and disease management. Further research is recommended to explore factors influencing patient knowledge in order to make training interventions more effective.

Keywords: Cross-sectional studies, Diabetes Mellitus, Type 2, Glycemic Control.

INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) remains a major global health burden, contributing to high morbidity and mortality due to its chronic course and complications. Globally, more than 537 million adults are living with diabetes, and approximately 90% of these cases are T2DM (International Diabetes Federation (1). Indonesia ranks among the top ten countries with the highest prevalence, with more than 19.5 million adults affected, showing a continuing upward trend (1).

Insufficient patient knowledge regarding diabetes management leads to inadequate glycemic control and a higher risk of complications such as nephropathy, neuropathy, cardiovascular disease, and diabetic foot ulcers (2,3). Education-based self-care behaviors including diet control, physical activity, regular medication intake, and glucose monitoring require appropriate knowledge to prevent long-

term complications (4,5). Therefore, understanding patient knowledge levels becomes an urgent need, particularly in primary healthcare settings where most Indonesian T2DM patients receive ongoing care.

The Michigan Diabetes Knowledge Test (MDKT) serves as a valid tool for measuring patients' diabetes knowledge across essential domains including disease concepts, treatment, diet, and complication prevention(6,7). Studies in Southeast Asia indicate that knowledge levels vary widely, and many patients remain unaware of diabetes complications despite years of being diagnosed (8,9).

In Indonesia, evidence on diabetes knowledge continues to grow; however, findings are largely based on hospital samples, with fewer studies exploring real-world knowledge gaps in primary care where education is first delivered (10,11). Tangerang District is a rapidly urbanizing region, where lifestyle changes may increase metabolic risks, yet contextual assessments of diabetes knowledge among primary care outpatients remain limited.

There is a lack of localized, domain-specific evidence describing which aspects of diabetes knowledge are insufficient among T2DM patients in urban–peri-urban primary healthcare environments, such as Puskesmas Curug. Addressing this gap will strengthen the development of targeted patient education strategies to improve self-management and reduce complication risks. The aimed of this study was to assess the knowledge level of T2DM patients, particularly regarding disease management and complication prevention in Tangerang District.

METHODS

Study Design

This study utilized a descriptive cross-sectional design and was conducted at Puskesmas Curug, Tangerang District, ``Indonesia.

Sample and Sampling Technique

A total of 110 respondents participated in the study. Sampling was performed using a consecutive sampling technique based on the order of patient attendance during the data collection period.

Inclusion and Exclusion Criteria

Participants were eligible if they had been diagnosed with Type 2 Diabetes Mellitus for at least six months, were aged 18 years or older, were able to communicate verbally and in writing in Bahasa Indonesia, and were registered outpatients receiving routine diabetes care at Puskesmas Curug. Individuals with cognitive impairments that hindered questionnaire completion, as well as those presenting with acute or severe diabetic complications requiring hospital referral, were excluded.

Sample Size Determination

Sample size estimation was carried out using G*Power version 3.1 for a one-sample proportion test with a significance level (α) of 0.05, an effect size of 0.30, and power (1-β) of 0.80. The minimum required sample size was calculated as 88. To improve the precision of estimates and account for potential non-response, the final sample consisted of 142 respondents.

Instrument

Diabetes-related knowledge was assessed using the Diabetes Knowledge Questionnaire – 24 items (DKQ-24), originally developed by the University of Michigan Diabetes Research and Training Center and widely applied in primary care settings. The DKQ-24 consists of 24 multiple-choice items assessing essential knowledge related to diabetes pathology, medication use, diet management, glycemic control, and complication prevention. Each correct answer is given one point, while incorrect or unanswered responses are scored zero, resulting in a total score range of 0–24. Knowledge levels are interpreted as low (<12), moderate (12–18), and high (>18).

The instrument has demonstrated acceptable reliability, with internal consistency coefficients ranging from Cronbach's alpha of 0.72 to 0.78 in previous studies (Moss et al., 2020). The Indonesian language version of the DKQ-24 has been psychometrically evaluated and yielded Cronbach's alpha values of at least 0.80, suggesting strong internal reliability (Fauziyyah et al., 2021).

