



The Association Between Knowledge and Foot Wound Prevention Behavior Among Patients with Type 2 Diabetes Mellitus at the Pasar Minggu Community Health Center

Tommy J.F. Wowor*

Universitas Nasional,
INDONESIA

Retno Widowati

Universitas Nasional,
INDONESIA

Firohmatin

Universitas Indonesia,
INDONESIA

Dea Aprilia

Universitas Nasional,
INDONESIA

*** Corresponding author:**

Tommy J.F. Wowor, Universitas Nasional, INDONESIA. ✉ tommywowor@civitas.unas.ac.id

Article Info

Article history:

Received: June 14, 2026

Revised: July 15, 2026

Accepted: July 29, 2026

Keywords:

Diabetic Foot Ulcer Prevention,
Knowledge Level,
Type 2 Diabetes Mellitus.

Abstract

Background of study: Diabetes Mellitus is a chronic disease associated with various long-term complications, including diabetic foot wounds, which may lead to infection, lower-extremity amputation, disability, and increased mortality if not properly prevented. Effective prevention relies on patients' adherence to appropriate foot care practices, which may be influenced by their level of knowledge regarding diabetes and foot care.

Aims and scope of paper: This study examined the association between knowledge level and foot wound prevention behavior among patients with Type 2 Diabetes Mellitus at the Pasar Minggu Community Health Center.

Methods: A quantitative study with a cross-sectional design was conducted among 56 patients with Type 2 Diabetes Mellitus selected through total sampling. Data were collected using the Diabetes Knowledge Questionnaire (DKQ-24) and a foot wound prevention behavior questionnaire. Univariate analysis was performed to describe respondent characteristics, while the Pearson chi-square test was used to determine the association between knowledge level and foot wound prevention behavior.

Result: Most respondents demonstrated a moderate level of knowledge (75.0%), while 64.3% exhibited a high level of foot wound prevention behavior. Statistical analysis revealed a significant association between the level of knowledge and foot wound prevention behavior ($p = 0.016$), indicating that respondents with higher knowledge levels were more likely to demonstrate appropriate preventive practices.

Conclusion: Knowledge level was significantly associated with foot wound prevention behavior among patients with Type 2 Diabetes Mellitus. These findings highlight the importance of strengthening patient education on diabetic foot care to support preventive practices and reduce the risk of diabetes-related foot complications.

To cite this article: Wowor, T. J. F., Widowati, R., Firohmatin, F., & Aprilia, D. (2026). The Association Between Knowledge and Foot Wound Prevention Behavior Among Patients with Type 2 Diabetes Mellitus at the Pasar Minggu Community Health Center. *Journal of Nursing Management Innovations*, 2(1), 50–56. <https://doi.org/10.58723/jnmi.v2i1.100>

This article is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/) ©202x by author/s

INTRODUCTION

Diabetes Mellitus (DM) is one of the fastest-growing chronic non-communicable diseases and remains a major global public health concern because of its continuously increasing prevalence and associated complications (Hossain et al., 2024; Lin et al., 2020). Type 2 Diabetes Mellitus accounts for more than 95% of all diabetes cases worldwide and represents the most common form of the disease (World Health Organization [WHO], 2024). Persistent hyperglycemia can lead to various microvascular and macrovascular complications, including diabetic foot wounds, which may result in infection, lower-limb amputation, reduced quality of life, and even death if not appropriately prevented and managed (Armstrong et al., 2017).

Preventing diabetic foot wounds is an essential component of diabetes management because most cases can be minimized through appropriate self-care practices (Bus et al., 2023). Effective prevention depends largely on patients' adherence to daily preventive behaviors, including routine foot inspection, maintaining foot hygiene, wearing appropriate footwear, and maintaining optimal blood glucose control (Bus et al., 2023; PERKENI, 2021). Knowledge plays an important role in shaping these preventive behaviors, as patients who understand diabetes and its potential complications are more likely to adopt appropriate self-care practices and reduce the risk of diabetic foot wounds (American Diabetes Association [ADA], 2024).

