

The Relationship Between Prolanis Participation and Blood Sugar Control Among Type 2 Diabetes Mellitus Patients at Puskesmas SindangkertaSri Wahyuni¹, Moch Rezha Alfiqri¹, Sri Atun¹, Ryka Juaeriah¹¹STIKes Budhi Luhur Cimahi, Indonesia**ABSTRACT**

Outpatient visits for Type 2 Diabetes Mellitus at Puskesmas Sindangkerta increased from 122 to 269 patients from February 2024 to January 2025, with Diabetes Mellitus service coverage reaching 186.69% of the estimated target. The Chronic Disease Management Program (Prolanis) was designed to improve the quality of life of patients with chronic diseases; however, empirical evidence on its association with blood sugar control in primary care settings in West Bandung Regency remains limited. This study aimed to analyze the relationship between Prolanis participation and blood sugar control among patients with Type 2 Diabetes Mellitus at Puskesmas Sindangkerta. A quantitative cross-sectional study was conducted using secondary data from the Prolanis register and medical records of patients with Type 2 Diabetes Mellitus for the period from February 2025 to January 2026. The sample consisted of 55 respondents selected through total sampling and analyzed using the Chi-square test ($\alpha = 0.05$). The results showed that 37 respondents (67.3%) actively participated in Prolanis, and 39 respondents (70.9%) had controlled fasting blood sugar levels. The Chi-square test showed a significant association ($p < 0.001$), with an odds ratio (OR) of 10.057 (95% CI: 2.643–38.276) and a prevalence ratio (PR) of 2.22 (95% CI: 1.23–4.03). Active Prolanis participants had a 2.22-fold higher prevalence of controlled blood sugar levels than inactive participants (PR = 2.22; 95% CI: 1.23–4.03). Optimization of Prolanis through digital technology and continuous education is needed to support Diabetes Mellitus control in primary care settings. These findings provide an empirical basis for strengthening Prolanis through active monitoring and continuous education to improve blood sugar control among patients with Type 2 Diabetes Mellitus in primary care settings.

Keywords: Prolanis, type 2 diabetes mellitus, fasting blood glucose, cross-sectional study**Correspondence:**

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<https://doi.org/10.62817/jkbl.v19i2.527>**INTRODUCTION**

Globally, the International Diabetes Federation (2024) estimates that 588.7 million people were living with diabetes in 2024 and this is projected to rise to 852.5 million by 2050, representing an increase of nearly 45%. In Indonesia, the total adult population (20–79 years) was

approximately 185.2 million, with an estimated 20.4 million living with diabetes, placing Indonesia among the countries with the highest number of people with diabetes in the world (International Diabetes Federation, 2024). In West Java Province, the number of people with Diabetes Mellitus increased from 645,390 cases in 2023 to 668,220 cases in 2024, a rise of 3.54% (Dinas Kesehatan Provinsi Jawa Barat, 2024). West Bandung Regency recorded 15,911 cases in 2024, and Sindangkerta Sub-district achieved 186.69% of the estimated target with 593 cases identified from a target of only 318 persons. Data from Puskesmas Sindangkerta recorded an increase from 122 to 269 registered DM patients from February 2024 to January 2025.

Diabetes Mellitus is a chronic metabolic disease characterized by hyperglycemia due to impaired insulin secretion, insulin resistance, or both. This disease can cause microvascular complications such as retinopathy, nephropathy, neuropathy, as well as macrovascular complications such as coronary heart disease, stroke, and peripheral artery disease, which contribute to high morbidity and mortality (American Diabetes Association, 2024). Suboptimal long-term blood sugar control is the primary factor causing these various complications.

The Chronic Disease Management Program (Prolanis) launched by BPJS Kesehatan is a response to this challenge. The program aims to improve the quality of life of participants with chronic diseases such as Type 2 Diabetes Mellitus through a series of activities including health education, Prolanis exercise, periodic health examinations, and home visits (Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan, 2022). Through the Health Promotion Model (HPM) Nola J. Pender theory approach, this program can influence patient health behavior through improved perception of benefits, self-efficacy, and interpersonal support.