Data Collection Procedure

Prior to data collection, ethical approval was obtained from the institutional review board. Potential respondents who met the eligibility criteria were informed about the study's purpose and procedures and subsequently provided written informed consent. The DKQ-24 questionnaire was distributed and completed individually by participants in a private

consultation room to ensure confidentiality and minimize distractions. After returning the questionnaire, participants were provided with brief corrective education to enhance understanding of diabetes management.

Data Analysis

Data analysis was performed using SPSS version 29 (IBM Corp., Armonk, NY). Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and knowledge scores. Inferential statistics, including independent t-tests and one-way analysis of variance (ANOVA), were conducted to examine associations between knowledge level and demographic variables such as age, gender, disease duration, and education level. A p-value of less than 0.05 was set as the threshold for statistical significance.

Ethical consideration

This study has passed the ethics of the Ethics Committee of the Faculty of Nursing, Universitas Pelita Harapan with reference number: 095/KEPFON/II/2025. Written informed consent has been given by all respondents who fall within the inclusion criteria in this study.

RESULTS

Table 1 shows that all respondents totaled 142 people. The mean age of respondents was 52.39 ± 8.496 years old. The majority of respondents were female (69%), the majority had completed secondary education (33.1%), the majority were housewives (64.1%), the majority had access to health information from health care professionals (71.1%). Most respondent (78.2%) had diabetes aged 0-4 years and most had no family history of T2DM (53.5%).

Tabel 1. Demographic characteristic among study population

Variables	N (%)	Mean ± SD
Age		52.39 ± 8.496
Gender		
Females	98 (69)	
Males	44 (31)	
Education Level		
Not graduated from elementary school	8 (5.6)	
Elementary School	46 (32.4)	
High School	28 (19.7)	
Senior High School	47 (33.1)	
Diploma	4 (2.8)	
Bachelor's Degree	4 (2.8)	
	5 (3.5)	
Occupation		
Self-employed	45 (31.7)	
Housewife/Not Working	91 (64.1)	
Other	6 (4.2)	
Source of Information		
Digital Media	32 (22.5)	
News	7 (4.9)	
Health workers	101 (71.1)	
Other	2 (1.4)	
Duration of DMT2 (Year)		
0-4	111 (78.2)	
≥5	31 (21.8)	
Family History with DMT2		
Yes	66 (46.5)	
No	76 (53.5)	

Table 2 shows that the knowledge level of most respondents are low, namely 95 respondents (66.9%). This result suggests that most T2DM patients do not have a proper understanding of their disease.

Table 3 presents an analysis of each questionnaire item by dimension. On the basic information dimension, some respondents (58.5%) answer incorrectly in the statement "Trembling and sweating are signs of high blood sugar levels". The majority of respondents (56.3%) answered incorrectly on the statement "Frequent urination and feeling thirsty are signs of low blood sugar". As regards glycemic control, the majority of respondents (68.3%) answered incorrectly on the statement "Regular exercise will increase the need for the hormone insulin or other diabetes medications". The majority of respondents (52.1%) answered incorrectly on the statement "Medication is more important to control diabetes than maintaining diet and exercise".

Table 2 Level of Knowledge among Patient with T2DM (n=142)

Level of knowledge	Frequency (%)
Low	95 (66.9)
Middle	28 (19.7)
High	19 (13.4)

Table 3. DKQ-24 item analysis by dimension (N = 142)

