



The Role of The Chronic Disease Management Program in Indonesia (PROLANIS) As A Diabetes Mellitus Management Strategy: A Scoping Review

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Abstract

Background: Diabetes Mellitus (DM) is a non-communicable disease with an increasing number of sufferers every year, and its negative impacts require special attention. The Indonesian government has taken steps to manage DM by establishing the PROLANIS program.

Objective: This study aims to identify the roles of PROLANIS in treating DM in Indonesia.

Methods: This study used a scoping review design. We performed extensive searches in CINAHL Plus, Cochrane Library, Embase, PubMed, and Google Scholar. Based on the search results, we found a total of 280 articles. After a selection process, 27 articles met the criteria for review. The papers were grouped by year, study design, setting, and the role of PROLANIS.

Results: According to research results, PROLANIS effectively maintains and reduces several essential aspects of DM patients' health, such as body mass index, fasting blood glucose, and HbA1c levels. PROLANIS also plays a positive role in improving the lipid profiles of DM patients. Furthermore, PROLANIS contributes to increasing self-efficacy, self-acceptance, self-management, adherence to therapy, and overall quality of life.

Conclusion: PROLANIS positively affects the management of DM by improving physical health and enhancing the quality of life for patients.

Keywords: *Chronic disease; diabetes mellitus; non-communicable diseases; PROLANIS*

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Background

Diabetes Mellitus (DM) is included in the top four non-communicable diseases (NCDs), causing severe health problems for society. The prevalence and incidence data show that it increases yearly (World Health Organization, 2016). In 2014, data shows that the number of adult DM sufferers worldwide is 422 million. The number of DM sufferers aged 20-79 years is 537 million (2021) and is estimated to be

643 million (2030) and 783 (2045). In the first place, as a country with the number of DM sufferers, China is 74.2 million, followed by India with 74.2 million, Pakistan with 33.0 million, and the United States with 32.2 million. Indonesia ranks fifth with 19.5 million (International Diabetes Federation, 2021).

The main problem caused by DM can cause chronic complications in macrovascular and microvascular disease (Bonora et al., 2020). DM is a life-long disease and causes severe physical, psychological, and emotional problems, disease perception, and changes in daily life (Egan & Dinneen, 2019). DM is the leading cause of retinopathy, cardiovascular attack, stroke, chronic kidney disease, and amputation, especially of the legs (Organization, 2016). Data for 2021 shows that as many as 6.7 million patients died from DM (International Diabetes Federation, 2021). DM with complications is Indonesia's third cause of death (Ndraha, 2014); diabetes caused 57.42 deaths per 100,000 population in 2022 (Ditpui, 2023).

DM is a disease that requires high costs to treat. At least USD 966 billion in health spending for treating DM has increased by 316% over the last 15 years (International Diabetes Federation, 2021). Data in Indonesia shows that in 2010, DM spent IDR 58.7 billion for advanced outpatient services (6.5% of total outpatient costs) and IDR 79.5 billion for advanced inpatient services (4.2 % of total inpatient costs) (Idris, 2014). In 2045, it is projected that the burden of treating diabetes on the National Health Insurance (NHI) of Indonesia will continue to increase to between IDR 10.22 trillion and IDR 23.59 trillion (Wisanggeni et al., 2023).

Proper management of DM is needed so that sufferers can avoid further problems. Management of DM generally consists of two main pillars: medical and lifestyle modification. Consuming medication or insulin is part of the medical management of DM patients. Changes in diet, nutritional therapy, sleep patterns, stress management, and physical activity are part of lifestyle modifications for DM patients. As a disease that requires lifelong treatment, lifestyle modification plays a vital role for DM patients (Garedow et al., 2023). Increasing patient knowledge must be addressed to achieve self-management (Qiu et al., 2020).

Considering the increasing number of diabetes mellitus sufferers and the negative impacts that follow, the Indonesian government has developed steps to handle it, one of which is by creating a program called the "*Program Pengelolaan Penyakit Kronis*" (PROLANIS). PROLANIS is a chronic disease management program intended for sufferers of chronic diseases, including diabetes mellitus and hypertension. PROLANIS uses a proactive approach in the health care system to handle chronic disease problems integrated by involving participants, health facilities and NHI. (Tampubolon, 2018). Several studies on the role of PROLANIS for DM patients have been carried out in several areas in Indonesia. However, it is necessary to conduct a literature review and summary of these roles to provide important information regarding the effectiveness of PROLANIS. Based on this, the author wants to review PROLANIS as a program for treating diabetes mellitus in Indonesia.

Method

Study Design

This study uses a methodological framework to compile a scoping review by Pollock (Pollock et al., 2021).

Data Bases and Search Strategy

This study aims to search for relevant literature regarding the role of PROLANIS in DM patients in Indonesia. The article search was carried out on September 5 2023, in several databases from 1998 to 2023, namely CINAHL Plus, Cochrane Library, Embase, PubMed, and Google Scholar. The search strategy uses the keywords ('Chronic Disease Management Program' OR PROLANIS) AND (Diabetes Mellitus) AND (Indonesia). The final search strategy process for the Pubmed database can be seen in additional file 1.

