

The relationship between the level of knowledge of diabetic diet and blood glucose stability among patients with type 2 diabetes mellitus

Tuhu Sobiron

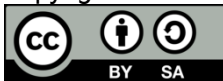
Nursing Staff, RSUD Temanggung, Temanggung, Central Java, Indonesia
Corresponding Author: tuhusobiron@gmail.com

ABSTRACT

Introduction: Type 2 Diabetes Mellitus is a non-communicable disease with a continuously increasing prevalence in Indonesia. Data from the International Diabetes Federation indicate a high diabetes burden and project a further rise in cases. Diabetes control does not rely solely on pharmacological therapy but also on adherence to a diabetic diet. Patients' level of knowledge regarding diabetic diet plays an important role in maintaining blood glucose stability. Insufficient knowledge may lead to reduce dietary compliance and increased the risk of complications. **Objective:** To determine the relationship between the level of knowledge of diabetic diet and blood glucose stability among patients with Type 2 Diabetes Mellitus at RSUD Temanggung. **Methods:** This study employed a quantitative correlational design with a cross-sectional approach. **The research instruments:** the Knowledge of Diabetic Diet Questionnaire (KDDQ) and a glucometer. Data were analyzed using the Chi-Square correlation test. **Results:** The level of knowledge regarding the diabetic diet among patients at RSUD Temanggung was predominantly moderate (54.39%), while blood glucose stability was mostly stable (68.42%). The *Chi-Square* correlation test showed a p-value of 0.001. **Conclusion:** A significant relationship exists between diabetic diet knowledge and blood glucose stability among patients with Type 2 Diabetes Mellitus at RSUD Temanggung. The study recommends enhancing collaborative, technology-based dietary education programs and encourages future research to apply more comprehensive designs and glycemic control indicators while considering potential confounding factors.

KEYWORD: Blood Glucose Stability; Knowledge of Diabetic Diet; Type 2 Diabetes Mellitus

Copyright © 2026 Journal



This work is licensed under a Creative Commons Attribution Share Alike 4.0 International License

INTRODUCTION

Diabetes Mellitus (DM) is a major non-communicable disease whose prevalence continues to rise globally, including in Indonesia. According to the International Diabetes Federation, 11.1% of the global adult population aged 20–79 years lives with diabetes, with approximately 40% remaining undiagnosed (International Diabetes Federation, 2025). Indonesia ranks fifth worldwide in terms of the number of adults with diabetes, with an estimated 20.4 million cases in 2024, and projections indicate an increase to 28.6 million by 2050 (Candra, 2025). At the regional level, Central Java recorded more than 600,000 people living with DM. However, disparities in healthcare coverage remain, including in Temanggung Regency, where service coverage has not yet reached optimal levels (Dinas Kesehatan Provinsi Jawa Tengah, 2021).

Type 2 Diabetes Mellitus is the most common form of DM and is strongly associated with lifestyle factors, particularly physical activity and dietary habits (Febrinasari et al., 2020). Several studies have demonstrated a significant relationship between physical activity levels and blood glucose control. Lestari and Laksmi (2020) reported a statistically significant association between physical activity and blood glucose levels among patients with type 2 DM ($p = 0.004$), while Karolus et al. (2023) found similar results in a hospital-based study using Chi-Square analysis ($p < 0.001$). These findings underscore the crucial role of lifestyle modification as a cornerstone in diabetes management, alongside pharmacological therapy.

Dietary management is a central pillar of diabetes care, as food intake directly influences blood glucose levels. Inadequate dietary control may lead to acute metabolic disturbances and long-term vascular complications, including cardiovascular disease and micro- and macroangiopathy (Aulianah, 2021). Patient knowledge of a diabetic diet is crucial for ensuring dietary adherence and achieving glycemic stability. Previous studies have shown a significant correlation between dietary knowledge, patient attitudes, and diet adherence among individuals with DM (Kaemulhayati et al., 2019), as well as the positive impact of nutritional counseling on knowledge and dietary compliance (Halawa et al., 2018). Therefore, this study aimed to examine the relationship between the level of diabetic diet knowledge and blood glucose stability among patients with type 2 DM, providing evidence to support more effective nutritional education strategies, particularly in RSUD Temanggung.