Several previous studies support the effectiveness of Prolanis. Rohmah *et al.* (2023) found a significant relationship between Prolanis implementation and blood sugar control ($p < 0.001$). Kristianto *et al.* (2021) showed the risk of uncontrolled blood sugar in the Prolanis group was 0.53 times lower than in the non-Prolanis group. Pangesti, (2021) found $p = 0.015$ with $OR = 8$, indicating a relationship between Prolanis adherence and blood sugar level stability. However, research specifically analyzing the relationship between Prolanis participation and blood sugar control based on secondary data in areas with a very high burden of DM cases, such as Sindangkerta Sub-district, remains very limited. Given that the DM case achievement rate in this area reached 186.69% of the estimated target, far exceeding the district average, this research is important as a basis for evaluating the effectiveness of Prolanis and strengthening Type 2 DM management at the primary healthcare level.

METHODS

This study used a quantitative design with a cross-sectional approach. The study population was all Type 2 Diabetes Mellitus patients registered in the Prolanis Program at Puskesmas Sindangkerta, West Bandung Regency, for the period February 2025–January 2026. Sampling was performed using the total sampling technique, yielding 55 respondents who met the study criteria.

The independent variable was Prolanis participation, measured based on the percentage of participant attendance in Prolanis activities during the study period. During the 12-month study period, a total of 12 Prolanis activity sessions were held at Puskesmas Sindangkerta. Participation was categorized as active ($\geq 75\%$, equivalent to attending at least 9 of 12 sessions) and inactive ($< 75\%$) based on the concept of (Atto'illah *et al.*, 2021). The dependent variable was blood sugar control based on the last fasting blood glucose (FBG) value recorded in the medical record, categorized as controlled (80–130 mg/dL) and uncontrolled (≥ 130 mg/dL) according to the guidelines (PB PERKENI, 2024). FBG was selected as the primary outcome measure rather than HbA1c because HbA1c data were not routinely available in the secondary medical records at this primary care facility; this limitation is acknowledged in the limitations section.

Data were collected through observation sheets from two sources: (1) Prolanis activity register for participation data, and (2) patient medical records for Fasting Blood Glucose (FBG) values. Inclusion criteria were: (1) Type 2 DM patients registered in Prolanis at Puskesmas Sindangkerta, (2) having at least one recorded FBG examination during the study period, and (3) having complete attendance data in the Prolanis register. Exclusion criteria were: (1) patients with incomplete medical records and (2) patients who were transferred out or deceased during the study period. Data completeness and accuracy were verified by cross-checking the Prolanis register against medical record entries; records with missing FBG values were excluded from the analysis. All FBG values used were the most recent fasting blood glucose measurement recorded within the study period (February 2025–January 2026), ensuring a consistent observation window across respondents. Univariate analysis was used to describe the frequency distribution of respondent characteristics (age, sex, education, occupation), Prolanis participation, and blood sugar control. Bivariate analysis used the Chi-Square test; Chi-Square assumptions were verified, and no cells had expected counts less than five. This study received ethical approval from the Health Research Ethics Committee (KEPK) of STIKes Budi Luhur Cimahi with number 002001/STIKes Budi Luhur Cimahi/2026. The confidentiality of all data was fully maintained and data were used only for scientific purposes.

RESULTS

The study involved 55 respondents with Type 2 Diabetes Mellitus registered in the Prolanis Program at Puskesmas Sindangkerta in 2025. The characteristics of respondents, distribution of Prolanis participation, blood sugar control, and the relationship between variables are presented in the following tables.