Selection Studies

The articles followed the inclusion criteria in Indonesian and English, full text, using a cross-sectional, cohort retrospective, or case study research design. Some exclusion criteria are theses/thesis/dissertations not published in journals, qualitative research designs, proceedings manuscripts, preprinted journals, and manuscripts in the proofreading process.

Identification of Study

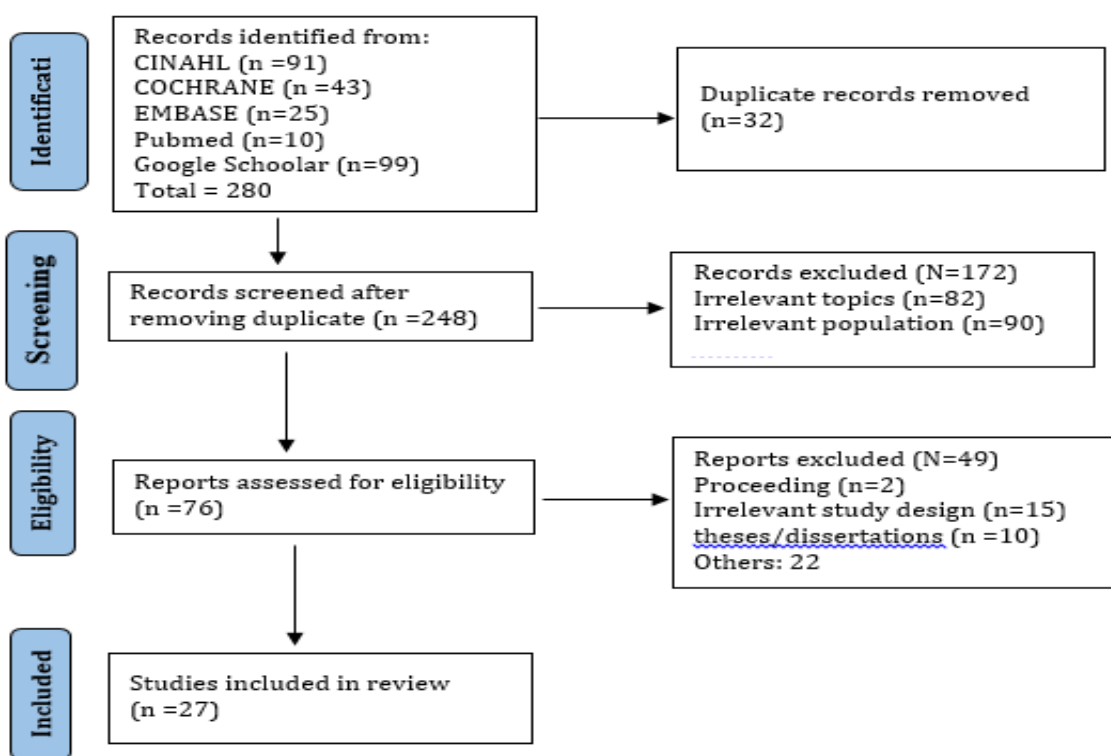
To maintain consistency, all authors reviewed the articles, discussed the results, and determined which articles were relevant to this study. Disputes regarding selecting articles and the data extraction process

are resolved by consensus and discussion with other reviewers if necessary. The number of articles obtained during the search process was 280 from 5 databases. A total of 32 articles were removed due to duplication, so 248 articles continued the screening process. A total of 174 articles were excluded during the screening process, with details of 82 articles having irrelevant topics and 90 articles having irrelevant populations. Seventy-six articles were eligible for the next stage, but 27 were excluded because they needed to meet the criteria (2 proceedings, 15 unsuitable design studies, 10 were theses/dissertations, and 22 others). At the end of the selection, 27 articles met the specified criteria. The search and selection process of the article is presented in Figure 1.

Data Extraction and Analysis

We follow the PRISMA guidelines for reporting the review process. After the search process, articles that match the criteria are carried out in several stages. The first stage is to summarize the entire article with details of the author's name, year of publication, title, journal description, research methodology, research location, results, and database. These data are presented in table form using the Excel program. The next step is to compose questions related to the topic to make it easier for researchers to determine subtitles at the discussion stage. The next step is to discuss and explain the research results and strengthen them with supporting theories.

Figure 1. PRISMA Flowchart



Results

Table 1 shows 27 research articles that fit the criteria included in this study, presented according to the author and year of publication, research methods, location of data collection, and the results obtained. These articles were published in the period 2016 to 2023. Almost all data collection locations were at Community Health Centers (26 articles), and only one was at a hospital. This is following government regulations that the implementation of PROLANIS is focused at the primary service level (Badan Penyelenggara Jaminan Sosial Kesehatan, 2014). The number of samples used varied, with a minimum of 31 people and a maximum of 426 people. Data collection methods mostly use questionnaires and secondary data from laboratory examinations carried out at Community Health Centers. According to WHO, blood sugar markers are one of the gold standards for managing DM. The cut-off point for fasting blood glucose (FBG) levels for DM patients is <126 mg/dl (World Health Organization, 2016). High levels of blood sugar markers indicate a poor prognosis. Studies show that PROLANIS participation is associated