METHODS

Design

This study employed a quantitative correlational design with a cross-sectional approach.

Research Questions

Is there a relationship between knowledge of a diabetic diet and blood glucose stability among patients with type 2 Diabetes Mellitus (DM)?

Sample and Settings

The study population consisted of all adult patients with type 2 DM receiving healthcare services at a hospital, with a sample size of 57 respondents determined using a minimum sample size calculation. Sampling was conducted using purposive and accidental sampling techniques according to predefined inclusion and exclusion criteria. The research was conducted at RSUD Temanggung, without detailing specific service units, as the hospital served solely as the research setting.

Variables

This study uses two variables: the level of knowledge about a diabetic diet as the independent variable and the stability of blood glucose levels as the dependent variable.

Instruments

The research instruments included the Knowledge of Diabetic Diet Questionnaire (KDDQ) to assess diabetic diet knowledge and an observation sheet for Random Blood Glucose (RBG/GDS) measurement to evaluate blood glucose stability. The KDDQ consists of 15 items with dichotomous scoring (correct–incorrect) and categorizes knowledge levels into poor, moderate, and good. Blood glucose stability was classified based on GDS values of <200 mg/dL (stable) and \geq 200 mg/dL (unstable).

Data Collections

Data were collected through questionnaire administration, GDS examination, and medical record review.

Study Procedure

The study population consisted of all patients with Type 2 Diabetes Mellitus at RSUD Temanggung from January to June 2025, totaling 363 patients. A sample of 47 patients was selected using purposive and accidental sampling techniques. with data collected from May 2025 to February 2026. The data were processed through editing, scoring, coding, tabulation, and data cleaning procedures.

Data Analysis

Data analysis included univariate analysis to describe frequency distributions and bivariate analysis using the Chi-Square test with an alpha level of 0.05 (5%) to assess the relationship between variables, with category merging applied to meet statistical assumptions.

Ethical Consideration

This study received ethical approval with number 0450/KEP/UNKAHA/LPPM /XII/2025, research permission from RSUD Temanggung with number B/0206/070/I/2026, and its implementation adhered to ethical principles of health research, including informed consent, confidentiality, justice, and the protection of respondents' rights to withdraw from the study at any time without affecting the healthcare services they received.

RESULTS

Table 1. Frequency Distribution of Respondents' Characteristics (n = 57)

| Demographic Variables | Frequency (f) | Percentage (%) |
|-----------------------------------------------------|---------------|----------------|
| Age Group | | |
| 20-35 years | 5 | 8.77% |
| 36-45 years | 2 | 3.51% |
| 46-55 years | 16 | 28.07% |
| 56-65 years | 34 | 59.65% |
| Gender | | |
| Male | 22 | 38.60% |
| Female | 35 | 61.40% |
| Education | | |
| Higher education | 8 | 14.04% |
| Senior high school/equivalent | 24 | 42.11% |
| Junior high school/equivalent | 6 | 10.53% |
| Elementary school/equivalent | 11 | 19.30% |
| Did not complete elementary school | 8 | 14.04% |
| Duration of Suffering from Diabetes Mellitus | | |
| <5 years | 29 | 50.88% |
| 5-10 years | 19 | 33.33% |
| >10 years | 9 | 15.79% |