Item	Statement (translated)	True n (%)	False n (%)
Basic Information			
1	Consuming many sugary/sweet foods causes diabetes.	12 (8.5)	130 (91.5)
2	A common cause of diabetes is insufficient effective insulin in the body.	72 (50.7)	70 (49.3)
3	Diabetes is caused by kidney failure to filter sugar from urine.	64 (45.1)	78 (54.9)
4	The kidneys produce the hormone insulin.	54 (38.0)	88 (62.0)
6	If I have diabetes, my children are at higher risk of developing diabetes.	98 (69.0)	44 (31.0)
7	Diabetes can be cured.	67 (47.2)	75 (52.8)
11	There are two types of diabetes: type 1 (insulin-dependent) and type 2 (insulin resistance).	78 (54.9)	64 (45.1)
12	Hypoglycemia is caused by eating too much food.	42 (29.6)	100 (70.4)
21	Trembling and sweating are signs of **high** blood sugar.[2]	83 (58.5)	59 (41.5)
22	Frequent urination and thirst are signs of **low** blood sugar.[2]	80 (56.3)	62 (43.7)
	Glycemic Control		
5	In untreated diabetes, blood sugar levels usually increase.	123 (86.6)	19 (13.4)
8	A fasting blood glucose of 210 is very high.	110 (77.5)	32 (22.5)
9	The best way to check for diabetes is a urine test.	38 (26.8)	104 (73.2)
10	Regular exercise increases the need for insulin or other diabetes medications.[2]	97 (68.3)	45 (31.7)
13	Medication is more important for diabetes control than diet and exercise.[2]	74 (52.1)	68 (47.9)
18	How I prepare food is as important as the type of food I eat.	107 (75.4)	35 (24.6)
24	A diabetes diet mostly consists of special foods.	114 (80.3)	28 (19.7)
Complication Prevention			
14	Diabetes often leads to poor circulation.	93 (65.5)	49 (34.5)
15	Cuts and wounds in people with diabetes heal more slowly.	108 (76.1)	34 (23.9)
16	People with diabetes should be careful when trimming their nails.	102 (71.8)	40 (28.2)
17	People with diabetes should clean wounds with iodine and alcohol.	106 (74.6)	36 (25.4)
19	Diabetes can damage the kidneys.	99 (69.7)	43 (30.3)
20	Diabetes can reduce sensation (e.g., numbness) in hands, fingers, and feet.	109 (76.8)	33 (23.2)
23	Tight elastic stockings/socks are not harmful for people with diabetes.	47 (33.1)	95 (66.9)

DISCUSSION

This study aims to determine the knowledge of T2DM patients at one of the health centers in Tangerang. This study showed that most T2DM patients in Puskesmas Curug had low levels of knowledge. These results are in line with those of previous studies (3). Similarities in the results of the study can occur due to similarities in the characteristics of respondents who are mostly housewives, do not work, and do nor university degrees. Patients with less than 6 years of education are more likely to develop complications associated with diabetes. Educational attainment at a certain level may be related to health literacy. Health literacy enables patients to understand health information better (7).

Most respondents still lack basic knowledge of the causes of diabetes, the signs and symptoms of hyperglycemia and hypoglycemia. In patients with T2DM, understanding the signs and symptoms of hyperglycemia may reflect their ability to control their blood glucose level. The ability of T2DM patients to recognize and act upon signs and symptoms of hypoglycemia depends on the patient's ability to recognize the symptoms and signs, and this awareness is based on knowledge of the disease (8). In this study, respondents still did not understand the effect of exercise on medicines used to control blood sugar. This indicates that there is a need for respondents to be educated on how the unity of self-care consisting of medication, exercise, and dietary management plays a role and works together in maintaining stable blood glucose. Other studies confirm that healthy diet, regular exercise and insulin injections are the best way to control diabetes (8)

Yasin and Siska show a different result, namely the level of knowledge of T2DM patients is at a medium to high level (12,13). This difference in results can occur due to differences in respondent characteristics, namely the duration of diagnosis of T2DM which is more than 5 years. Whereas in this study almost all respondents had been diagnosed for a range of 0-4 years. The length of T2DM from the time of initial diagnosis is one of the factors that may predict diabetes knowledge (9).

In this study, most respondents received information about health from healthcare professionals, but the level of knowledge of patients was still low. These results indicate that T2DM patients still rely heavily on healthcare professionals for information and are not used to seeking information from other sources. This is evidenced by the lack of respondents accessing digital or print media to obtain information. Inadequate information-seeking ability in T2DM patients can affect patients' ability to receive information and knowledge about the disease and how to manage it (10). If T2DM patients have the habit of seeking information, then this habit can be used to improve their condition (11). The more sources of information accessed by patients, the easier it is for patients to improve their diabetes-related knowledge, and the better their glycemic control (10). This highlights the need for educational programs for patients. The education program that is carried out can then be tailored to the needs of patients personally through various educational or consultation media.

This study was limited to T2DM patients who visited Puskesmas Curug. Therefore, the results obtained in this study cannot be generalized to all T2DM patients in Indonesia. This is one of the limitations of this study. Future research recommendations are suggested to identify socio-demographic factors associated with knowledge possessed by T2DM patients in a larger sample to generalize the findings. Qualitative studies may also be carried out to explore more closely how patients experience applying knowledge to their disease management practices and the obstacles encountered.