with a decrease in FBG (p0.003 (Dewi & Muflihatin, 2019)), (p0.002, r=-0.724 (Ahmad et al., 2017)) (p0.000 (Manninda et al., 2021; Primahuda & Sujianto, 2016; Rokhmad & Supriyanto, 2023; Setyawan et al., 2020)). There is a significant difference in FBG PROLANIS and NONPROLANIS (p=0.019) (Kristianto et al., 2021), a high number of participants with controlled GDP levels (54.63% and p0.034) (Larasati et al., 2020). The mean of routine PROLANIS participants showed lower values compared to irregular (126.5 mg/dl vs 149.8 mg/dl (126.5 mg/dl vs 149.8 mg/dl (Melinda et al., 2022)), (99.57 ± 29.841 mg/dL(Ashary, 2019)). Only one article showed no significant relationship between PROLANIS participation and blood glucose levels (p0.171) (Wiboworini et al., 2021).

DM patients will have a good prognosis if the HbA1c level is <6.5% (World Health Organization, 2016). The research results show that PROLANIS is associated with a decrease in HbA1c levels (p0.001 (Setyawan et al., 2020)) and (p0.013 (Syuadzah, 2017)), (p1,000, OR 1,400 (Ladyani et al., 2020)). Apart from that, PROLANIS activities showed a significant relationship with reducing HbA1c levels, namely health consultations (p0.001, r-0.77), group activities (p0.001, r-0.82), SMS gateway (p0.001, r-0.81), and home visits (p0.047, r- 0.49) (Ahmad et al., 2017). Different results by Ladyani et al. and Mukti showed there was no significant relationship between PROLANIS participation and HbA1c (p=0.389 (Mukti, 2020)) dan (p1,000, OR 1,400 (Ladyani et al., 2020)). The results also show that the number of DM participants who take PROLANIS who have QoL in the excellent category is increasing (>50%) (Dewi & Faozi, 2023; Marwati et al., 2022; Noviyantini et al., 2020). There is a significant relationship between active participation in PROLANIS and QoL (p.000, r0.731) (Wicaksono & Fajriyah, 2018). Two articles discussing PROLANIS and the incidence of retinopathy in DM patients show that the majority of PROLANIS participants did not experience diabetic retinopathy (71.64% (Nasrul, 2021)) dan (86.8% (Natasia & Evatta, 2022)).

Table 1 Summary of The Articles

Author (Year)	Methods	Location	Results
(Ahmad et al., 2017)	This study is a correlation research using a cross-sectional design with 40 samples. Data collection was conducted in 2016 using a questionnaire and blood examination. The data analyzed used Pearson Correlation and Spearman Rank	Antang and Pampang Community Health Centres, Makassar, South Sulawesi	<ul style="list-style-type: none"> The results showed a significant relationship between PROLANIS and decreased fasting blood sugar in people with type 2 DM (p0.002, r=-0.724). It was found that there was a significant relationship between PROLANIS and a decrease in HbA1c in people with type 2 DM. The results also show that there is a relationship between PROLANIS activity and HbA1c with details of health consultations (p0.001, r-0.77), group activities (p0.001, r-0.82), SMS gateway (p0.001, r-0.81), and home visits (p0.047, r- 0.49).
(Alkaff et al., 2021)	This research is a retrospective cohort study using a sample of 30 people. Data was collected from April to October 2018 using questionnaires and blood tests. Data were tested using a Paired t-test and Wilcoxon sign-rank test adjusted p-values using Bonferroni correction.	Mojokerto Community Health Centres, East Java	<ul style="list-style-type: none"> PROLANIS implementation significantly improved Triglyserida serum level (p<0.001). PROLANIS implementation showed significant BMI changes (p0.002). There was a decrease in the number of participants who achieved the target of reducing BMI, DBP, LDL and HbA1C levels. In contrast, there was an increase in the number of participants who achieved targeted TG and HDL levels. Application of PROLANIS showed a significant increase in BUN levels (p0.001)
(Anwar et al., 2020)	This study is a correlation research using a cross-sectional design with 86 samples. The	Tamamaung and Dahlia Primary Health Care,	<ul style="list-style-type: none"> Most PROLANIS participants have a reasonable health satisfaction (67.4%).

