



Implementation of the posbindu PTM program by community nurses in early detection of diabetes and hypertension in rural villages

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ABSTRACT

Background: The increasing prevalence of non-communicable diseases (NCDs), particularly diabetes mellitus and hypertension, poses a significant health challenge in Indonesia. Early detection through Posbindu PTM (Integrated Non-Communicable Disease Health Post) is essential to prevent complications. Community nurses play a vital role in organizing and sustaining this program, especially in rural and remote regions such as Subang Regency, West Java.

Purpose: To describe the implementation of the Posbindu PTM program by community nurses in the early detection of diabetes and hypertension in rural villages within the Kalijati Health Center area, Subang Regency, West Java.

Methods: This quantitative descriptive study involved 90 adult participants aged 18 years and older who attended Posbindu PTM activities at Kalijati Health Center, Subang Regency, West Java, between January and March 2024. Data were collected through structured questionnaires and secondary data from screening records. Descriptive analysis was performed using SPSS version 27, focusing on coverage, participation, and outcomes of early detection activities. Of the 90 participants recruited, 82 were included in the final analysis; 8 were excluded due to incomplete data.

Results: Among 82 participants, 58.9% were female and 41.1% were male, with a mean age of 47.6 years (SD = 12.3). Screening results indicated that 21.1% had elevated fasting blood glucose levels (≥ 126 mg/dL), and 34.4% had high blood pressure ($\geq 140/90$ mmHg). Nurse involvement in Posbindu PTM was reported as active by 82% of respondents, particularly in health education and screening. However, challenges included irregular attendance, limited diagnostic equipment, and lack of follow-up visits.

Conclusion: The study highlights the crucial contribution of community nurses in detecting early-stage diabetes and hypertension through Posbindu PTM. Strengthening nurse capacity, ensuring equipment availability, and enhancing community participation are recommended to optimize program sustainability in rural areas.



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1. Background

Non-communicable diseases (NCDs) such as diabetes mellitus and hypertension have become leading causes of morbidity and mortality in Indonesia, contributing significantly to the national disease burden. The Ministry of Health reported

that NCDs accounted for more than 73% of total deaths in 2019, with cardiovascular and metabolic diseases dominating the list [1]. In rural and semi-urban areas like Subang Regency, West Java, lifestyle changes, limited access to preventive care,

and low health literacy have accelerated the rise in these conditions [2], [3].

To combat this, the Indonesian government established the Posbindu PTM program, a community-based initiative aimed at the early detection, monitoring, and control of NCDs. The Posbindu PTM is designed to empower communities in identifying risk factors, detecting cases early, and promoting healthy lifestyles through regular screening and education [4], [5]. The program aligns with the WHO Package of Essential Noncommunicable (PEN) Disease Interventions for primary health care in low-resource settings, first introduced in 2010 [6].

Community nurses play a central role in implementing Posbindu PTM. They are responsible for organizing activities, conducting health assessments, and coordinating follow-up care. Their proximity to the community and cultural understanding make them essential in bridging the gap between public health programs and local populations [7], [8]. Previous studies have shown that active nurse participation in community-based NCD prevention programs increases attendance rates, improves early diagnosis, and enhances treatment adherence [9], [10].

Despite the national implementation, challenges persist in many rural regions. A study by Wulandari et al. [11] found that participation in Posbindu PTM was often irregular due to low awareness, logistical barriers, and insufficient human resources. Furthermore, equipment for blood glucose and cholesterol testing was often limited, making early detection suboptimal [12]. In rural West Java, where health access is constrained by geographical and infrastructure conditions, the implementation of Posbindu PTM relies heavily on the initiative and commitment of community nurses [13].

Kalijati Health Center, located in a predominantly rural area of Subang Regency, West Java, has been conducting Posbindu PTM activities since 2019. However, local health records indicate fluctuating participation levels and inconsistent screening outcomes. The prevalence of hypertension in the service area was reported at 29.4% in 2023, while suspected diabetes cases increased to 11.8%. This highlights the need to evaluate the extent to which Posbindu PTM is functioning as intended, especially in terms of early detection effectiveness and community engagement [14].

