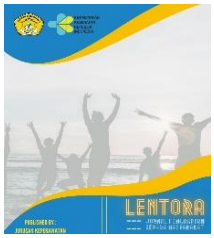

Jurnal Pengabdian Masyarakat Lentora
e-ISSN: 2809-0667
Volume 5 Nomor 1, September 2025, Halaman 32-41
DOI: 10.33860/jpml.v5i1.4211
Website: https://jurnal.poltekkespalu.ac.id/index.php/jpml/

Reducing Cardiovascular Risk in the Diabetic Community: A Screening and Counseling Program at Talise Health Centre

Baiq Emy Nurmalisa[1*], Helena Pangaribuan[2], Evita[3]
[1,2]Prodi Pendidikan Profesi Ners, Poltekkes Kemenkes Palu
[3]Puskesmas Mamboro
*Email: nurmalisa@gmail.com

Received: 13 September 2025 | Accepted: 29 September 2025 | Published: 30 September 2025

Keywords:
Cardiovascular Disease Risk; Diabetes Mellitus; Patient Education; Screening; WHO risk prediction

ABSTRACT

Background: *Noncommunicable diseases, particularly cardiovascular disease (CVD) and diabetes mellitus (DM), pose a significant global and national health burden. Patients with DM face a 2-4 times higher risk of CVD, the leading cause of mortality in over 65% of this population. Despite this, awareness and integrated screening for CVD risk among DM patients in primary healthcare settings, such as the Talise Health Center, remain limited. This community service initiative was designed to address this gap by implementing a comprehensive screening and personalized education program.* ***Objective:*** *This community service initiative aimed to detect CVD risk and provide targeted education to DM patients in the work area of the Talise Health Center.* ***Methods: Methods:*** *The activity was conducted on June 3, 2025, with 30 DM patients. The method involved a three-step process: (1) Screening of blood pressure, BMI, blood glucose, and cholesterol, with results plotted on the WHO/ISH risk prediction chart to stratify participants into low, moderate, or high 10-year CVD risk categories; (2) An educational session, comprising a pre-test, personalized counseling based on risk category, and a post-test to evaluate knowledge retention; (3) Dissemination of educational booklets and banners for sustained learning.****Results:*** *Screening revealed that 20 participants (66.7%) had low CVD risk, 9 (30.0%) had moderate risk, and 1 (3.3%) had high risk. The educational intervention was successful in reinforcing knowledge. The average knowledge score was increased at a high level (Pre-test score: 42,5.1% ± 10.2 vs. Post-test score: 82.0% ± 9.8).****Conclusion and Suggestion:*** *The finding that over one-third of screened DM patients were at moderate-to-high CVD risk underscores the critical need for integrated screening in primary care. Personalized counseling effectively maintained patient knowledge. It is strongly recommended that the Talise Health Center integrates routine CVD risk screening for all DM patients and continues providing targeted education to mitigate long-term cardiovascular complications.*

INTRODUCTION

Noncommunicable diseases (NCDs) continue to be a major concern for healthcare systems worldwide and in Indonesia, with cardiovascular disease (CVD) and diabetes mellitus (DM) accounting for a large burden of morbidity and mortality (BKPK Kemenkes, 2023). A 45% increase in the number of diabetes worldwide, with 588.7 million in 2024 and 852.5 million expected by 2050. Indonesia ranks fifth in the world for the number of diabetics, with an anticipated 28.6 million adults diagnosed by 2050 (International Diabetes Federation, 2025). Indonesia ranks fifth globally in the number of people with diabetes, with an anticipated 28.6 million adults diagnosed by 2050.

The chronic hyperglycemia condition associated with diabetes causes endothelial dysfunction, oxidative stress, and persistent systemic inflammation, hastening the progression of atherosclerosis (Roth et al., 2020). As a result of these pathological processes, people with diabetes mellitus have a two to four times increased chance of developing significant cardiovascular events, such as coronary heart disease, heart failure, and stroke, compared to the general population without diabetes (Low Wang et al., 2016). In fact, cardiovascular complications are the leading cause of death in more than 65% of diabetic patients, underscoring that CVD is not merely a comorbidity but the most feared outcome of the condition (Saeedi et al., 2019).

Despite this overwhelming clinical evidence, community awareness of the link between diabetes and heart disease remains low (Ali et al., 2020). Many patients focus primarily on blood glucose control without appreciating the need to manage other cardiovascular risk factors such as hypertension, dyslipidemia, and obesity (Pamungkas et al., 2017). This situation is aggravated by limited time and resources in primary healthcare settings, where comprehensive screening and education are often overlooked (Shiyanbola et al., 2018). This is evident in the working area of the Talise Health Center, an urban frontline healthcare facility. With over 500 active DM patients and rising new cases annually (Puskesmas Talise, 2023), initial discussions with health workers revealed that most patients were unaware of their CVD risk and had never undergone systematic risk screening.