	Indonesian version of WHOQOL BREF was used in the data collection process. The data analyzed used Chi-square.	Makassar, South Sulawesi	
(Ashary, 2019)	This study is a correlation research using a cross-sectional design with 35 samples. Data collection used blood examination. The data analyzed used Pearson correlation.	Somagede Community Health Centres, Banyumas, Central Java	<ul style="list-style-type: none"> • The mean and median blood pressure was $138.86 \pm 17,282$ mmHg $140.00 \pm 17,282$ mmHg. • The mean and median blood glucose levels were 99.57 ± 29.841 mg/dL and 92.00 ± 29.841 mg/dL.
(Dewi & Muflihatin, 2019)	This study is a correlation research using a cross-sectional design with 41 samples. Data collection used blood examination. The data analyzed used Chi-square	PPK 1 Denkesyah Polyclinic, Samarinda, East Kalimantan	<ul style="list-style-type: none"> • The study results show a significant relationship between the level of PROLANIS compliance regarding diet and physical activity and blood glucose in people with DM (0.001 and 0.003).
(Dewi & Faozi, 2023)	The study used Descriptive methods and survey approaches, with 95 samples. Data collection used the Diabetes Quality of Life (DQoL) questionnaire. The data analyzed used descriptive and quantitative analysis techniques.	Community Health Centres in Sukoharjo, Central Java	<ul style="list-style-type: none"> • The majority of participant had moderate QoL (50.5%) followed by high quality of life (27.4%).
(Inonu, 2019)	This study is a correlation research using a cross-sectional design with 52 samples. Data collection was from October to November 2018, using the Acceptance Illness Scale (AIS) and Diabetes Self-Management Questionnaire (DSMQ). The data analyzed used Chi-square.	Kedaton Community Health Centres Bandar Lampung, Lampung	<ul style="list-style-type: none"> • Most respondents had moderate acceptance (63.5%) and good self-management (9.2%).
(Kristianto et al., 2021)	This study is correlation research using a cross-sectional design, with 44 samples (20 PROLANIS, 24 NONPROLANIS). Data collection used Questionnaire and Blood Examination. The data analyzed used Chi-square.	Kalirungkut and Medokan Ayu Community Health Centres, East Java	<ul style="list-style-type: none"> • The findings show a significant difference in blood sugar levels on the 30th day between PROLANIS and NONPROLANIS ($p = 0.019$) with a risk ratio of 0.53. PROLANIS participants had a 0.53 lower risk of experiencing uncontrolled blood sugar. • There is a significant difference in patient compliance on day 30 between PROLANIS and NONPROLANIS ($p = 0.020$). • Absolute risk reduction in blood sugar levels on the 30th day between PROLANIS and NON-PROLANIS, namely $0.75 - 0.40 = 0.35$ (35%).
(Ladyani et al., 2020)	The study used a survey analytic cross-sectional design with 60 samples. Data collection was in February 2020, using PROLANIS Blood examination and attendance of patients. Data analyzed used Chi-square with an alternative Fisher exact test.	Kedaton Community Health Centres Bandar Lampung, Lampung	<ul style="list-style-type: none"> • Results showed no significant relationship between adherence to PROLANIS and HbA1c ($p1,000$, OR 1,400).
(Larasati et al.,	The study used an	Community	<ul style="list-style-type: none"> • Respondents have high self-

2020)	observational cross-sectional design with 97 samples. Data collection was from October to December 2017, using The Summary of Diabetes Self-Care Activities (SDSCA) Questionnaire and Blood Examination. Data analysis was carried out using Chi-square.	Health Centres in Bandar Lampung, Lampung	management (80.41%) and controlled FBG levels (54.63%). <ul style="list-style-type: none"> The study shows a significant relationship between self-management of people with DM and FBG control (p0.034).
(Manninda et al., 2021)	The study used observational and retrospective design, with 426 samples. Data collection was from January to December 2015, using medical records (Demography and blood examination). The data analyzed used Mann-Whitney and Chi-square.	Community Health Centres in Jakarta	<ul style="list-style-type: none"> There is a significant relationship between the level of control compliance and clinical outcomes (FBG p0.000 and BG2PP p0.000). There is a significant difference in the clinical outcomes of type 2 DM patients who follow PROLANIS and those who do not follow PROLANIS (FBG p0.000 BG2PP p0.036)
(Marwati et al., 2022)	The study used an observational cross-sectional design with 63 samples. Data collection was July–October 2021, using the WHOQOL-BRIEF questionnaire. The data analyzed used descriptive statistical tests.	Community Health Centres in Bantul Yogyakarta	<ul style="list-style-type: none"> Majority of DM people in the PROLANIS group had a good QoL (53%) and life satisfaction (54%)
(Melinda et al., 2022)	The study used descriptive and retrospective design, design with 48 samples. Data collection used Morisky medication adherence scales and Blood examination. The data analyzed used descriptive statistical tests.	Community health centres in Banyumas, Central Java, Indonesia	<ul style="list-style-type: none"> Mean overall blood glucose was 143.4 mg/dl. The Mean PROLANIS regular blood sugar level was 126.5 mg/dl and irregular 149.8 mg/dl.
(Mukti, 2020)	The study used a retrospective cohort design, with 22 samples (18 routine, 4 non-routine). Data collection was from January to May 2019, using attendance and Blood examination. Data was analyzed using an independent t-test and uji Mann-Whitney.	Primary care Klinik Pratama Sartika 59 Surabaya, East Java	<ul style="list-style-type: none"> The mean HbA1C profile in the routine PROLANIS group was 7.15 ± 1.51 % and non-routine 7.95 ± 2.26 %. The results show no significant difference in HbA1C values between people who regularly and not routinely follow PROLANIS (p=0.389).
(Nasrul, 2021)	The study used a descriptive survey with a cross-sectional approach, with 68 samples. Data collection was from April to July 2017, using the fundus examination. The data analyzed used descriptive statistical tests.	Mataram, NTB	<ul style="list-style-type: none"> The majority of PROLANIS participants did not experience diabetic retinopathy 48 (71.64%).
(Natasia & Evatta, 2022)	he study used a descriptive retrospective approach with 440 samples. Data collection was 1 January-31 December 2021, using Secondary data, autorefractor keratometer (ARK), and funduscopy indirect. Data was analyzed	Gondanglegi Islam Hospital, Malang, East Java	<ul style="list-style-type: none"> Most PROLANIS participants did not experience diabetic retinopathy 382 (86.8%).

