

LENTORA NURSING JOURNAL
e-ISSN: 2776-1622 dan p-ISSN: 2776-1371
Volume 6 Issue 1, October 2025, Page 16-23
DOI : 10.33860/lnj.v6i1.4399
Website: https://jurnal.poltekkespalu.ac.id/index.php/LNJ

Original Article

Factors Associated with Medication Adherence Among Outpatients with Type 2 Diabetes: An Exploratory Cross-Sectional Study in Central Sulawesi, Indonesia

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ARTICLE INFO

Article History:
Received : 2025-07-27
Accepted : 2025-11-03
Published : 2025-11-03

Keywords:
Medication Adherence; Type 2 Diabetes Mellitus; Family Support; Spiritual Well-Being; Monotherapy.

ABSTRACT

Background: Medication adherence is central to type 2 diabetes management, but evidence from Central Sulawesi remains limited. Objective: To explore factors associated with medication adherence among outpatients with type 2 diabetes. Methods: This exploratory cross-sectional study used a feasibility sample of 34 patients purposively recruited at Undata General Hospital in March 2024. All 34 invited patients consented, completed the questionnaires, and were analyzed. MMAS-8 scores were classified as adherent (score 6–8) or non-adherent (score <6) for the retained binary analysis. Bivariate associations were assessed using Pearson Chi-square tests. Results: Seventeen participants (50.0%) were adherent. Spiritual well-being showed a bivariate Pearson Chi-square association ($p = 0.031$), whereas the other examined factors did not reach $p < 0.05$. Conclusion: The findings identify preliminary association between spiritual well-being and medication adherence. The small purposive sample, self-reported measures, and cross-sectional design limit precision and generalizability.

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INTRODUCTION

Diabetes mellitus has become a major global public health problem, with around 451–476 million adults living with diabetes in 2017 and 2019 and projections reaching about 571–693 million cases by 2025–2045 et al., 2020). In 2021–2024, about 10–11% of the world's adults (≈537–589 million people) had diabetes, with numbers projected to approach 800–850 million by 2045–2050 (Sun et al., 2022). The burden is rising particularly fast in Southeast Asia, where age-standardized prevalence, mortality, and disability from type 2 diabetes have increased substantially over recent decades (Nugrahani et al., 2025). Indonesia is among the countries contributing prominently to this regional escalation, with one analysis identifying Indonesia as one of the countries with the greatest worsening of type 2 diabetes burden indicators in Southeast Asia (Nugrahani et al., 2025).

In Indonesia, the problem appears at least as serious and may be worse in some clinical settings. A cross-sectional study in a hospital-based diabetes clinic in Surabaya found that 83.5% of patients with type 2 diabetes were medication nonadherent (Suprapti et al., 2023). In another Indonesian primary care study, 24.4% of patients had low adherence, while 75.6% had high adherence, suggesting that adherence levels vary across populations and service settings (Lestari et al., 2025). Evidence from Asia also indicates that medication adherence is generally low to moderate and shaped by multiple interacting determinants (Wibowo et al., 2022). Patient-related factors appear to dominate, including knowledge, beliefs, forgetfulness, perceptions of illness and therapy, comorbidities, and social support (Suprapti et al., 2023; Wibowo et al., 2022). Studies in tertiary and regional settings further identify education level, glycemic control, drug type, forgetfulness, distance to health facilities, fear of drug dependency, occupation, and family support as relevant correlates, although some determinants remain inconsistent across studies (Lestari et al., 2025; Wahyuni et al., 2025).

Poor adherence to oral hypoglycemic therapy has important clinical and economic consequences. Inadequate adherence is a major cause of therapy failure and contributes to poor glycemic control, disease progression, and increased risk of microvascular and macrovascular complications. Chronic hyperglycemia increases the risk of vascular inflammation, retinopathy, neuropathy, nephropathy, cardiovascular disease, and multiorgan dysfunction. Poor medication adherence is also associated with emergency department visits, hospitalization, higher morbidity and mortality, and increased healthcare costs (Piragine et al., 2023).