The gap analysis indicates an urgent need for community-based interventions that integrate early detection (screening) with intensive education. This approach aligns with the primary prevention strategy recommended by the Indonesian Society of Cardiovascular Specialists (PERKI) for reducing heart disease in high-risk populations (Perhimpunan Dokter Spesialis Kardiovaskuler Indonesia (PERKI), 2021). As a result, the community service program " Reducing Cardiovascular Risk in the Diabetic Community: A Screening and Counseling Program at Talise Health Centre" was implemented. This program aims to enhance patient awareness and knowledge, identify high-risk individuals for early intensive therapy, and ultimately contribute to reducing regional morbidity and mortality from cardiovascular disease.

METHOD

This community service initiative employed a one-group, pre-test and post-test design to evaluate the impact of a cardiovascular disease (CVD) risk screening and education program. The activity was conducted on June 3, 2025, at the Tondo Shelter in Palu City. A total of 30 participants were recruited through purposive sampling from the registry of diabetic patients in the work area of the Talise Health Center. Inclusion criteria were a confirmed diagnosis of diabetes mellitus and willingness to provide

informed consent.
The intervention consisted of three integrated components:

a. CVD Risk Screening
   Each participant underwent a comprehensive screening assessment, which included: Measurement of height and weight to calculate Body Mass Index (BMI); Blood pressure measurement using a digital sphygmomanometer; Point-of-care testing for fasting blood glucose and total cholesterol using a validated portable analyzer; The results of these measurements were plotted on the WHO/ISH CVD Risk. Prediction Chart for the Western Pacific Region B to stratify each participant into a 10-year CVD risk category: low, moderate, or high.
b. Educational Session and Knowledge Assessment
   The education component was structured as follows: Pre-test: Participants completed a structured questionnaire containing 10 multiple-choice questions to assess baseline knowledge of CVD risk and prevention in diabetes. Personalized Counseling: Based on their stratified CVD risk category, participants received individualized counseling from a trained healthcare provider. The counseling focused on interpreting their screening results, explaining their personal risk, and providing tailored lifestyle modification advice (e.g., diet, physical activity, medication adherence). Post-test: Immediately following the counseling session, participants completed the same questionnaire to assess short-term knowledge retention and the immediate impact of the education.
c. Sustainability and Resource Dissemination
   To reinforce learning and ensure the sustainability of the intervention, all participants received an educational booklet detailing heart-healthy practices for diabetics. Additionally, a standing banner featuring the WHO/ISH risk prediction chart was provided to the local integrated health post (*posyandu lansia*) to serve as a permanent reference tool for health cadres and the community.

Data Analysis : Knowledge improvement was analyzed by comparing the pre-test and post-test scores. Descriptive statistics (frequencies and percentages) were used to report the distribution of CVD risk categories and the proportion of participants with adequate knowledge before and after the intervention.

RESULTS AND DISCUSSION

1. Participant Characteristics and Clinical Profile
   A total of 30 diabetic patients participated in this community service activity. The demographic and clinical profile of the respondents is presented in Table 1. The majority were in the 40-59 age range (96.7%), female (60.0%), and overweight (40.0%). A significant proportion had elevated blood pressure, with 76.7% in pre-hypertension or hypertensive stages. Most were non-smokers (76.7%). This profile outlines a population with several modifiable risk factors for cardiovascular disease.

2. Distribution of Cardiovascular Disease Risk
   Screening using the WHO/ISH risk prediction chart revealed a heterogeneous distribution of CVD risk among the participants (Table 1). Twenty respondents

(66.7%) were classified as low risk (<10% chance of a CVD event in 10 years), nine (30.0%) as moderate risk (10-20%), and one (3.3%) as high risk (≥20%).