	using descriptive statistical tests.		
(Noviyantini et al., 2020)	The study used a cross-sectional design with 85 samples. Data collection was from October to November 2018, using the Diabetes Quality of Life- Brief Clinical Inventory (DQL-BCI) Bahasa Indonesia version. The data analyzed used descriptive statistical tests.	Depok 1, Depok 2, and Depok 3 Community Health Centres Sleman, Yogyakarta	<ul style="list-style-type: none"> The mean quality of life of respondents is 3.84 (1-5). The mean quality of life for PROLANIS participants ≥ 6 months was higher than < 6 months ($3.86 \pm 0.45 > 3.76 \pm 0.66$).
(Primahuda & Sujianto, 2016)	The study used quantitative non-experimental with an analytical correlational design, with 82 samples. Data collection used a diet adherence questionnaire, the Baecke questionnaire, and the MMAS-8 questionnaire. Data were analyzed using Chi-Square with the Fisher Exact alternative test.	Babat Community Health Centres, Lamongan, East Java	<ul style="list-style-type: none"> A relationship exists between compliance with PROLANIS BPJS and blood glucose stability in people with type 2 DM in the Babat Lamongan District area (p0.000).
(Puspita & Rakhma, 2018)	The study used observational through a cross-sectional approach, with 43 samples. Data collection was in July 2018, and membership duration was measured using attendance, nutritional knowledge level measurement using a questionnaire, and diet compliance using a form recall 24 hours. The data analyzed used the Pearson Product Moment test.	Gilingan Community Health Centre Surakarta, Cengtral Java	<ul style="list-style-type: none"> Findings show a significant relationship between PROLANIS participation and knowledge about nutrition in people with DM at the Gilingan Surakarta Community Health Center (p0.000). Findings show that there is a significant relationship between PROLANIS participation and dietary compliance in people with DM at Gilingan Surakarta Health Center (p0.002)
(Rokhmad & Supriyanto, 2023)	The study used observational through a cross-sectional approach, with 546 samples. Data collection was from April to July 2022, using secondary data, medical records and blood examinations. Data analyzed used descriptive statistical tests and Chi-square.	Community Health Center in Tulungagung, East Java	<ul style="list-style-type: none"> The study shows a relationship between PROLANIS participation and blood glucose control in type 2 DM patients (p0.000).
(Salami, 2017)	The study used observational through a cross-sectional approach, with 40 samples. Data collection used the Diabetes Self-Efficacy Questionnaire (DSEQ). Data analyzed used descriptive statistical tests and Chi-square.	Community Health Center Talaga Bodas, West Java	<ul style="list-style-type: none"> The overall self-efficacy of Type 2 DM sufferers is mainly included in the suitable criteria.
(Setyawan et al., 2020)	The study used a Retrospective cohort design with 42 samples. Data collection held January-April 2019, used Blood Examination. Data analyzed used an Independent T-test and	Nursing Ngletih Community Health Center, Kediri, East Java	<ul style="list-style-type: none"> The mean of HbA1c non PROLANIS higher than PROLANIS ($9.27 \pm 2.06 > 7.2 \pm 1.47$). There is a significant difference between the Non-PROLANIS and PROLANIS groups regarding HbA1c

	Mann-Whitney.		(p0.001). <ul style="list-style-type: none"> • FBG non-PROLANIS all indicated >126 mg/dl (100%). Data shows a significant difference between the non-PROLANIS and PROLANIS groups regarding FBG (p0.000).
(Syuadzah, 2017)	The study used observational through a cross-sectional approach, with 31 samples. Data collection was conducted in October 2015, using Blood Examination. The data analyzed used an Independent T-test.	Community Health Center Jaten, Central Java	<ul style="list-style-type: none"> • Compliance with PROLANIS activities is related to HbA1c levels (p0.013).
(Tanjung et al., 2021)	The study used a prospective observational study with 60 samples. Data collection was conducted in May-July 2019 using Questionnaire and Blood Examination. Data analyzed used ANOVA (parametric test) or Kruskal Wallis Test (non-parametric test)	Rancaekek, Linggar, and Nanjungmekar Community Health Center West Java	<ul style="list-style-type: none"> • All three puskesmas show decreasead FBG, Rancaekek (32.15±26.03), Linggar (21.35±17.20), and Nanjungmekar (35.45±22.76).
(Wiboworini et al., 2021)	This study used descriptive correlation through a cross-sectional approach with 68 samples. Data was collected from July to August 2020 using Questionnaire and Blood Examination. The data analyzed used Chi-square.	Community Health Center in Surabaya, East Java	<ul style="list-style-type: none"> • There is no significant relationship between PROLANIS participation and blood glucose levels (p0.171).
(Wicaksono & Fajriyah, 2018)	This study used descriptive correlation through a cross-sectional approach with 31 samples. Data collection used the Indonesian version of the World Health Organization Quality Of Life-BREF. The data analyzed used the Spearman Rank.	Community Health Center in Pekalongan, Central Java	<ul style="list-style-type: none"> • There is a significant relationship between active participation in PROLANIS and the quality of life of people with type 2 DM (p.000, r0.731).
(Widianingtyas et al., 2021)	This study used descriptive correlation through a cross-sectional approach with 44 samples. Data collection used the Diabetes Management Self-Efficacy Scale (DMSES). The data analyzed used the Spearman Rank.	Community Health Center in Banyumas, Central Java	<ul style="list-style-type: none"> • The majority of PROLANIS participants' efficacy level is in the high category (86%) • Research shows a relationship between the participation of people with DM undergoing PROLANIS and the level of self-efficacy (p0.000, r0.637).