Table 1 shows the frequency distribution of respondents' characteristics. The majority of respondents were in the 56–65 years age group, totaling 34 respondents (59.65%), while the smallest age group was 36–45 years, with 2 respondents (3.51%). This indicates that most patients with diabetes mellitus in this study were categorized as late elderly. Based on gender, most respondents were female, totaling 35 respondents (61.40%), while male respondents totaled 22 (38.60%). These data indicate that female respondents were more dominant than male respondents. Based on educational level, the majority of respondents had a senior high school/equivalent educational background, totaling 24 respondents (42.11%). Meanwhile, respondents with junior high school/equivalent education totaled 6 respondents (10.53%), elementary school/equivalent education totaled 11 respondents (19.30%), higher education totaled 8 respondents (14.04%), and those who did not complete elementary school totaled 8 respondents (14.04%). Based on the duration of suffering from diabetes mellitus, most respondents had suffered from DM for less than 5 years, totaling 29 respondents (50.88%). Respondents who had suffered from DM for 5–10 years totaled 19 respondents (33.33%), while those who had suffered from DM for more than 10 years

totalled 9 respondents (15.79%). This indicates that the majority of respondents were categorized as having a relatively recent duration of DM.

Tabel 2. Frequency Distribution of Diabetic Diet Knowledge Levels (n = 57)

| Level of Diabetic Diet Knowledge | Frequency (f) | Percentage (%) |
|----------------------------------|---------------|----------------|
| Poor | 26 | 45,61 % |
| Moderate | 31 | 54,39 % |
| Good | 0 | 0 % |
| Total | 57 | 100% |

Based on Table 2, the frequency distribution of diabetic diet knowledge levels shows that out of 57 respondents, the majority had a moderate level of knowledge, totaling 31 individuals (54.39%). Furthermore, 26 respondents (45.61%) had poor knowledge, while none (0%) had good knowledge.

Tabel 3. Frequency Distribution of Blood Glucose Stability (n = 57)

| Blood Glucose Level | Frequency (f) | Percentage (%) |
|---------------------|---------------|----------------|
| Stable | 39 | 68,42 % |
| Unstable | 18 | 31,58 % |
| Total | 57 | 100% |

Based on Table 3, the frequency distribution of blood glucose stability shows that, out of 57 respondents, the majority (39, 68.42%) were in the stable category. Meanwhile, 18 respondents (31.58%) had unstable blood glucose levels.

Tabel 4. The Relationship Between Diabetic Diet Knowledge Level and Blood Glucose Stability Among Patients with Type 2 Diabetes Mellitus at RSUD Temanggung (n = 57)

| Diabetic Diet Knowledge Levels | Blood Glucose Stability | | | | Total (f) | Total (%) | P value |
|--------------------------------|-------------------------|--------------|--------------|--------------|-----------|------------|---------|
| | Stable (f) | Stable (%) | Unstable (f) | Unstable (%) | | | |
| Moderate | 27 | 87,10 | 4 | 12,90 | 31 | 100 | 0,001 |
| Poor | 12 | 46,15 | 14 | 53,85 | 26 | 100 | |
| Total | 39 | 68,42 | 18 | 31,58 | 57 | 100 | |

Based on Table 4, the 31 respondents (100%) with a moderate level of diabetic diet knowledge, 27 (87.10%) had stable blood glucose levels, while 4 (12.90%) had unstable blood glucose levels. Among the 26 respondents (100%) with poor diabetic diet knowledge, 12 (46.15%) had stable blood glucose levels, whereas 15 (53.85%) had unstable blood glucose levels. The statistical analysis showed a p-value of 0.001, indicating a statistically significant relationship between the variables.

DISCUSSION

The findings of this study indicate that diabetic diet knowledge among patients with type 2 Diabetes Mellitus (DM) was generally inadequate. Of the 57 respondents, 45.61% had low knowledge levels, 54.39% had moderate knowledge levels, and none demonstrated good knowledge regarding diabetic dietary management. These results suggest that many patients still have a limited understanding of appropriate dietary principles for glycemic control. Previous studies have shown that inadequate health

education, ineffective nutritional counseling, older age, and lower educational background contribute significantly to poor dietary knowledge among patients with diabetes (Andala et al., 2024; Anggraeni et al., 2024; Puspita Sari et al., 2025). In the present study, most respondents were aged 56–65 years, and only a small proportion had higher educational attainment, which may have affected their ability to understand complex dietary concepts such as glycemic index selection and portion regulation. Poor dietary knowledge may subsequently influence dietary adherence and glycemic management, as studies have consistently demonstrated that higher dietary knowledge is associated with better adherence and improved blood glucose control (Fadhli et al., 2022; Suwarno, 2025).