CONCLUSION

This study showed a low level of knowledge about diabetes. Most respondents were not familiar with basic information on diabetes and glycemic control. Therefore, specific educational programs for the population should be planned and implemented to improve knowledge and disease management.

Acknowledgments

The researcher would like to thank all those who have helped and contributed to this research, especially the respondents who have volunteered to fill out our questionnaire and the Puskemas Curug which is our research site. The researchers would also like to thank the Centre for Research and Community Development-Universitas Pelita Harapan for funding this study's publication.

Funding Statement

This study did not receive specific funding for the research process. Publication support was provided by the Centre for Research and Community Development, Universitas Pelita Harapan

Author Contributions

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Conflict of Interest

The authors have no conflict of interest to declare.

Data Availability Statement

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request, subject to ethical approval and data protection regulations.

REFERENCES

1. International Diabetes Federation. Diabetes Atlas. 2021.
2. Khairuddin, R. B. M., Ramli, R. M., Muhammad RB. Determinants of diabetes self-management practices among type 2 diabetes mellitus patients in primary health clinics in Terengganu, Malaysia: a cross-sectional study. Int J Environ Res Public Health. 2023;20(4):3624.
3. Ahmad, N., Islahudin, F., Sarkar C. Assessment of knowledge, attitude, and practice among type 2 diabetes mellitus patients in a tertiary care hospital in Malaysia. J Public health Res. 2020;9(2):1735.
4. Alanzi T. mHealth for Diabetes Self-Management: A Systematic Review. J Multidiscip Healthc. 2023;
5. Mahadzir, K. A., Ismail, S. A., Nordin, S. N., Manap RA. Effectiveness of a knowledge-based diabetes education programme on self-care management practices among type 2 diabetes mellitus patients in a community health center. Malaysian J Public Heal Med. 2022;22(1):101–10.
6. Feleke Y, Tegegne F, Berhane Y. Diabetes knowledge and self-care practices among diabetic patients in Addis Ababa, Ethiopia: a cross-sectional study. BMC Public Health. 2019;20:324.
7. Alramadan MJ, Alhumaid AA, Alawami SA, Alkashkool NA, Alnasir FA, Binhijji IA. Diabetes knowledge, health literacy and diabetes self-care in relation to self-care practices among older adults with type 2 diabetes. BMC Public Health. 2022;24(1):3097.
8. Memon et al. Diabetes Guidelines 2022" dan komplikasi diabetes di Asia Tenggara. Lancet Reg Heal – Southeast Asia. 2022;4.
9. Chua et al. Case series of genetically confirmed index cases of familial hypercholesterolemia in primary care. Am J Case Rep. 2023;1–12.
10. Fauziyyah WR. Gambaran Pengetahuan, Persepsi, dan Kepatuhan Diet pada Penderita Diabetes Melitus Tipe 2 di Puskesmas Tamansari Kota Tasikmalaya [Internet]. 2023. Available from: https://repo.poltekkestasikmalaya.ac.id/3280/4/HALAMAN JUDUL.pdf
11. Siahaan SMR, Alimuddin MA, Sari IM. Diabetes Mellitus Knowledge Among Communities in Pontianak City. J Acad Sci [Internet]. 2023;2(2). Available from: http://thejoas.com/index.php/thejoas/article/view/278
12. Rusmayanti PSA, Manto OAD, Santoso BR. Hubungan Pengetahuan dengan Kualitas Hidup Penderita Diabetes Melitus Tipe 2 di Puskesmas Terminal Banjarmasin. Indones J Nurs Heal Sci [Internet]. 2024;9(1). Available from: https://ejurnal.esaunggul.ac.id/index.php/IJNHS/article/view/7286/pdf
13. Yasin NM, Ekasari MP, Prabasworo W, Arom S, Ridhayani F. Knowledge Level and Information Needs of Patients with Diabetes in Yogyakarta City, Indonesia. Heal Educ Heal Promot [Internet]. 2024;12(3):431–8. Available from: https://hehp.modares.ac.ir/article-5-76292-en.html