Table 2 provides data that the majority of articles were published in 2021 (7 articles), with a cross-sectional research design (21 articles), and were conducted in Central Java province (8 articles). Table 3 shows that PROLANIS has many roles in managing DM patients. Based on the review studies that have been carried out, data from the majority of articles shows the role of PROLANIS in maintaining and reducing fasting blood glucose (FBG) (Ahmad et al., 2017; Ashary, 2019; Dewi & Muflihatin, 2019; Kristianto et al., 2021; Larasati et al., 2020; Manninda et al., 2021; Melinda et al., 2022; Primahuda & Sujianto, 2016; Rokhmad & Supriyanto, 2023; Setyawan et al., 2020; Tanjung et al., 2021), only one article found that PROLANIS was not associated with FBG (Wiboworini et al., 2021). The second role that many people get from PROLANIS is maintaining and reducing HbA1c (Ahmad et al., 2017; Alkaff et al., 2021; Ladyani et al., 2020; Mukti, 2020; Setyawan et al., 2020; Syuadzah, 2017). Furthermore, PROLANIS also

has a role in improving the quality of life of DM patients (Anwar et al., 2020; Dewi & Faozi, 2023; Marwati et al., 2022; Noviyantini et al., 2020; Wicaksono & Fajriyah, 2018)

Table 2 General Characteristics of Articles

Charasteristics	Number of Article	Authors
Year		
2016	1	(Primahuda & Sujianto, 2016)
2017	3	(Ahmad et al., 2017; Salami, 2017; Syuadzah, 2017)
2018	3	(Inonu, 2019; Puspita & Rakhma, 2018; Wicaksono & Fajriyah, 2018)
2019	2	(Ashary, 2019; Dewi & Muflihatin, 2019)
2020	6	(Anwar et al., 2020; Ladyani et al., 2020; Larasati et al., 2020; Mukti, 2020; Noviyantini et al., 2020; Setyawan et al., 2020)
2021	7	(Alkaff et al., 2021; Kristianto et al., 2021; Manninda et al., 2021; Nasrul, 2021; Tanjung et al., 2021; Wiboworini et al., 2021; Widianingtyas et al., 2021)
2022	3	(Marwati et al., 2022; Melinda et al., 2022; Natasia & Evatta, 2022)
2023	1	(Rokhmad & Supriyanto, 2023)
Study Design		
Cross-sectional study	21	(Ahmad et al., 2017; Anwar et al., 2020; Ashary, 2019; Dewi & Muflihatin, 2019; Dewi & Faozi, 2023; Inonu, 2019; Kristianto et al., 2021; Ladyani et al., 2020; Larasati et al., 2020; Marwati et al., 2022; Nasrul, 2021; Noviyantini et al., 2020; Primahuda & Sujianto, 2016; Puspita & Rakhma, 2018; Rokhmad & Supriyanto, 2023; Salami, 2017; Syuadzah, 2017; Tanjung et al., 2021; Wiboworini et al., 2021; Wicaksono & Fajriyah, 2018; Widianingtyas et al., 2021)
Retrospective study	6	(Alkaff et al., 2021; Manninda et al., 2021; Melinda et al., 2022; Mukti, 2020; Natasia & Evatta, 2022; Setyawan et al., 2020)
Province		
Central Java	8	(Ashary, 2019; Dewi & Faozi, 2023; Melinda et al., 2022; Puspita & Rakhma, 2018; Syuadzah, 2017; Wiboworini et al., 2021; Wicaksono & Fajriyah, 2018; Widianingtyas et al., 2021)
East Java	7	(Alkaff et al., 2021; Kristianto et al., 2021; Mukti, 2020; Natasia & Evatta, 2022; Primahuda & Sujianto, 2016; Rokhmad & Supriyanto, 2023; Setyawan et al., 2020)
Lampung	3	(Inonu, 2019; Ladyani et al., 2020; Larasati et al., 2020)
South Sulawesi	2	(Ahmad et al., 2017; Anwar et al., 2020)
Yogyakarta	2	(Marwati et al., 2022; Noviyantini et al., 2020)
West Java	2	(Salami, 2017; Tanjung et al., 2021)
East Kalimantan	1	(Dewi & Muflihatin, 2019)
Jakarta	1	(Manninda et al., 2021)
West Nusa Tenggara	1	(Nasrul, 2021)