Understanding the nurse's role and the level of program implementation in this context is crucial for improving NCD control strategies at the grassroots level. Nurses are not only implementers but also educators, motivators, and data managers within the Posbindu system. As emphasized by the World Health Organization [1], nurses are essential for scaling up universal health coverage and community-based disease prevention, particularly in low-resource settings [6], [8].

Therefore, this study aims to describe the implementation of the Posbindu PTM program by community nurses in early detection of diabetes and hypertension in rural villages under the jurisdiction of Kalijati Health Center, Subang Regency, West Java. The results are expected to provide insight into nurse-led NCD prevention initiatives and contribute to evidence-based policy improvements for rural health promotion in Indonesia.

2. Methods

2.1 Research design

A quantitative descriptive design was used to describe the implementation of Posbindu PTM activities by community nurses. The study took place in two rural villages served by the Kalijati Health Center, Subang Regency, West Java [15].

2.2 Setting and sample

The population included adults aged ≥ 18 years who attended Posbindu PTM sessions between January and March 2024. A total of 90 respondents were recruited using purposive sampling. Inclusion criteria were: (1) residents of the study villages, (2) participation in at least one Posbindu session during the study period, and (3) willingness to provide written informed consent. Exclusion criteria were: (1) individuals with documented severe mental illness that would impair their ability to respond to questionnaires, and (2) individuals who withdrew consent during data collection.

Of the 90 participants recruited, 82 were included in the final analysis. Eight participants were excluded due to incomplete questionnaire data ($n=5$) or missing screening records ($n=3$).

2.3 Instruments and data collection

Data were collected using a structured questionnaire and observation checklist covering: (1) demographic characteristics (age, gender, education, occupation); (2) participation and awareness of Posbindu PTM; and (3) health screening outcomes, including fasting blood

glucose and blood pressure (recorded from Posbindu reports).

The structured questionnaire consisted of 25 items developed by the researchers based on the Posbindu PTM technical guidelines [4] and existing literature [11]. The questionnaire was validated by three community health nursing experts for content validity (Content Validity Index = 0.92) and tested for reliability using Cronbach's alpha ($\alpha = 0.84$) in a pilot study of 30 participants from a neighboring health center not included in the main study.

The observation checklist assessed nurse-led activities including health education, screening procedures, and documentation practices. Observations were conducted by the first author during Posbindu sessions using a standardized protocol.

Data were obtained through interviews using structured questionnaires with participants after Posbindu activities and verified against program records. Measurements were performed using calibrated glucometers (Accu-Chek Active, Roche) and digital sphygmomanometers (Omron HEM-7121), calibrated monthly against standard

reference instruments at the health center laboratory.

2.4 Data analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation) were analyzed using SPSS version 27. Data were checked for completeness and consistency before analysis. Missing data were handled by exclusion from analysis.

2.5 Research ethics

Ethical approval was obtained from the Health Research Ethics Committee of Sekolah Tinggi Ilmu Kesehatan Muhammadiyah Ciamis (No. 072/KEPK-MUCIS/II/2024). Participants provided written informed consent and were assured of confidentiality and voluntary participation. All data were anonymized and stored securely.

3. Results

A total of 82 participants were included in this study. Most participants were aged 36–55 years, female, and had a junior or senior high school education level. Results are displayed in Tables 1 and 2:

Table 1. Characteristics of Respondents (n = 90)

Variable	Category	n	%
Age	18–35 years	22	24.4
	36–55 years	44	48.9
	>55 years	24	26.7
Gender	Male	37	41.1
	Female	53	58.9
Education	Elementary	26	28.9
	Junior High	31	34.4
	Senior High	27	30.0
	College	6	6.7

Table 2. Posbindu PTM Implementation Outcomes (n = 90)

Indicator	Category	n	%
Fasting blood glucose ≥ 126 mg/dL	Yes	19	21.1
Blood pressure $\geq 140/90$ mmHg	Yes	31	34.4
Participation frequency ≥ 1 /month	Yes	74	82.2
Nurse-led education received	Yes	80	88.9
Follow-up visit conducted	Yes	56	62.2

The results indicate that 21.1% of participants had elevated glucose levels and 34.4% had high blood pressure. Nurse-led education

coverage was 88.9%, showing strong engagement, though follow-up rates remained modest at 62.2%.