Table 1. Demographic Data of Diabetes Mellitus respondents (n= 30)

Variable	n	%
Age		
40 – 49 years	17	56,7
50 – 59 years	12	40,0
60 – 69 years	1	3,3
Gender		
Male	12	40,0
Female	18	60,0
Blood Pressure		
Normal	7	23,3
Pre-hypertension	12	40,0
Hypertension stage 1	9	30,0
Hypertension stage 2	2	6,7
Body Mass Index		
Normal	18	60,0
Overweight	12	40,0
Smoking		
Yes	7	23,3
No	23	76,7
Cardiovascular risk		
Mild	20	66,7
Moderate	9	30,0
Severe	1	3,3

Figure 1. screening, which includes height, weight, blood pressure measurement, as well as blood glucose and cholesterol testing

Figure 2. pretest

Figure 3. giving counseling based on risk category

Figure 4. closing

According to the findings of the screening using the WHO/ISH risk prediction table, 20 of the 30 respondents (66.7%) were classified as having a low risk of developing fatal or non-fatal cardiovascular events in the following 10 years (WHO, 2007). These findings are a favorable indicator, showing that the majority of the DM patients tested did not have a significant accumulation of cardiovascular risk factors.

Conversely, the "low-risk" status of the majority should not be misinterpreted as "no risk." Within a diabetic population, this category still warrants vigilant monitoring and ongoing education to prevent progression to a higher risk category (Cosentino et al., 2020). This stratification underscores the inappropriateness of a "one-size-fits-all" approach and validates the use of cost-effective tools like the WHO/ISH chart for efficient resource allocation in primary care (Khan et al., 2018).

The high prevalence of moderate and high-risk individuals (collectively 33.3%) provides a crucial epidemiological picture for the Talise Health Center. A total of nine (30.0%) of the respondents were in the medium risk category, suggesting that they had a 10-20% probability of suffering a myocardial infarction or stroke in the next decade (WHO, 2007). It identifies a significant subset of the diabetic population that requires urgent and targeted clinical attention. These patients likely have compounding risk factors beyond diabetes, such as the hypertension observed in our cohort (Visseren et al., 2021). The finding of even one high-risk patient is critical, as this individual requires management equivalent to secondary prevention, including consideration of cardioprotective medications (Arnett et al., 2019). The existence of this group emphasizes the significance of regular screening, because without pharmacological therapies and strong lifestyle modifications, they are extremely likely to shift into the high-risk category.

One respondent (6.7%) was classified as high-risk (≥20%) (WHO, 2007) which is concerning. This figure is consistent with the research, which suggests that a portion of the diabetic population is at extremely high risk and frequently has subclinical cardiovascular disease. The management approach in these patients should be equivalent to that of patients who already have heart disease (secondary prevention), which includes strict glycemic control, aggressive blood pressure and lipid management, as well as consideration for therapy with cardioprotective drugs such as SGLT2 inhibitors or GLP-1 receptor agonists that have been shown to lower major cardiovascular events (Arnett et al., 2019; Marso. S.P & Daniels, 2016).

This risk range (mild 66.7%, moderate 30.0%, severe 6.7%) reflects the heterogeneity of cardiovascular risk in the diabetes community (Gæde et al., 2016); Because not all DM patients are at equal risk, the "one-size-fits-all" approach to therapeutic care is no longer appropriate. Risk classification with prediction tools such as WHO/ISH charts is an important and cost-effective initial step toward more efficient health resource allocation (Khan et al., 2018). Low-risk groups can receive regular instruction, whereas medium and high-risk groups require more extensive counseling and frequent monitoring.

3. Impact of the Educational Intervention

The knowledge assessment before and after the counseling session revealed interesting findings. During the pre-test, the average score was 42,5% ± 10.2 and this score was increaseded at 82.0% ± 9.8in the post-test conducted immediately after counseling (Figure 5). The intervention's success in medium and high risk groups is heavily dependent on behavioral changes and adherence to therapy. found that a systematic and continuing educational program can dramatically enhance patients'

knowledge, self-efficacy, and health behaviors, resulting in a reduction in risk factors (Pogosova et al., 2015).

This result indicates that the single-session, personalized counseling was effective in reinforcing and maintaining existing knowledge among participants. The slight fluctuation does not indicate an increase in knowledge but rather successful knowledge retention. This is a positive outcome, as sustained knowledge is a necessary precursor to long-term behavioral change (Kebede et al., 2017). However, the fact that nearly half of the participants did not reach the "knowledgeable" threshold even after counseling suggests that future interventions may need to be more intensive, utilize different teaching methods, or employ more robust assessment tools to better effect knowledge gain.

This activity successfully mapped the CVD risk profile of a sample of diabetic patients in the Talise Health Center area, identifying a substantial proportion at elevated risk. The integrated model of screening followed by risk-based counseling is a crucial strategy for primary prevention. We strongly recommend that the health center institutionalizes this practice, ensuring that all diabetic patients undergo annual CVD risk stratification. Management and education can then be tailored accordingly: low-risk patients can receive maintenance education, while moderate and high-risk patients are prioritized for intensive lifestyle counseling, pharmacological management, and more frequent follow-up to mitigate their long-term cardiovascular complications.