Previous studies have consistently reported that higher levels of diabetes-related knowledge are associated with better foot wound prevention behavior among patients with Type 2 Diabetes Mellitus. Patients with greater knowledge of diabetes and foot care are more likely to perform appropriate preventive practices, including routine foot inspection, proper foot hygiene, and early recognition of foot abnormalities (Bus et al., 2023; ADA, 2024). In addition, a previous study conducted at the Pasar Minggu Community Health Center found a significant association between patients' knowledge and diabetic foot ulcer prevention behavior ($p < .05$), indicating that improved knowledge may contribute to better preventive practices. However, further investigation remains important to strengthen the evidence in different patient populations and healthcare settings.

At the Pasar Minggu Community Health Center, patients with Type 2 Diabetes Mellitus routinely receive education regarding diabetes management, including diabetic foot care. However, differences in patients' knowledge and adherence to recommended preventive practices are still observed in clinical settings. Understanding the relationship between knowledge and foot wound prevention behavior is therefore important to provide evidence that can support the development of more effective educational interventions and improve preventive care for patients with Type 2 Diabetes Mellitus. Therefore, this study aimed to analyze the relationship between knowledge and foot wound prevention behavior among patients with Type 2 Diabetes Mellitus at the Pasar Minggu Community Health Center.

METHODS

This study employed a quantitative analytical design with a cross-sectional approach to examine the relationship between knowledge level and foot wound prevention behavior among patients with Type 2 Diabetes Mellitus. The study was conducted at the Pasar Minggu Community Health Center, South Jakarta. The study population consisted of all patients with Type 2 Diabetes Mellitus registered within the community health center's service area. A total sampling technique was used, in which all eligible patients who met the inclusion criteria were recruited. Eligible participants were active members of the Integrated Chronic Disease Management Program (Prolanis) during January and February 2026, resulting in a final sample of 56 respondents.

Data were collected using two research instruments: the Diabetes Knowledge Questionnaire (DKQ-24) and a foot wound prevention behavior questionnaire. The DKQ-24 consists of 24 items that assess respondents' knowledge of Diabetes Mellitus and diabetic foot care. Each correct answer received one point, whereas incorrect and "do not know" responses received zero points. The total knowledge score was converted into a percentage and classified into three categories: poor (<55%), moderate (56–75%), and good (76–100%), according to the questionnaire scoring guideline. Foot wound prevention behavior was measured using a 15-item Likert-scale questionnaire that assessed respondents' daily preventive practices. Both instruments had previously demonstrated acceptable reliability, with Cronbach's Alpha coefficients of 0.719 for the knowledge questionnaire and 0.749 for the foot wound prevention behavior questionnaire.

Data collection was conducted in February 2026 after obtaining administrative approval from the Faculty of Health Sciences, Universitas Nasional, the South Jakarta Health Office, and the Head of the Pasar Minggu Community Health Center. Ethical approval was obtained from the Health Research Ethics Committee of Universitas Nasional (Ethical Clearance No. 038/e-KEPK/FIKES/I/2026). Data collection was assisted by trained nurses working at the community health center. Before participation, respondents received an explanation of the study objectives, procedures, potential benefits, confidentiality of the collected information, and their rights as

participants. Written informed consent was obtained from all respondents prior to completing the questionnaires.

The collected data were checked for completeness before being analyzed using statistical software. Univariate analysis was performed to describe respondents' demographic characteristics, knowledge level, and foot wound prevention behavior using frequencies and percentages. Bivariate analysis was conducted using the Pearson Chi-Square test to examine the association between knowledge level and foot wound prevention behavior. Statistical significance was established at $p < 0.05$.