In one cohort analysis, patients with type 2 diabetes who were nonadherent to oral antihyperglycemic medication had a 2.53-fold higher risk of hospitalization in the following year . These consequences are especially important in tertiary hospitals, where patients are more likely to have complications, comorbidities, or difficulties with treatment-taking behavior (Suprapti et al., 2023).

Despite the high and increasing diabetes burden in Indonesia, evidence on determinants of oral hypoglycemic adherence remains limited for many provincial and tertiary-care contexts, including Central Sulawesi. Determinants of adherence can differ by population, social environment, education, socioeconomic status, beliefs, and healthcare system characteristics (Wibowo et al., 2022). Therefore, identifying local determinants is necessary to inform targeted interventions, patient education, and service strategies to improve adherence and clinical outcomes (Piragine et al., 2023; Wahyuni et al., 2025).

This study aimed to explore factors associated with oral hypoglycemic medication adherence among patients with type 2 diabetes mellitus attending a tertiary hospital in Central Sulawesi, Indonesia.

RESEARCH METHOD

Study Design and Setting

This analytic cross-sectional study was conducted at the Internal Medicine Outpatient Clinic of Undata General Hospital, Central Sulawesi, Indonesia. Data were collected in March 2024.

Study Population and Sampling

A feasibility sample of 34 patients was purposively invited during the March 2024 data-collection period, and all 34 consented, completed the questionnaires, and were included in the analysis Eligible participants were aged 18 years or older, had a physician-confirmed diagnosis of type 2 diabetes, received outpatient care at the study clinic, used prescribed antidiabetic medication, and provided written informed consent. Patients with acute clinical deterioration or cognitive or communication limitations that prevented questionnaire completion were excluded

Variables

The independent variables were age, sex, education level, duration of diabetes, comorbid conditions, number of medications, type of therapy, family support, and spiritual well-being. The dependent variable was medication adherence.

Instruments and Data Collection

Data were collected using a structured self-administered questionnaire comprising four sections: demographic and clinical characteristics, medication adherence, family support, and spiritual well-being.

Medication Adherence (MMAS-8)

Medication adherence was measured using the validated Indonesian version of the eight-item Morisky Medication Adherence Scale (MMAS-8). Total scores range from 0 to 8, with higher scores indicating better adherence. The conventional categories are high adherence (score 8), medium adherence (score 6 to <8), and low adherence (score <6). For the exploratory binary analysis reported in the retained tables, participants with scores ≥6 were classified as adherent and those with scores <6 as non-adherent.

Family Support (HDFSS)

Family support was assessed using the Indonesian adaptation of the 25-item Hensarling Diabetes Family Support Scale (HDFSS) described by Yusra (2010). The scale covers emotional (8 items), appreciation (7 items), instrumental (7 items), and informational support (3 items). Items are rated from 1 (never) to 4 (always), with reverse scoring for 12 negatively worded items. Total scores range from 25 to 100 and were categorized as high (63–100) or low (25–62) support in the retained analysis.

Spiritual Well-Being (SWBS)

Spiritual well-being was measured using the 20-item Spiritual Well-Being Scale (SWBS) developed by Paloutzian and Ellison (1982). The instrument contains Religious Well-Being and Existential Well-Being subscales, each comprising 10 items. Responses are recorded on a 6-point scale, and negatively worded items are reverse-scored. Total scores range from 20 to 120, with higher scores indicating greater spiritual well-being. The high and low categories shown in the retained analysis were based on the study dataset's median split: scores at or above the sample median were classified as high and scores below the median as low.

Data Analysis

Data were summarized using frequencies and percentages. Bivariate relationships were examined using Pearson Chi-square tests.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of the Poltekkes Kemenkes Palu under approval number 000208/KEPK POLTEKKES KEMENKES PALU/2024 before participant recruitment in March 2024. Before enrollment, each participant received an explanation of the study objectives, procedures, voluntary nature of participation, confidentiality protections,

and right to withdraw without consequences for clinical care. Written informed consent was obtained from all participants.