Table 3 The role of PROLANIS in the Management of Diabetes Mellitus

Role of PROLANIS	Authors
Maintain and reduce Fasting Blood Glucose levels	(Ahmad et al., 2017; Ashary, 2019; Dewi & Muflihatin, 2019; Kristianto et al., 2021; Larasati et al., 2020; Manninda et al., 2021; Melinda et al., 2022; Primahuda & Sujianto, 2016; Rokhmad & Supriyanto, 2023; Setyawan et al., 2020; Tanjung et al., 2021; Wiboworini et al., 2021)
Maintain and reduce HbA1c levels	(Ahmad et al., 2017; Alkaff et al., 2021; Ladyani et al., 2020; Mukti, 2020; Setyawan et al., 2020; Syuadzah, 2017)
Lowering Body Mass Index	(Alkaff et al., 2021)
Maintain and reduce blood pressure levels	(Alkaff et al., 2021; Ashary, 2019)
Maintain and reduce bad fats (LDL and Triglycerides) and increase HDL	(Alkaff et al., 2021)
Correlated with BUN serum level	(Alkaff et al., 2021)
Improve the quality of life	(Anwar et al., 2020; Dewi & Faozi, 2023; Marwati et al., 2022; Noviyantini et al., 2020; Wicaksono & Fajriyah, 2018)
Increase health satisfaction	(Anwar et al., 2020)
Increase self-acceptance	(Inonu, 2019)

Improve self-management	(Inonu, 2019; Larasati et al., 2020)
Increase therapy compliance	(Kristianto et al., 2021; Puspita & Rakhma, 2018)
Reduces the incidence of diabetic retinopathy	(Nasrul, 2021; Natasia & Evatta, 2022)
Increase self-efficacy	(Salami, 2017; Widianingtyas et al., 2021)

Discussion

Community health centres (CHS) are essential in treating non-communicable diseases, especially DM, by reducing the incidence and preventing complications (Infodatin Kemenkes, 2014). CHS is a first-level health facility that is a gatekeeper for resolving health problems. In line with research by Rahma, which states that CHS are one of the gatekeepers, they need to improve the quality of health services provided and be able to improve the welfare of the community in their working areas (Rahma et al., 2017). PROLANIS, as one of the programs owned by CHS, seeks to provide treatment for patients.

The Role of PROLANIS in Blood Glucose Markers (FBG and HbA1c)

DM is a disease commonly associated with blood sugar problems, characterized by persistent hyperglycemia (Inzucchi et al., 2015). High glucose in the blood causes many long-term health problems and worsens DM complications (Kisiel & Marsons, 2009). A retrospective cohort study in Ethiopia shows data that high fasting blood glucose (FBG) values are significantly associated with the risk of microvascular complications in DM patients (Gashaye Shita & Sharew Iyasu, 2022). A total of 11 articles out of the 27 found that PROLANIS was significantly associated with reducing FBG levels, while only one article showed the opposite result. Research in Japan using a single-group pre-test and post-test design showed that an effective program for chronic diseases was associated with a reduced HbA1c but not significantly with FBG at evaluation after six months and one year. However, FBG levels in the 6th and 12th months showed a decrease in the average (Kazawa et al., 2015). Different results were shown by RCT research in China that the chronic care model was effective in reducing FBG in DM patients (Kong et al., 2019).

Apart from FBG, Glycated haemoglobin (HbA1c) is recommended as a standard of care for diagnosing and monitoring DM, especially type 2. Therefore, the results of previous studies are popular using HbA1c as an indicator for monitoring DM. The research results are in line with the implementation of similar programs associated with a reduction in HbA1c, such as in China (Ding et al., 2021), Slovakia (Mužik et al., 2023), Germany (Kostev et al., 2017), Michigan (Holtrop et al., 2017), Texas (Forjuoh et al., 2014), and Pakistan (Ansari et al., 2022). The results of a systematic review show that planned and regular training in chronic disease management programs positively affects metabolic control variables such as HbA1c in DM patients (Bağriaçık & Bayraktar; Pimouguet et al., 2011). A 2004-2015 longitudinal study in Germany found different results that showed no significant change in HbA1c results for disease management program patients (Mehring et al., 2017).

The Role of PROLANIS in Lipid Profiles

Lipid profile abnormalities can cause problems in DM sufferers, which are usually characterized by high levels of three aspects, namely total cholesterol (T-Chol), triglycerides (Tg), and low-density lipoprotein cholesterol (LDL-C). Meanwhile, the fat content in the excellent category, high-density lipoprotein cholesterol (HDL-C), is low (Santos-Gallego & Rosenson, 2014). Data show that dyslipidemia is closely related to insulin resistance, which causes DM and other metabolic disorders (Li et al., 2014). Study results show that PROLANIS reduces LDL and triglycerides and increases HDL (Alkaff et al., 2021). Rice et al. found that as many as 52% of DM patients who followed chronic disease management for diabetes achieved the LDL goal of <100 mg/dL (Rice et al., 2010). A systematic review also shows that training in disease management programs effectively reduces LDL in DM patients (Bağriaçık & Bayraktar), confirmed by a meta-analysis study which shows similar results (Egginton et al., 2012). Another longitudinal study showed varying results; the examination six months after program implementation did not show significant results for non-HDL and triglycerides. However, after one year, the results showed that program implementation was significantly related to both variables (Kazawa et al., 2015).