Table 1. Frequency Distribution of Respondent Characteristics of Type 2 Diabetes Mellitus Patients in the Prolanis Program at Puskesmas Sindangkerta

	Characteristics	Frequency (f)	Percentage (%)
Age	< 45 Years	7	12.7
	≥ 45 Years	48	87.3
Sex	Male	5	9.1
	Female	50	90.9
Last Education	Elementary School (SD)	8	14.5
	Junior High School (SMP)	3	5.5
	Senior High School (SMA)	41	74.5
	D2	1	1.8
	Bachelor's Degree (S1)	2	3.6
Occupation	Housewife	44	80.0
	Entrepreneur	5	9.1
	Retiree	2	3.6
	Daily Labor	2	3.6
	Civil Servant (PNS)	1	1.8
	Private Employee	1	1.8
Total		55	100

Source: Secondary Data Processed with SPSS Version 25

Table 2. Frequency Distribution of Prolanis Participation and Blood Sugar Control in Type 2 Diabetes Mellitus Patients at Puskesmas Sindangkerta

Variable	Category	Frequency (f)	Percentage (%)
Prolanis Participation	Active	37	67.3
	Inactive	18	32.7
Total		55	100
Blood Sugar Control	Controlled	39	70.9
	Uncontrolled	16	29.1
Total		55	100

Source: Secondary Data Processed with SPSS Version 25

Table 3. Relationship Between Prolanis Program Participation and Blood Sugar Control in Type 2 Diabetes Mellitus Patients at Puskesmas Sindangkerta

Prolanis Participation	Blood Sugar Control				Total		p Value	OR (95%CI)	PR (95%CI)
	Controlled		Uncontrolled						
	F	%	F	%	F	%			
Active	32	86.5	5	13.5	37	100	<0.001	10.057 (2.643– 38.276)	2.22 (1.23– 4.03)
Inactive	7	38.9	11	61.1	18	100			
Total	39	70.9	16	29.1	55	100			

Source: Secondary Data Processed with SPSS Version 25

DISCUSSION

The results showed that the majority of respondents were aged ≥ 45 years (87.3%). This finding is consistent with the characteristics of Prolanis, which targets the age group ≥ 50 years with chronic diseases. Increasing age is associated with a decline in metabolic function and reduced tissue sensitivity to insulin, thereby increasing the risk of Type 2 Diabetes Mellitus. The predominance of female respondents (90.9%) is consistent with several studies stating that women tend to have a higher risk of Diabetes Mellitus compared to men, related to hormonal factors and body fat composition. The dominant education level of senior high school (74.5%) and status as housewives (80.0%) indicate that the majority of respondents have relatively more flexible time to participate in Prolanis activities.

A total of 67.3% of respondents actively participated in Prolanis. This high proportion reflects patient awareness of the importance of chronic disease management. This is consistent with Widianingtyas et al. (2021) who stated that participation in Prolanis is associated with improved self-management ability in patients. However, 32.7% of respondents were still inactive. In 2024, of 593 DM cases in the Sindangkerta area, only 55 patients (9.3%) were registered in Prolanis, indicating a significant gap between existing cases and program coverage that warrants further investigation.

Blood sugar control showed a proportion between controlled (70.9%) and uncontrolled (29.1%). This distribution suggests that while Prolanis participation is associated with better glycemic outcomes, a substantial proportion of patients remain uncontrolled, indicating the complexity of glycemic management in a real-world primary care setting. Blood sugar control cannot be achieved through program participation alone but is also correlated with adherence to medication, dietary management, physical activity, and patient health literacy. The American Diabetes Association (2023) states that good blood sugar control can prevent long-term complications such as nephropathy, neuropathy, and cardiovascular disease.

The Chi-Square test assumptions were satisfied, as no cells had expected counts less than five (0 cells; 0.0%). The Chi-Square statistical test showed $p < 0.001$ ($p < 0.05$) with OR = 10.057 (95% CI = 2.643–38.276), indicating a significant association between Prolanis