RESULTS

Sociodemographic and Clinical Characteristics

Table 1 presents the distribution of respondents based on sociodemographic and clinical characteristics.

Table 1. Distribution of Respondents by Sociodemographic and Clinical Characteristics (N=34)

Characteristic	Category	Frequency (n)	Percentage (%)
Age	20–59 years	20	58.8
	≥60 years	14	41.2
Sex	Male	9	26.5
	Female	25	73.5
Education Level	Elementary	8	23.5
	Junior High	7	20.6
	Senior High	12	35.3
	Tertiary	7	20.6
Duration of Diabetes	<5 years	15	44.1
	≥5 years	19	55.9
Comorbid Conditions	Present	21	61.8
	Absent	13	38.2
Number of Medications	1–2 drugs	19	55.9
	≥3 drugs	15	44.1
Type of Therapy	Monotherapy	11	32.4
	Combination Therapy	23	67.6

Source: Primary Data, 2024

As shown in Table 1, the majority of respondents were aged 20–59 years (58.8%), female (73.5%), and had completed senior high school education (35.3%). More than half of the respondents had a duration of diabetes of ≥5 years (55.9%), presented with comorbid conditions (61.8%), consumed 1–2 antidiabetic medications (55.9%), and received combination therapy (67.6%).

Family Support and Spiritual Well-Being

Table 2. Distribution of Respondents by Family Support and Spiritual Well-Being (N=34)

Variable	Category	Frequency (n)	Percentage (%)
Family Support	High	26	76.5
	Low	8	23.5
Spiritual Well-Being	High	22	64.7
	Low	12	35.3

Source: Primary Data, 2024

Table 2 shows that the majority of respondents reported high family support (76.5%) and high spiritual well-being (64.7%)

Medication Adherence (MMAS-8)

Table 3. Distribution of Respondents by Medication Adherence Level (N=34)

Adherence Category	Frequency (n)	Percentage (%)
Adherent (MMAS-8 score 6–8)	17	50.0
Non-adherent (MMAS-8 score <6)	17	50.0
Total	34	100.0

Source: Primary Data, 2024

As presented in Table 3, 17 participants (50.0%) were classified as adherent (MMAS-8 score 6–8), while 17 participants (50.0%) were classified as non-adherent (score <6). This binary definition combined the conventional high- and medium-adherence levels for the retained exploratory analyses.

Association between each independent variable and Medication Adherence

Table 4. Association between each independent variable and Medication Adherence (N=34)

Variable / Category	Non-Adherent n (%)	Adherent n (%)	Total n (%)	p-value
Age				1.000
20–59 years	10 (50.0)	10 (50.0)	20 (100)	
≥60 years	7 (50.0)	7 (50.0)	14 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Sex				0.697
Male	5 (55.6)	4 (44.4)	9 (100)	
Female	12 (48.0)	13 (52.0)	25 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Education Level				0.772
Elementary	5 (62.5)	3 (37.5)	8 (100)	
Junior High	4 (57.1)	3 (42.9)	7 (100)	
Senior High	5 (41.7)	7 (58.3)	12 (100)	
Tertiary	3 (42.9)	4 (57.1)	7 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Duration of Diabetes				0.730
<5 years	8 (53.3)	7 (46.7)	15 (100)	
≥5 years	9 (47.4)	10 (52.6)	19 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Comorbid Conditions				0.078
Present	13 (61.9)	8 (38.1)	21 (100)	
Absent	4 (30.8)	9 (69.2)	13 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	

Number of Medications				0.730
1–2 drugs	9 (47.4)	10 (52.6)	19 (100)	
≥3 drugs	8 (53.3)	7 (46.7)	15 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Type of Therapy				0.067
Monotherapy	3 (27.3)	8 (72.7)	11 (100)	
Combination Therapy	14 (60.9)	9 (39.1)	23 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Family Support				0.106
High	11 (42.3)	15 (57.7)	26 (100)	
Low	6 (75.0)	2 (25.0)	8 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	
Spiritual Well-Being				
High	8 (36.4)	14 (63.6)	22 (100)	0.031
Low	9 (75.0)	3 (25.0)	12 (100)	
Total	17 (50.0)	17 (50.0)	34 (100)	

*Source: Primary data, 2024

In the retained Pearson Chi-square analysis, spiritual well-being had $p = 0.031$, while comorbid conditions ($p = 0.078$), therapy type ($p = 0.067$), family support ($p = 0.106$), age, sex, education, duration of diabetes, and number of medications did not reach $p < 0.05$.