Regarding blood glucose stability, 68.42% of respondents had stable blood glucose levels, while 31.58% experienced unstable levels. Blood glucose instability in patients with type 2 DM is influenced not only by impaired glucose metabolism and insulin resistance, but also by behavioral and psychosocial factors. Previous literature has identified non-adherence to routine monitoring, poor medication adherence, low physical activity, unhealthy lifestyle patterns, poor sleep quality, and stress as important contributors to glycemic instability (Ismaiyah et al., 2023; Serenli Nezlin, 2024; Sinaga et al., 2025; Zuliana et al., 2025). These findings highlight the importance of holistic diabetes management strategies that integrate education, routine monitoring, lifestyle modification, and psychosocial support to improve glycemic outcomes.

The analysis further demonstrated a statistically significant relationship between diabetic diet knowledge and blood glucose stability ($p = 0.001$). Among respondents with moderate dietary knowledge, most had stable blood glucose levels (87.10%), whereas respondents with poor knowledge were more likely to experience unstable glucose levels (53.85%). The Chi-Square correlation test showed a moderate positive correlation ($r = 0.439$), indicating that better dietary knowledge is associated with a greater likelihood of achieving stable blood glucose levels. These findings support theoretical perspectives and previous studies emphasizing that dietary knowledge is an important component of diabetes self-management because it helps patients regulate meal timing, food selection, and portion control according to clinical recommendations (Aulianah, 2021; Muhasidah et al., 2017; Ramadhina et al., 2022).

Nevertheless, this study also revealed that knowledge alone does not fully determine glycemic outcomes. Some respondents with moderate knowledge still experienced unstable blood glucose levels, likely due to poor dietary adherence, inadequate physical activity, stress, or other lifestyle-related factors (Cahyaningtyas et al., 2025; Fadhli et al., 2024). Conversely, several respondents with poor knowledge maintained stable blood glucose levels, potentially because of good medication adherence, family support, consistent eating patterns, and strong personal motivation (Ernawati, 2025). These findings indicate the existence of a knowledge–practice gap in diabetes management, where theoretical understanding does not always translate into effective behavioral implementation. Therefore, comprehensive diabetes interventions should not focus solely on improving knowledge, but also on strengthening adherence, motivation, social support, and sustainable healthy lifestyle behaviors to achieve optimal glycemic control.

Strengths and Limitations

This study has several strengths, including the use of validated instruments and direct data collection. However, it also has limitations, such as the cross-sectional design, which cannot establish causality, and the relatively small sample size.

Implications for Practice

Based on the findings of this study, it is recommended that healthcare professionals, particularly nurses and dietitians, collaborate in providing integrated diabetic diet education through joint counseling, individualized nutrition guidance, and structured

follow-up tailored to patient characteristics. Healthcare institutions are encouraged to strengthen diabetes education programs, including routine counseling and the use of digital platforms, to support comprehensive care for patients with type 2 diabetes mellitus. Furthermore, future research should employ longitudinal or experimental designs, involve larger and more diverse samples, utilize more comprehensive glycemic indicators, such as fasting blood glucose and HbA1c, and control for potential confounding factors, including medication adherence, physical activity, and duration of diabetes.

CONCLUSIONS

The findings of this study strengthen empirical evidence that diabetic diet knowledge is significantly associated with blood glucose stability. The practical implication of these results is the need to enhance structured, systematic, and continuous nutritional education programs for patients with type 2 DM. Effective education should focus not only on increasing knowledge but also on fostering consistent dietary behavior change, thereby achieving optimal blood glucose control and reducing the risk of diabetes-related complications.

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Source

The research was self-funded by the authors.

Author Acknowledgement

The authors would like to express their gratitude to Almighty God and all participants who have contributed to this study.