RESULTS AND DISCUSSION

Results

Respondent Characteristics

Table 1. Respondent Characteristics

Characteristics	Frequency (N)	Percentage(%)
Gender		
Male	28	50
Female	28	50
Age		
Matur (20-59 Years Old)	36	64,3
Elderly (>60 Years)	20	35,7
Total	56	100

Table 1 presents the demographic characteristics of the respondents. Of the 56 respondents, 28 (50.0%) were male and 28 (50.0%) were female. Most respondents were adults aged 20–59 years (64.3%), whereas 35.7% were older than 60 years.

a. Foot Wound Prevention Behaviors

Table 2. Distribution of Foot Wound Prevention Behaviors

Preventive Behavior	Frequency (N)	Percentage (%)
High	36	64,3
Moderate	20	35,7
Total	56	100

Table 2 shows that most respondents demonstrated a high level of foot wound prevention behavior (64.3%), whereas 35.7% exhibited a moderate level of preventive behavior.

b. Knowledge Level

Table 3. Distribution of Knowledge Levels Regarding Diabetes and Foot Care

Knowledge Level	Frequency (N)	Percentage (%)
Good	14	25
Moderate	42	75
Total	56	100

Table 3 shows that the majority of respondents demonstrated a moderate level of knowledge (75.0%), whereas the remaining respondents demonstrated a good level of knowledge (25.0%).

c. Relationship Between Knowledge Level and Foot Wound Prevention Behavior

Table 4. Relationship Between Knowledge Level and Foot Wound Prevention Behavior

Level of Knowledge	Preventive Behavior				P-value
	Low	Moderate	High	Total	

	n	%	n	%	n	%	n	%	
Poor	0	0,0	5	38,5	8	61,5	13	100	0,016*
Moderate	1	4,0	13	52,0	11	44,0	25	100	
Good	0	0,0	1	5,6	17	94,4	18	100	
Total	1	1,8	19	33,9	36	64,3	56	100	

The Pearson Chi-Square test revealed a significant association between knowledge level and foot wound prevention behavior among patients with Type 2 Diabetes Mellitus ($p = 0.016$). Respondents with good knowledge were more likely to demonstrate high preventive behavior (94.4%), whereas respondents with sufficient knowledge predominantly exhibited moderate preventive behavior (52.0%).

Discussion

The present study found an equal distribution of male and female respondents, with each group accounting for 50.0% of the study population. In addition, most respondents were adults aged 20–59 years (64.3%), while the remaining participants were older than 60 years. These findings indicate that Type 2 Diabetes Mellitus affects both men and women and is commonly observed among adults and older individuals. The increasing prevalence of Type 2 Diabetes Mellitus with advancing age has been attributed to age-related physiological changes, including decreased pancreatic β -cell function, increased insulin resistance, and reduced glucose metabolism. Furthermore, the International Diabetes Federation reported that the burden of Type 2 Diabetes Mellitus continues to increase worldwide, particularly among middle-aged and older adults ([International Diabetes Federation \[IDF\], 2025](#)).

The present study found that most respondents had a moderate level of knowledge regarding diabetes and foot wound prevention. This finding suggests that although respondents had acquired basic knowledge about diabetes management, there is still room to improve their understanding of diabetic foot care and preventive practices. Adequate knowledge is considered a fundamental component of diabetes self-management because it enables patients to recognize risk factors, understand the importance of preventive measures, and make informed decisions regarding their daily self-care. The American Diabetes Association (ADA) emphasizes that Diabetes Self-Management Education and Support (DSMES) plays a crucial role in improving patients' knowledge, self-care skills, and long-term diabetes outcomes ([American Diabetes Association \[ADA\], 2024](#)). Similarly, the Indonesian Society of Endocrinology (PERKENI) recommends continuous patient education as an essential strategy to prevent diabetes-related complications, including diabetic foot wounds ([PERKENI, 2021](#)). Therefore, strengthening educational interventions may help improve patients' knowledge and encourage more effective foot wound prevention practices.