DISCUSSION

Half of the participants were non-adherent according to the exploratory binary MMAS-8 definition. The present study found that low adherence was common, with half of respondents classified as having low MMAS-8 adherence, which is consistent with prior diabetes literature showing substantial variability and often suboptimal adherence across populations (Nonogaki et al., 2019). The predominance of respondents with comorbid conditions and combination therapy is also clinically plausible, because type 2 diabetes frequently coexists with other chronic diseases and often requires multiple concurrent drugs (Cakir, 2025).

Most respondents were between 20 and 59 years of age, female, had attained secondary-level education, had lived with Type 2 Diabetes Mellitus (T2DM) for five years or longer, presented with comorbid conditions, and were treated with combination therapy. These characteristics represent a typical outpatient population with long-standing T2DM, highlighting the need for sustained disease management, routine surveillance for diabetes-related complications, and individualized therapeutic modifications in response to the progressive nature of the disease.

High family support had a higher adherence point estimate. Practical reminders, supervision, and emotional support are plausible mechanisms, but the estimate was imprecise and should be treated as hypothesis-generating rather than as evidence of an independent effect. Indonesian studies also report a similar pattern, strengthening the contextual relevance of the present findings. Family support has repeatedly shown significant relationships with adherence among patients with T2DM, including studies in Bandung, Gorontalo, and other Indonesian care settings (Kartini et al., 2024; Pakaya et al., 2024). High spiritual well-being showed a higher adherence point estimate in the retained analyses. Spiritual resources may support coping and persistence with long-term treatment, but the wide confidence interval, data-driven categorization, and cross-sectional design preclude causal interpretation.

Age, sex, education, duration of diabetes, and number of medications did not show statistically significant Pearson Chi-square associations with adherence in this sample. These null findings should be interpreted cautiously because small samples may have insufficient power to detect clinically relevant differences (Shakya et al., 2023).

This study has several limitations. First, the feasibility sample was small, purposively selected, and drawn from a single outpatient clinic, limiting statistical power and generalizability. second, the cross-sectional design cannot establish temporality or causality, and residual confounding by health literacy, medication cost, access to care, glycemic control, adverse effects, and disease severity cannot be excluded.

CONCLUSION

Among 34 outpatients with type 2 diabetes, 17 were classified as adherent and 17 as non-adherent using the retained binary MMAS-8 threshold. The analyses produced preliminary directional patterns involving spiritual well-being. Larger multicenter studies with prospective recruitment, verified instrument scoring, exact sparse-cell methods, and prespecified adequately powered models are needed.

REFERENCES

Akbarpour, M. H., Khanchemehr, Y., Rafi, A., Neshati, A., Naeimi, S., & Ardali, M. N. (2025). Effect Of A Psycho-Spiritual Intervention On Medication Adherence, Self-Management, And Glycemic Control In Women With Type 2 Diabetes: A Randomized Controlled Trial. Journal Of Diabetes & Metabolic Disorders, 25(1), 4. https://doi.org/10.1007/S40200-025-01821-3

Baah-Nyarkoh, E., Alhassan, Y., Dwomoh, A. K., & Kretchy, I. A. (2023a). Medicated-Related Burden And Adherence In Patients With Co-Morbid Type 2 Diabetes Mellitus And Hypertension. Heliyon, 9(4). https://doi.org/10.1016/J.Heliyon.2023.E15448

Basu, S., Sengupta, T., & Kundu, S. (2026). Medication Adherence And Its Predictors In Patients With Type 2 Diabetes Mellitus In India: A Systematic Review And Meta-Analysis Of Current Evidence. In Health Science Reports (Vol. 9, Number 2). John Wiley And Sons Inc. https://doi.org/10.1002/Hsr2.71845