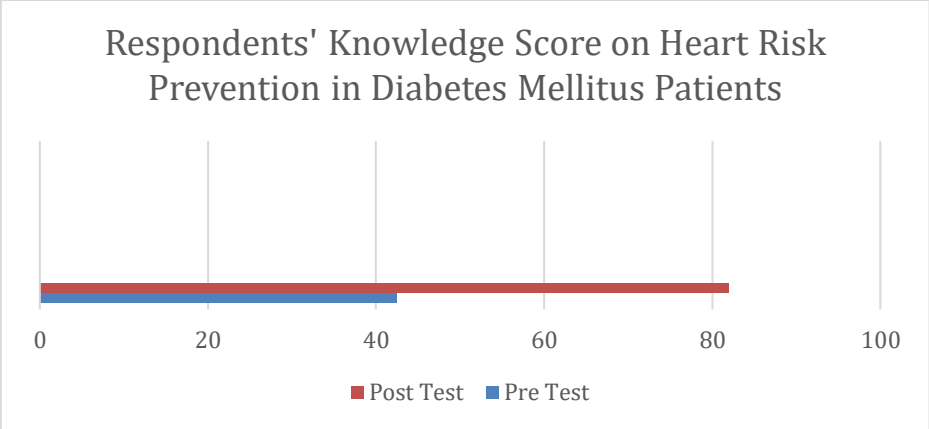

Figure 5. Diagram of increase in respondents' knowledge level

Providing health education and counseling is a critical intervention in the risk management of heart disease, especially in populations with chronic illnesses such as diabetes mellitus.

Various interventional studies have repeatedly shown that an organized and continuing education program greatly increases patients' understanding of risk factors, symptoms, and preventive strategies for cardiovascular disease (Smits et al., 2023) This increase in knowledge is not the ultimate goal, but rather a necessary prerequisite for inducing behavioral changes that have a direct influence on risk reduction.

A sufficient understanding allows patients to make more educated health decisions, which leads to better adherence to pharmaceutical therapy and healthy lifestyle advice (Kebede et al., 2017). Patients who grasp the'reasons behind a recommendation'—for example, why blood pressure should be regulated or eating patterns should be altered—will have a stronger intrinsic incentive to obey than those who merely follow orders.

Furthermore, successful health education frequently includes counseling approaches and collaborative goal-setting among health practitioners and patients. This patient-centered approach has been found to be successful in supporting lifestyle changes such as increased physical activity, adherence to a heart-healthy diet (such as the DASH or Mediterranean diet), and smoking cessation (Anderson et al., 2017). This behavior change is a critical component in lowering the risk of significant cardiovascular events later in life.

Comprehensive education for specific populations, such as diabetic patients, focuses not only on glucose control but also on the management of associated cardiovascular risk factors, such as hypertension and dyslipidemia. A meta-analysis revealed that intensive educational interventions led to significant changes in clinical indices such as HbA1c levels, blood pressure, and lipid profiles, all of which are indicators of cardiac risk (Demissie et al., 2025).

As a result, incorporating education and counseling services into diabetic patients' routine care is an evidence-based need rather than a complement. The ability of health staff to give easy-to-understand, personalized, and empowered education to patients so that they can become essential actors in their own health journeys is critical to the success of a preventative program (Zheng et al., 2020). Thus, investing in health education is a cost-effective and long-term strategy for reducing the worldwide burden of cardiovascular disease.

CONCLUSIONS AND SUGGESTIONS

Conclusion: The high proportion of diabetic patients (33.3%) identified with moderate-to-high CVD risk underscores the critical need for integrated screening and education programs in primary care. The community service activity confirmed that systematic screening using the WHO/ISH chart is a feasible and effective tool for risk stratification in this setting. Furthermore, personalized counseling proved successful in reinforcing and maintaining patients' knowledge of CVD prevention.

Suggestions:

1. For Talise Health Center: It is strongly recommended to integrate annual CVD risk screening using the WHO/ISH chart into the standard care protocol for all diabetic patients. The results should then directly inform personalized education and management plans, ensuring that patients at moderate and high risk receive more intensive counseling and follow-up.
2. For Health Cadres: To ensure sustainability, health cadres should be trained to use the provided WHO/ISH banner and educational booklets to conduct ongoing community-based awareness sessions.
3. For Future Programs: Subsequent initiatives should consider long-term follow-up to evaluate the sustained impact of screening and education on clinical outcomes and patient behavior.

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