The findings also showed that most respondents demonstrated good foot wound prevention behavior. This result indicates that many participants had adopted recommended preventive practices, such as routine foot care and other self-management behaviors aimed at reducing the risk of diabetic foot wounds. One possible explanation is that respondents were actively enrolled in the Integrated Chronic Disease Management Program (Prolanis), which routinely provides health education, regular health monitoring, and ongoing interactions with healthcare professionals. Through these activities, Prolanis may reinforce patients' understanding of diabetes management and encourage the consistent adoption of recommended foot care practices. Current international guidelines emphasize that consistent preventive behaviors, including regular foot inspection, proper foot hygiene, appropriate footwear use, and timely recognition of foot problems, are essential for reducing the risk of diabetic foot ulcers ([Bus et al., 2023](#)). Likewise, PERKENI recommends continuous patient education and regular foot care as key strategies to prevent diabetes-related foot complications ([PERKENI, 2021](#)). These findings suggest that ongoing education and structured diabetes management programs may contribute to better foot wound prevention behavior among patients with Type 2 Diabetes Mellitus.

The present study demonstrated a statistically significant association between knowledge level and foot wound prevention behavior among patients with Type 2 Diabetes Mellitus ($p = 0.016$). Greater patient knowledge was associated with better foot wound prevention behavior.

These findings suggest that adequate knowledge may encourage patients to adopt appropriate self-care practices, including routine foot inspection, proper foot hygiene, and the use of appropriate footwear. Consistent with these findings, the American Diabetes Association (ADA) emphasizes that Diabetes Self-Management Education and Support (DSMES) enhances patients' knowledge and self-management skills, thereby promoting healthier behaviors and improving long-term diabetes outcomes (American Diabetes Association [ADA], 2024). Likewise, the International Working Group on the Diabetic Foot (IWGDF) recommends structured patient education as an essential component of diabetic foot ulcer prevention because informed patients are more likely to perform appropriate preventive foot care (ElSayed et al., 2023; McDermott et al., 2022; Nather et al., 2018).

These findings are consistent with those reported by Aryani et al. (2022), who also found a significant association between knowledge and diabetic foot ulcer prevention among patients with Type 2 Diabetes Mellitus. Although knowledge plays an important role in supporting preventive behavior, it is unlikely to be the only influencing factor. Other factors, such as previous experience, family support, health education provided by healthcare professionals, and access to healthcare services, may also contribute to patients' adherence to recommended preventive practices. Therefore, continuous patient education combined with comprehensive support from healthcare providers is essential to strengthen foot wound prevention behavior among patients with Type 2 Diabetes Mellitus.

CONCLUSION

This study found a statistically significant association between knowledge level and foot wound prevention behavior among patients with Type 2 Diabetes Mellitus at the Pasar Minggu Community Health Center. Respondents with higher levels of knowledge tended to demonstrate better foot wound prevention behavior, highlighting the importance of patient knowledge in supporting appropriate self-care practices. These findings emphasize the need for continuous diabetes education and structured foot care programs to improve preventive behaviors and reduce the risk of diabetic foot complications. Future studies are recommended to include larger sample sizes, multiple healthcare settings, and additional factors that may influence foot wound prevention behavior, such as family support, duration of diabetes, educational level, and treatment adherence.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the Faculty of Health Sciences, Universitas Nasional, for their academic support throughout this study. The authors also thank the Pasar Minggu Community Health Center, the healthcare staff who assisted with data collection, and all respondents who willingly participated in this research. Their cooperation and support made this study possible.

AUTHOR CONTRIBUTION STATEMENT

TJFW conceptualized and designed the study, supervised the research process, validated the methodology, interpreted the study findings, and critically revised the manuscript. RW supervised the research, participated in data collection, performed the statistical analysis, contributed to the interpretation of the findings, and critically revised the manuscript. FM reviewed the manuscript, provided scientific expertise, contributed to the interpretation of the findings, and participated in the final evaluation of the manuscript. All authors reviewed and approved the final version of the manuscript.