REFERENCES

- Andala, S., Akbar, Y., & Nurjannah, N. (2024). Tingkat Pengetahuan Pasien Diabetes Melitus Tentang Pola Makan. *Aceh Journal of Health Innovation*, 1(1), 32–38. <https://jurnal.lldikti13.id/index.php/ahohi/article/view/8>
- Anggraeni, N. D., Novaria, A. A., Utami, R. P., & Wiryanto, W. (2024). The Effectiveness of Leaflet and Video Educational Media Toward the Knowledge of Type 2 Diabetes Mellitus Patients. *Journal of Health and Nutrition Research*, 3(2), 172–176. <https://doi.org/10.56303/jhnresearch.v3i2.200>
- Aulianah, H. (2021). Hubungan Pengetahuan Dan Tindakan Pelaksanaan Diet Dengan Kadar Gula Darah Pasien Diabetes Melitus (Dm). *Jurnal Ilmiah Multi Science Kesehatan*, 7(2), 1–18. http://www.joi.isoss.net/PDFs/Vol-7-no-2-2021/03_J_ISOSS_7_2.pdf
- Cahyaningtyas, R., Sulistyowati, E., & Palupi, F. D. (2025). The Effect of Education on Knowledge, Carbohydrate Intake, Magnesium, and Blood Glucose Levels of Type II Diabetes Mellitus Patients at the Dinoyo Public Health Center. *Nutriture Journal*, 4(3), 134–144. <https://ojs.poltekkes-malang.ac.id/Nutriture/article/view/5809>
- Dinas Kesehatan. (2021). Jawa Tengah Tahun 2021. *Profil Kesehatan Provinsi Jawa Tengah Tahun 2021*, i–123.
- Ernawati, U. (2025). Hubungan Pengetahuan Diet dengan Kadar Gula Darah Pasien Diabetes Melitus Tipe 2 di Klinik Mutiara Delima. *Jurnal Ilmiah Kedokteran Dan Kesehatan*, 4(1), 292–304. <https://doi.org/10.55606/klinik.v4i1.5164>
- Fadhli, R., Turcia, R. Y., & Ekaputri, M. (2022). Hubungan Tingkat Pengetahuan dan Kepatuhan Diet dengan Kadar Gula Darah Penderita Diabetes Mellitus Tipe II di Poli Penyakit Dalam Rumah Sakit Sansani Pekanbaru. *Al-Asalmiya Nursing: Jurnal Ilmu Keperawatan (Journal of Nursing Sciences)*, 11(2), 178–188. <https://doi.org/10.35328/keperawatan.v11i2.2287>