The Role of PROLANIS in BMI and Blood Pressure

The study's findings showed a significant relationship between PROLANIS and blood pressure. One article stated that PROLANIS was associated with a decrease in BMI, and two articles explained that PROLANIS was associated with blood pressure. The research aligns with studies that state that chronic disease patients' disease management program and service framework are significantly related to BMI and blood pressure at the 6th and 12th-month assessments (Kazawa et al., 2015). Similar results were also shown by research in rural China that chronic disease management in primary health care correlates

with blood pressure control in DM patients (Ding et al., 2021). BMI is an essential factor for DM patients and blood pressure; studies show that care management implementation effectively reduces the BMI of obese DM patients (Holtrop et al., 2017). Different results in longitudinal research in Germany showed no significant improvement in obesity levels after undergoing disease management programs (Mehring et al., 2017).

DM also causes problems with blood pressure; increased blood pressure (hypertension) is often found in type 2 DM patients, with a prevalence of 3 times that of healthy people (Sowers, 2013). However, hypertensive patients also often find disorders of carbohydrate metabolism (Perreault et al., 2017), so it can be said that hypertension and DM have a reciprocal relationship. The combination of DM and hypertension significantly increases the risk of cardiovascular disease (Saeedi et al., 2019); controlling blood pressure as one of the management of DM patients is essential.

The Role of PROLANIS in Reducing the Risk of Diabetic Retinopathy

DM patients are significantly at risk of experiencing microvascular complications, including retinopathy (Alves-Cabratosa et al., 2020). Diabetic retinopathy, the leading cause of vision loss worldwide, occurs in one in three diabetes patients (Wang et al., 2009). Correct therapy in DM patients can prevent retinopathy. Study results from 2 articles show data that PROLANIS reduces the incidence of diabetic retinopathy in patients. The results follow research that chronic disease management programs correlate with the incidence of microvascular complications in DM patients. Previous research shows a significant difference between DM patients who do and do not participate in a chronic disease management program and the incidence of retinopathy (Hyun et al., 2023).

The Role of PROLANIS to Quality of Life (QoL) and Health Satisfaction

WHO defines quality of life as an individual's perception of his life position regarding his culture and relation to his goals, hopes, standards and concerns (World Health Organization, 1995). Health-related quality of life (HRQoL) is a person's ability to measure the value placed on the duration of life that has been changed by disorders, functional states, perceptions and opportunities, which are influenced by disease, injury, treatment and policy (Gill & Feinstein, 1994). DM conditions significantly negatively impact patients' social relationships, life expectancy, academic performance and overall HRQoL due to long-term complications (American Diabetes Association, 2014; World Health Organization, 2006). The research results showed that five articles found that PROLANIS was significantly associated with improving the quality of life of DM patients. The results align with research in China, which stated that the chronic disease self-management program effectively improved the QoL of DM patients (Browning et al., 2015). RCT research also shows similar results that the chronic care model improves HQoL and health satisfaction in DM patients (Kong et al., 2019); similar results were obtained from meta-analysis research conducted in the US (Egginton et al., 2012).

The Role of PROLANIS to Self-Management and Therapy Compliance

Chronic diseases require living well therapy, so treatment requires patient-centred management, empowerment, self-management support, and compliance (Stellefson et al., 2013). The research results in 2 articles stated that PROLANIS was associated with increased therapy compliance and self-management in DM patients. This result aligns with previous research, which states that the chronic care model is associated with increased diabetes self-management (Ansari et al., 2022). The results of a systematic review show similar results that the chronic care model of diabetes management is related to patient self-management (Stellefson et al., 2013). Self-management plays a significant role in patient compliance in carrying out treatment therapy. The results of a systematic review show that mHealth chronic disease management is efficacious in improving the treatment of DM patients (Hamine et al., 2015). Meta-analysis studies show that disease-management programs improve patient self-management so that patients will adhere to the programs with or without supervision from other people, such as health workers (Egginton et al., 2012; Pimouguet et al., 2011).

This study has limitations, including that of the 38 provinces in Indonesia, only nine were included. This is because there were no reports from other provinces in the form of published journals. For this reason, care needs to be taken in generalizing the results of this research.

Conclusion

PROLANIS, one of the Indonesian government's programs for managing non-communicable diseases, is vital in managing people with diabetes mellitus. PROLANIS plays a good role in maintaining and lowering blood glucose markers, lipid profile and blood pressure. Apart from that, the role that is no less important is to increase the positive aspects of the patient, such as quality of life, health satisfaction, self-acceptance,

self-efficacy and compliance in undergoing therapy. Considering the importance of PROLANIS, it is hoped that this program can run comprehensively throughout Indonesia.

Declaration Conflicting Interest

The authors have no conflicts of interest to declare.

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Author Contribution

The authors confirm their contributions to the paper as follows: The study conception and design were formulated by the Author, who also undertook the collection of data. The Author performed detailed analysis and interpretation of the results, and was responsible for the initial drafting of the manuscript. Additionally, the Author meticulously reviewed the manuscript's results, ensuring accuracy and coherence in the final document.

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