Böhm, A. K., Schneider, U., Aberle, J., & Stargardt, T. (2021). Regimen Simplification And Medication Adherence: Fixed-Dose Versus Loose-Dose Combination Therapy For Type 2 Diabetes. Plos One, 16(5 May). https://doi.org/10.1371/Journal.Pone.0250993

Cakir, L. (2025). Advances In Clinical Pharmacology And Therapeutics Polypharmacy In Type 2 Diabetes Mellitus And Related Conditions: A Double-Edged Sword: A Narrative Review. In *Acpt* (Vol. 2, Number 2).

Cho, N. H., Shaw, J. E., Karuranga, S., Huang, Y., Da Rocha Fernandes, J. D., Ohlrogge, A. W., & Malanda, B. (2018). Idf Diabetes Atlas: Global Estimates Of Diabetes Prevalence For 2017 And Projections For 2045. Diabetes Research And Clinical Practice, 138, 271–281. https://doi.org/10.1016/J.Diabres.2018.02.023

Horii, T., Iwasawa, M., Kabeya, Y., & Atuda, K. (2019). Polypharmacy And Oral Antidiabetic Treatment For Type 2 Diabetes Characterised By Drug Class And Patient Characteristics: A Japanese Database Analysis. Scientific Reports, 9(1). https://doi.org/10.1038/S41598-019-49424-2

Huang, J., Ding, S., Xiong, S., & Liu, Z. (2021). Medication Adherence And Associated Factors In Patients With Type 2 Diabetes: A Structural Equation Model. Frontiers In Public Health, 9. https://doi.org/10.3389/Fpubh.2021.730845

Kartini, Y., Tohri, T., & Warna, M. P. (2024). The Relationship Between Family Support And Medication Adherence In Type 2 Diabetes Patients At Cililin Hospital, Bandung, Indonesia. Health Dynamics, 1(12), 454–459. https://doi.org/10.33846/Hd11204

Kwakye, A. O., Kretchy, I. A., Peprah, P., & Mensah, K. B. (2024). Factors Influencing Medication Adherence In Co-Morbid Hypertension And Diabetes Patients: A Scoping Review. In Exploratory Research In Clinical And Social Pharmacy (Vol. 13). Elsevier Inc. https://doi.org/10.1016/J.Rcsop.2024.100426

Lestari, P., Liyanovitasari, & Prabowo, H. (2025). Medication Adherence In Patients With Diabetes Mellitus And Influencing Factors In Indonesia. Diabetes Mellitus, 28(2), 237–242. https://doi.org/10.14341/Dm13068

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

Nonogaki, A., Heang, H., Yi, S., Van Pelt, M., Yamashina, H., Taniguchi, C., Nishida, T., & Sakakibara, H. (2019). Factors Associated With Medication Adherence Among People With Diabetes Mellitus In Poor Urban Areas Of Cambodia: A Cross-Sectional Study. Plos One, 14(11). https://doi.org/10.1371/Journal.Pone.0225000

Nugrahani, A. S. D., Muharram, F. R., Novida, H., Swannjo, J. B., Wibisono, S., & Wungu, C. D. K. (2025). Trends And Disability-Attributable Risk Factors Of Type 2 Diabetes Mellitus In Southeast Asia (1990–2019): An In-Depth 30-Year Analysis From The Global Burden Of Disease Study. Nutrition, Metabolism And Cardiovascular Diseases, 35(1). https://doi.org/10.1016/J.Numecd.2024.09.020

Pakaya, W., Katili, A., Basir, I. S., Studi, P., Keperawatan, I., Olahraga, F., Kesehatan, D., & Sulistiani Basir, I. (2024). The Relationship Between Family Support And Medication Adherence Among Type Ii Diabetic Patients. *An Idea Health Journal*, *4*(2).