REFERENCES

- American Diabetes Association. (2024). *Standards of Care In Diabetes 2024*. *Diabetes Care*, 47(Suppl. 1), S1–S350. <https://doi.org/10.2337/dc24-SINT>
- Armstrong, D. G., Boulton, A. J. M., & Bus, S. A. (2017). Diabetic Foot Ulcers And Their Recurrence. *New England Journal of Medicine*, 376(24), 2367–2375. <https://doi.org/10.1056/NEJMra1615439>

- Aryani, M., Hisni, D., & Lubis, R. (2022). Hubungan Tingkat Pengetahuan Dan Sikap Terhadap Pencegahan Ulkus Kaki Diabetik Pada Pasien DM tipe 2. *Jurnal Keperawatan dan Kesehatan Masyarakat Cendekia Utama*, 11(3), 184–191. <https://doi.org/10.31596/jcu.v11i3.1205>
- Boulton, A. J. M., Armstrong, D. G., Albert, S. F., et al. (2008). Comprehensive foot examination and risk assessment. *Diabetes Care*, 31(8), 1679–1685. <https://doi.org/10.2337/dc08-9021>
- Bus, S. A., Armstrong, D. G., Gooday, C., et al. (2023). *IWGDF Guidelines on the prevention of foot ulcers in persons with diabetes. International Working Group on the Diabetic Foot*, 40 (3). <https://doi.org/10.1002/dmrr.3651>
- Bus, S. A., van Netten, J. J., Lavery, L. A., et al. (2020). IWGDF guideline on the prevention of foot ulcers in at-risk patients with diabetes. *Diabetes/Metabolism Research and Reviews*, 36(S1), e3269. <https://doi.org/10.1002/dmrr.3269>
- Dorresteijn, J. A. N., Kriegsman, D. M. W., Assendelft, W. J. J., & Valk, G. D. (2014). Patient education for preventing diabetic foot ulceration. *Cochrane Database of Systematic Reviews*, CD001488. <https://doi.org/10.1002/14651858.CD001488.pub5>
- ElSayed, N. A., Aleppo, G., Bannuru, R. R., Bruemmer, D., Collins, B. S., Ekhlaspour, L., Gibbons, C. H., Giurini, J. M., Hilliard, M. E., Johnson, E. L., Khunti, K., Lingvay, I., Matfin, G., McCoy, R. G., Perry, M. Lou, Pilla, S. J., Polsky, S., Prahalad, P., Pratley, R. E., ... Gabbay, R. A. (2023). 12. Retinopathy, Neuropathy, and Foot Care: Standards of Care in Diabetes—2024. *Diabetes Care*, 47. <https://doi.org/10.2337/dc24-s012>
- Everett, E., & Mathioudakis, N. (2018). Update on diabetic foot ulcers. *Annals of the New York Academy of Sciences*, 1411(1), 153–165. <https://doi.org/10.1111/nyas.13569>
- Fatmona, F. A., Permana, D. R., & Sakurawati, A. (2023). Gambaran tingkat pengetahuan masyarakat tentang pencegahan diabetes melitus tipe 2. *Mahesa: Malahayati Health Student Journal*, 3(12), 4166–4178. <https://doi.org/10.33024/mahesa.v3i12.12581>
- Hossain, M. J., Al-Mamun, M., & Islam, M. R. (2024). Diabetes mellitus, the fastest growing global public health concern: Early detection should be focused. *Health Science Reports*, 7(3). <https://doi.org/10.1002/hsr2.2004>
- Hotimah, O. (2017). Magister Pendidikan Geografi Fakultas Ilmu Sosial Universitas Negeri Jakarta. *Researchgate.Net*. https://www.researchgate.net/profile/Arie-Feryanto/publication/355368370_Bahan_Ajar_Non_Cetak/links/616d1216b90c5126625fe5eb/Bahan-Ajar-Non-Cetak.pdf
- International Diabetes Federation. (2021). *IDF Diabetes Atlas* (10th ed.). Brussels: International Diabetes Federation.
- International Diabetes Federation. (2025). *IDF Diabetes Atlas* (11th ed.). Brussels: International Diabetes Federation.
- Jannah, L. R., Elvira, D., Noer, M., et al. (2024). Profil pasien diabetes melitus tipe 2 dengan ulkus kaki diabetik di RSUP Dr. M. Djamil Padang tahun 2020–2021. *Jurnal Ilmu Kesehatan Indonesia*, 5(2), 121–130. <https://doi.org/10.25077/jikesi.v5i2.1114>
- Kementerian Kesehatan Republik Indonesia. (2023). *Profil Kesehatan Indonesia 2023*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Kerr, M., Barron, E., Chadwick, P., et al. (2019). The cost of diabetic foot ulcers and amputations. *Diabetic Medicine*, 36(8), 995–1002. <https://doi.org/10.1111/dme.13973>
- Lin, X., Xu, Y., Pan, X., Xu, J., Ding, Y., Sun, X., Song, X., Ren, Y., & Shan, P.-F. (2020). Global, regional, and national burden and trend of diabetes in 195 countries and territories: an analysis from 1990 to 2025. *Scientific Reports*, 10(1). <https://doi.org/10.1038/s41598-020-71908-9>
- Lipsky, B. A., Senneville, E., Abbas, Z. G., et al. (2020). Guidelines on the diagnosis and treatment of foot infection in persons with diabetes. *Diabetes/Metabolism Research and Reviews*, 36(S1), e3280. <https://doi.org/10.1002/dmrr.3280>
- McDermott, K. M., Fang, M., Boulton, A. J. M., Selvin, E., & Hicks, C. W. (2022). Etiology, Epidemiology, and Disparities in the Burden of Diabetic Foot Ulcers. *Diabetes Care*, 46(1), 209–221. <https://doi.org/10.2337/dci22-0043>
- Monteiro-Soares, M., Russell, D., Boyko, E. J., et al. (2020). IWGDF guideline on risk stratification. *Diabetes/Metabolism Research and Reviews*, 36(S1), e3271. <https://doi.org/10.1002/dmrr.3273>
- Nather, A., Cao, S., Chen, J. L. W., & Low, A. A. Y. (2018). Prevention of diabetic foot complications.