participation and blood sugar control. The OR value of 10.057 indicates that patients who actively participate in Prolanis are approximately 10 times more likely to have controlled blood glucose levels, reflecting a clinically meaningful magnitude of association. Considering the relatively high prevalence of controlled blood glucose levels (70.9%), the prevalence ratio (PR = 2.22; 95% CI: 1.23–4.03) may provide a more conservative estimate of the association. This indicates that active participants had a 2.22-fold higher prevalence of controlled blood glucose levels compared with inactive participants. This practical implication is particularly important for program planning: even modest improvements in Prolanis attendance rates at Puskesmas Sindangkerta could translate into substantially better glycemic control across the patient population. This finding is consistent with the research of Rohmah et al. (2023) which showed that 85.4% of active Prolanis participants had controlled blood sugar with $p < 0.001$. Kristianto et al. (2021) also found a significant difference in blood sugar levels between the Prolanis and non-Prolanis groups ($p = 0.019$). Fachriany et al. (2026) found a significant difference in fasting blood sugar between Prolanis and non-Prolanis participants ($p < 0.001$). Putra et al. (2024) also showed a relationship between Prolanis implementation and the clinical indicator HbA1c ($p < 0.001$).

The association between Prolanis participation and blood sugar control may be further explained through the constructs of the Health Promotion Model (HPM) by Nola J. Pender. The program is designed to address key HPM constructs: perceived benefits of action (through health education and counseling), perceived barriers to action (by accommodating patients with transportation or scheduling challenges), self-efficacy (through ongoing mentoring and self-management skill-building), and interpersonal influences (through peer support during group activities). Active participants are more likely to internalize these constructs, which may be associated with improved health behaviors such as dietary regulation, regular physical activity, and medication adherence, and in turn correlated with better glycemic outcomes. These findings highlight the importance of increasing active participation as a priority strategy in primary healthcare. Strengthening Prolanis through periodic monitoring, continuous health education, and digital technology as a communication and reminder tool may further improve patient engagement and glycemic outcomes.

Nevertheless, 13.5% of active Prolanis participants still had uncontrolled blood glucose levels, highlighting that program participation alone is not sufficient to guarantee optimal glycemic outcomes. These finding underscores that blood sugar control is a multifactorial outcome. Factors such as medication adherence, dietary compliance, physical activity levels, body mass index, duration of diabetes, and comorbid conditions all independently contribute to glycemic status and were not controlled in this study. This residual confounding may partly explain why some active participants remained uncontrolled. The use of telehealth and communication media can be an alternative to reach patients with time and access limitations, as recommended by (World Health Organization & Digital, 2025) regarding the use of digital technology in healthcare services.

This study has several limitations. First, the cross-sectional design cannot establish a causal relationship between Prolanis participation and blood sugar control; the findings reflect an association only. Second, the observed association may have been influenced by unmeasured confounding factors such as medication adherence, duration of illness, dietary patterns, physical activity, and comorbid conditions, which were not controlled in this analysis. Third, the use of secondary data depends on the completeness and accuracy of medical record documentation. Fourth, blood sugar control was assessed using the most recent fasting blood glucose (FBG) value rather than HbA1c, which is generally considered the gold standard for evaluating long-term glycemic control. FBG was used because HbA1c data were not routinely recorded in the medical records of this primary care facility; future studies should incorporate HbA1c as the primary outcome indicator for more comprehensive glycemic assessment. Therefore, future research is recommended to use a longitudinal design with more comprehensive clinical indicators and multivariate analysis to control for potential confounders.

CONCLUSION

This study concludes that active participation in the Chronic Disease Management Program (Prolanis) was significantly associated with blood sugar control among patients with Type 2 Diabetes Mellitus at Puskesmas Sindangkerta ($p < 0.001$). Active participants had a 2.22-fold higher prevalence of controlled blood glucose levels compared with inactive participants (PR = 2.22; 95% CI: 1.23–4.03). Most respondents were female, aged ≥ 45 years, had a senior high school education, and were housewives.

RECOMMENDATION

Puskesmas Sindangkerta is recommended to optimize the implementation of Prolanis by implementing a WhatsApp-based reminder system, periodic education using simple media such as videos and leaflets, as well as exploring online activities for patients with limited access. Health workers are expected to increase active communication and follow-up with patients who are inactive or have not yet achieved blood sugar control targets. Educational institutions can contribute through community service activities supporting promotive and preventive programs for chronic diseases.

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