Piragine, E., Petri, D., Martelli, A., Calderone, V., & Lucenteforte, E. (2023). Adherence To Oral Antidiabetic Drugs In Patients With Type 2 Diabetes: Systematic Review And Meta-Analysis. In Journal Of Clinical Medicine (Vol. 12, Number 5). Multidisciplinary Digital Publishing Institute (Mdpi). https://doi.org/10.3390/Jcm12051981

Raza, M. H., Shahnaz, S., Riaz, S., Zain Ul Abideen, M., Khan Luqmani, A. I., Hayat, M. A., Murtaza, M. A., & Mansoor, S. (2026). Polypharmacy And Comorbidity Status In The Treatment Of Type 2 Diabetic Patients Attending Tertiary Care Hospitals. Indus Journal Of Bioscience Research, 4(3), 37–42. https://doi.org/10.70749/Ijbr.V4i3.2980

Shakya, P., Shrestha, A., Karmacharya, B. M., Morisky, D. E., & Kulseng, B. E. (2023). Factors Associated With Medication Adherence Among Patients With Type 2 Diabetes Mellitus: A Hospital-Based Cross-Sectional Study In Nepal. International Journal Of Environmental Research And Public Health, 20(2). https://doi.org/10.3390/Ijerph20021537

Sun, H., Saeedi, P., Karuranga, S., Pinkepank, M., Ogurtsova, K., Duncan, B. B., Stein, C., Basit, A., Chan, J. C. N., Mbanya, J. C., Pavkov, M. E., Ramachandaran, A., Wild, S. H., James, S., Herman, W. H., Zhang, P., Bommer, C., Kuo, S., Boyko, E. J., & Magliano, D. J. (2022). Idf Diabetes Atlas: Global, Regional And Country-Level Diabetes Prevalence Estimates For 2021 And Projections For 2045. Diabetes Research And Clinical Practice, 183. https://doi.org/10.1016/J.Diabres.2021.109119

Suprapti, B., Izzah, Z., Anjani, A. G., Andarsari, M. R., Nilamsari, W. P., & Nugroho, C. W. (2023). Prevalence Of Medication Adherence And Glycemic Control Among Patients With Type 2 Diabetes And Influencing Factors: A Cross-Sectional Study. Global Epidemiology, 5. https://doi.org/10.1016/J.Gloepi.2023.100113

Tamene, F. B., Zeleke, T. K., Desalew, A. F., Tarekegn, G. Y., Sendekie, A. K., Tafere, S. M., Kiflu, M., Moges, T. A., Dagnew, F. N., & Wondm, S. A. (2025). Polypharmacy And Associated Factors Among Patients With Type Two Diabetes Mellitus With Comorbidity: A Multicenter Cross-Sectional Study In Northwest Ethiopia. Bmc Endocrine Disorders, 25(1). https://doi.org/10.1186/S12902-025-02011-1

Teng, C. L., Chan, C. W., & Wong, P. S. (2022). Medication Adherence Of Persons With Type 2 Diabetes In Malaysia: A Scoping Review And Meta-Analysis. In Journal Of The Asean Federation Of Endocrine Societies (Vol. 37, Number 1, Pp. 75–82). Asean Federation Of Endocrine Societies. https://doi.org/10.15605/Jafes.037.01.14

Wahyuni, A. S., Marwa, D., Oktasari, S. R., Yulianti, T., Nugraheni, A. Y., & Al-Samea, R. A. M. O. (2025). Determination Of Factors Affecting Medication Adherence In Type 2 Diabetes Mellitus Patients In A Tertiary Hospital: Case-Control Study. International Journal Of Applied Pharmaceutics, 17(Special Issue 2), 126–131. https://doi.org/10.22159/Ijap.2025.V17s2.20

Wibowo, M. I. N. A., Yasin, N. M., Kristina, S. A., & Prabandari, Y. S. (2022). Exploring Of Determinants Factors Of Anti-Diabetic Medication Adherence In Several Regions Of Asia – A Systematic Review. In Patient Preference And Adherence (Vol. 16, Pp. 197–215). Dove Medical Press Ltd. https://doi.org/10.2147/Ppa.S34707