4. Discussion

4.1. Nurse-Led Implementation and Early Detection

The results of this study underscore the essential role of community nurses in the successful implementation of Posbindu PTM program in rural

Indonesia. Conducted at the Kalijati Health Center, Subang Regency, West Java, the research reveals that the involvement of nurses significantly contributes to the early detection of diabetes and hypertension. The findings that 21.1% of participants presented with elevated fasting blood glucose and 34.4% with high blood pressure highlight the pressing need for systematic early detection and regular community screening. These figures reflect national trends reported by the Indonesian Ministry of Health, which found that undiagnosed hypertension and diabetes remain prevalent among rural populations [1], [3].

The high level of nurse-led education (88.9%) and participation in monthly screening (82.2%) demonstrate the effective mobilization and coordination by community nurses. This success can be attributed to nurses' strong community presence and trust relationships, which align with the Health Promotion Model proposed by Pender [16]. According to this model, health-promoting behaviors are influenced by individual experiences, perceived benefits, and reinforcement from healthcare providers. In this study, nurses acted as consistent motivators, educators, and facilitators, helping community members recognize their risk factors and encouraging them to participate in screening activities [16].

4.2 Behavioral Change and Self-Efficacy

One important aspect that emerges is the behavioral change dynamic among residents. Many participants reported attending Posbindu activities after understanding the personal benefits of knowing their health status. This shift demonstrates that consistent nurse-patient interaction builds not only awareness but also self-efficacy—the belief that individuals can take control of their health. This finding mirrors those from previous studies observing that regular nurse counseling significantly improved lifestyle modification efforts among hypertensive patients in Indonesia [9], [10]. Thus, community nurses serve as catalysts for translating health education into preventive actions [7], [8].

4.3 Gaps in Follow-Up and Program Sustainability

However, despite encouraging participation rates, the study found gaps in program sustainability and follow-up care. Only 62.2% of respondents reported receiving follow-up visits or consultations after abnormal screening results. This finding points to systemic challenges such as limited human resources, logistical constraints, and

inadequate equipment availability—issues also identified in previous studies of rural Posbindu PTM implementation [11], [12]. Without proper follow-up mechanisms, the early detection process risks becoming a one-time screening event rather than a continuous preventive intervention [11], [13].

The absence of consistent follow-up is concerning because hypertension and diabetes are chronic conditions that require ongoing monitoring. The WHO emphasizes that community-based NCD programs must be designed not only for case detection but also for sustained behavioral and clinical management [6]. In the context of Kalijati Health Center, nurses' efforts are constrained by the lack of diagnostic tools such as portable glucometers and blood cholesterol meters. These logistical barriers reduce the comprehensiveness of screening and limit the program's effectiveness in identifying multi-risk profiles. Strengthening nurse access to resources is thus a critical step toward improving the program's sustainability and impact [6], [12].

4.4 Cultural Adaptation of Health Education

From a cultural perspective, the success of nurse-led education can be partly explained by the application of Leininger's Transcultural Nursing Theory [17]. This theory highlights the need to deliver culturally congruent care that aligns with local values, beliefs, and lifestyles. In the Kalijati context, many residents hold traditional perceptions about illness prevention, viewing hypertension and diabetes as hereditary rather than behaviorally influenced. By contextualizing education materials—using local food examples, familiar analogies, and the local language—nurses make abstract health concepts more tangible and relevant. Similar findings were observed in studies showing that culturally adapted health education in Indonesia increased comprehension and reduced resistance toward preventive health messages [9], [17].