- Fadhli, R., Turcia, R. Y., & Ekaputri, M. (2024). Hubungan tingkat pengetahuan dan kepatuhan diet dengan kadar gula darah penderita diabetes mellitus tipe II di Poli Penyakit Dalam Rumah Sakit Sansani Pekanbaru. *Jurnal Ilmu Keperawatan*, 11(2). <https://doi.org/10.35328/keperawatan.v11i2.2287>
- Febrinasari, R. P., Sholikhah, T. A., Pakha, D. N., & Putra, S. E. (2020). Buku saku diabetes melitus untuk awam. *Buku Saku*, 21.
- Halawa, E. J., Legi, N. N., Pasambuna, M., Ranti, I. N., Pioh, I. T., Kesehatan, P., & Kesehatan, K. (2018). Kepatuhan Diet Pada Pasien Diabetes Melitus Tipe II Terhadap Pengendalian Kadar Glukosa Darah Di Rsu Gmim Pancaran Kasih Manado. *Konseling, Pengetahuan Dan Diet KGD DM*, 01(02), 538–543.
- International Diabetes Federation, I. (2025). IDF Diabetes Atlas. In *IDF Diabetes Atlas. International Diabetes Federation, 11th editi*. <https://www.idf.org/aboutdiabetes/type-2-diabetes.html>
- Ismayyah, A. K., Majid, A., Suprayogi, A. S., & Arini, T. (2023). Kepatuhan Pemeriksaan Berhubungan Dengan Kestabilan Kadar Glukosa Darah Penyandang Diabetes Mellitus Tipe 2. *Jurnal Keperawatan*, 15(01), 22. <https://doi.org/10.61758/nursing.v15i01.119>
- Kaemulhayati, Supriyanti, & Kasad. (2019). *Hubungan pengetahuan dan sikap terhadap 2019*,. 1(1), 113–121.
- Karolus, karolus H., Butar Butar, S., Pangaribuan, S. M., Siregar, S. W., & Batubara, K. (2023). Hubungan Aktivitas Fisik Dengan Kadar Glukosa Darah Pada Pasien Diabetes Mellitus di Ruang Penyakit Dalam RSUD Koja Jakarta. *Jurnal Keperawatan Cikini*, 4(1), 32–39.
- Lestari, N. K. Y., & Laksmi, G. A. P. S. (2020). Aktivitas Fisik dengan Kadar Gula Darah pada Pasien Diabetes Melitus Tipe 2. *Jurnal Ilmu Kesehatan*, 11(2), 296–305. www.stikes-khkediri.ac.id
- Muhasidah, Hasani, R., & Wulan Majid, N. (2017). Hubungan Tingkat Pengetahuan, Sikap Dan Pola Makan Dengan Kadar Gula Darah Pada Penderita Diabetes Mellitus Di Wilayah Kerja Puskesmas Sudiang Kota Makassar. *Politeknik Kesehatan Makasar*, 08(02), 2087–2122. <https://journal.poltekkes-mks.ac.id/ojs2/index.php/mediakeperawatan/article/view/453/pdf>
- Puspita Sari, P., Zainal, S., & Arna Abrar, E. (2025). Efektivitas Health Education Tentang Diet Dalam Meningkatkan Pengetahuan Pasien Diabetes Melitus Tipe 2 Di Puskesmas Pampang Kota Makassar. *JIMPK: Jurnal Ilmiah Mahasiswa & Penelitian Keperawatan*, 5(3), 26–31. <https://doi.org/10.35892/jimpk.v5i3.1945>
- Ramadhina, A., Sulistyaningsih, D. R., & Wahyuningsih, I. S. (2022). Kepatuhan Diet Diabetes Melitus (DM) dengan Kadar Glukosa Darah pada Pasien DM di RS Islam Sultan Agung Semarang. *Jurnal Ilmiah Sultan Agung*, 1(1), 857–868.
- Serenli Nezlin, L. (2024). *Hubungan Aktivitas Fisik dengan Kadar Gula Darah Penderita Diabetes Melitus Tipe II di Wilayah Kerja Puskesmas Solokan Jeruk*. Universitas Bhakti Kencana.
- Sinaga, B. E., Laia, V. D., Nazara, F. S., Anggraini, M. D., Panjaitan, S. A., & Nababan, T. (2025). Hubungan Tingkat Stres dan Gaya Hidup terhadap Kadar Glukosa Darah pada Pasien Diabetes Melitus di RSU Royal Prima Medan Tahun 2025. *Jurnal Ners*, 9(4), 7023–7034. <https://doi.org/10.31004/jn.v9i4.51417>
- Suwarno, F. F. (2025). Hubungan Tingkat Pengetahuan Dengan Kepatuhan Diet Pada Pasien Penderita Diabetes Melitus Di Puskesmas Limboto Barat. *Medic Nutricia: Journal Ilmu Kesehatan*, 21(3), 131–140.
- Zuliana, E., Rusnoto, R., & Sukesih, S. (2025). Hubungan Kualitas Tidur, Kepatuhan Minum Obat dan Aktivitas Fisik dengan Kadar Gula Darah Pasien Diabetes Melitus di Pukesmas Kaliwungu Kudus. *Jurnal Pendidikan Tambusai*, 9(1), 5926–5937. <https://doi.org/10.31004/jptam.v9i1.25409>