- Singapore Medical Journal*, 59(6), 291–294. <https://doi.org/10.11622/smedj.2018069>
- Notoatmodjo, S. (2018). *Promosi kesehatan dan perilaku kesehatan*. Jakarta: Rineka Cipta.
- PERKENI. (2021). *Pedoman pengelolaan dan pencegahan diabetes melitus tipe 2 dewasa di Indonesia*. Jakarta: PB PERKENI.
- Powers, M. A., Bardsley, J., Cypress, M., et al. (2020). Diabetes self-management education and support in adults. *Diabetes Care*, 43(7), 1636–1649. <https://doi.org/10.2337/dci20-0023>
- Schaper, N. C., van Netten, J. J., Apelqvist, J., et al. (2020). Practical guidelines on diabetic foot management. *Diabetes/Metabolism Research and Reviews*, 36(S1), e3266. <https://doi.org/10.1002/dmrr.3266>
- Skafjeld, A., Iversen, M. M., Holme, I., et al. (2015). Knowledge and behavior in diabetic foot care. *Journal of Clinical Nursing*, 24(9–10), 1408–1417.
- Van Netten, J. J., Bus, S. A., Apelqvist, J., et al. (2020). Definitions and criteria for diabetic foot disease. *Diabetes/Metabolism Research and Reviews*, 36(S1), e3268. <https://doi.org/10.1002/dmrr.3268>
- World Health Organization. (2023). *Package of essential noncommunicable disease interventions (PEN)*. Geneva: World Health Organization.
- World Health Organization. (2024). *Diabetes*. <https://www.who.int/news-room/fact-sheets/detail/diabetes>
- Yalini, L., Samiasih, A., & Armiyati, Y. (2024). Perawatan kaki dalam pencegahan ulkus kaki diabetikum. *Jurnal Penelitian Kesehatan Suara Forikes*, 15(4), 136–139. <http://dx.doi.org/10.33846/sf15127>
- Yazdanpanah, L., Nasiri, M., & Adarvishi, S. (2015). Literature review on diabetic foot ulcer. *World Journal of Diabetes*, 6(1), 37–53. <https://doi.org/10.4239/wjd.v6.i1.37>
- Zhang, P., Lu, J., Jing, Y., et al. (2017). Global epidemiology of diabetic foot ulceration. *Annals of Medicine*, 49(2), 106–116. <https://doi.org/10.1080/07853890.2016.1231932>