4.5 Gender Disparities in Participation

The findings also indicate that women, who made up nearly 59% of participants, are more active in Posbindu PTM activities. This aligns with the traditional gender roles in Indonesian communities, where women are typically responsible for family health and dietary management. However, engaging men remains a challenge, even though they face equal or greater risks for hypertension and diabetes. As reported in previous studies, male participation in rural health screenings is often

limited due to working hours and low risk perception [11]. Nurses could therefore develop gender-sensitive approaches, such as after-hours or weekend sessions, to increase male involvement in preventive health efforts [11].

4.6 Integration with Primary Healthcare and Digital Systems

Another key discussion point is the integration of Posbindu PTM into the broader primary healthcare system. Nurses at Kalijati Health Center reported that data from Posbindu activities are often underutilized in planning or follow-up programs. This gap between community data collection and health management reduces the potential impact of early detection. The integration of digital reporting tools could enhance efficiency and coordination, as suggested by the Ministry of Health's technical guidelines [4]. The use of electronic data systems would allow nurses to track patient progress, identify high-risk individuals, and coordinate referrals more effectively [4], [12].

4.7 Quality of Health Education

In addition, the educational component of Posbindu PTM deserves particular attention. The study revealed that 88.9% of respondents received nurse-led education, but qualitative observations indicated that these sessions were often brief due to time constraints. As recommended by Notoatmodjo [18], effective health education must combine knowledge transfer with participatory engagement. Nurses could enhance education quality through interactive approaches such as small group discussions, peer support networks, and visual aids tailored to literacy levels [16], [18].

4.8 International Evidence and Policy Implications

International evidence supports the importance of such nurse-led community interventions. The WHO global review found that community nurses' involvement in NCD prevention can contribute significantly to reducing premature mortality when screening, education, and referral systems are well-integrated [6]. Likewise, previous studies emphasized that localized nurse-led interventions are cost-effective and adaptable to diverse cultural and geographic settings [7], [8]. This study's findings from rural West Java provide further empirical support for these global perspectives, demonstrating that even with limited resources, nurses can make significant contributions to NCD control [1], [6], [9].

4.9 Interprofessional Collaboration and System-Level Support

Nevertheless, achieving long-term success requires system-level reinforcement. The findings call for institutional investment in nurse training, supervision, and interprofessional collaboration. Nurses at Kalijati Health Center should work closely with nutritionists, midwives, and village health cadres to expand the scope and frequency of Posbindu PTM sessions. Intersectoral collaboration engaging local leaders, schools, and religious institutions could further enhance community participation and collective ownership of NCD prevention programs [13].

4.10 Limitations

This study has several limitations. First, the descriptive cross-sectional design limits the ability to establish causal relationships between nurse activities and health outcomes. Second, the use of purposive sampling may introduce selection bias, as participants who attend Posbindu sessions may be more health-conscious than non-attendees. Third, self-reported data on nurse activities and follow-up visits may be subject to recall bias. Fourth, the study was conducted in a single health center area, limiting generalizability to other rural regions in Indonesia. Longitudinal studies with larger, multi-site samples are recommended to confirm these findings.

5. Conclusion

Community nurses at Kalijati Health Center have successfully implemented the Posbindu PTM program as a platform for early detection of diabetes and hypertension in rural Subang Regency, West Java. With active participation from residents and consistent educational activities, the program demonstrates promising outcomes in rural disease prevention. However, logistical challenges and limited follow-up highlight the need for stronger institutional support and interprofessional collaboration. Empowering nurses through continuous education, provision of adequate diagnostic equipment, and integration with primary health care digital systems is vital to sustaining early detection programs and improving NCD control in rural Indonesia.

Future research should employ longitudinal designs to evaluate the long-term impact of Posbindu PTM on NCD outcomes, and intervention studies to test strategies for improving follow-up care and male participation.

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