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Article

Recognize heart and blood vessel diseases: Education and early detection of risk factors based on the who SEAR-B Instrument in the community

Syahrun[1*], Robertus Rebon[1], Ratih Arum Vatmasari[1], Septiana Bunga[2], Aula Fitriani[2], Olivya Alvani Betriss[2], Anita Nur Afifah[2], and Maria Yunianti Sulastri[2]

[1]Emergency Nursing Laboratory, Nursing Study Program, Faculty of Medicine, Mulawarman University, Samarinda, Indonesia
[2]Students of D3 Nursing Study Program, Faculty of Medicine, Mulawarman University, Samarinda, Indonesia

*Corresponding author: syahrun@fk.unmul.ac.id

Abstract

Background: Cardiovascular diseases (CVDs) remain the leading cause of mortality worldwide and represent a major public health challenge in Indonesia. Limited public awareness of cardiovascular risk factors and the lack of routine community-based screening contribute to delayed detection and increased disease burden.

Identification problems: A community assessment in the working area of Lok Bahu Health Center, Samarinda City, identified insufficient public knowledge of cardiovascular disease prevention and the absence of systematic early detection of cardiovascular risk factors at the community level.

Methods: This community service programme involved 75 community members and was implemented from March to April 2026. The programme consisted of door-to-door cardiovascular risk screening using the WHO SEAR-B instrument, community health education through interactive lectures, discussions, and leaflets at posyandu and community study groups, followed by individual counselling for participants identified as high risk. Programme outcomes were evaluated using descriptive analysis of cardiovascular risk profiles and pre- and post-intervention knowledge assessments.

Results: Community screening identified that 29.3% of participants had moderate to very high cardiovascular risk, while 45.3% showed impaired glucose metabolism, including prediabetes and diabetes. Following the educational intervention, the proportion of participants with good to very good knowledge increased from 25.8% to 83.9%, with the mean knowledge score improving from 55.5 to 91.1.

Conclusion: The community service programme effectively improved public knowledge of cardiovascular disease prevention while facilitating the early identification of individuals at increased cardiovascular risk. Integrating community-based screening with health education has the potential to strengthen preventive efforts, encourage timely referral, and support healthier lifestyle practices within the community.

Keywords: cardiovascular diseases, community service, early detection, health education, WHO SEAR-B

1. Introduction

Cardiovascular diseases (CVD) are a group of heart and blood vessel disorders that include coronary heart disease (CHD), cerebrovascular (stroke), rheumatic heart disease, and other conditions. Based on World Health Organization (WHO) data, non-communicable diseases (NCDs) cause 41 million deaths each year, equivalent to 74% of all global deaths, with cardiovascular disease being the most common cause of around 17.9 million deaths per year (Momot, Mobalen, & Fabanyo, 2025). Data from the Global Burden of Disease and the Institute for Health Metrics and Evaluation (IHME) show that in the 2014–2019 period, cardiovascular disease was the highest cause of death in Indonesia (Momot et al., 2025).

The results of Basic Health Research (Riskesdas) in 2018 show an increasing trend in the prevalence of cardiovascular diseases in Indonesia from 0.5% (Riskesdas, 2018) to 1.5% (Kementerian Kesehatan RI, 2018). Hypertension as the main risk factor increased from 25.8% to 34.1%, stroke from 10.9 per mile to 12.1 per mile, while coronary heart disease remained at 1.5%. The increased burden of NCDs, especially cardiovascular diseases, is closely related to behavioral risk factors such as unhealthy diet, lack of physical activity, smoking, and alcohol consumption. These factors contribute to increased blood pressure, glucose levels, lipids, and obesity that trigger the risk of heart attack, stroke, and heart failure (Momot et al., 2025).

Research by Arsyad et al. (2025) conducted on 395 coronary heart disease patients at the Makassar Cardiac Center revealed a very worrying finding: only 1.8% of patients achieved all the risk factor control targets recommended in the national guidelines. The lowest achievement was found at the LDL-C (low-density lipoprotein cholesterol) target, which was only 5.1%, followed by body mass index (59.7%), systolic blood pressure (62.8%), use of antithrombosis (76.7%), and non-smoking status (94.4%) (Arsyad et al., 2025). These findings confirm the need for increased awareness and effective management, especially for the control of LDL cholesterol in the coronary heart disease population in Indonesia (Arsyad et al., 2025).

In addition, a study by Sujarwoto et al., (2025) based on population in Indonesia shows that socio-demographic determinants and access to health services contribute significantly to the estimated risk of cardiovascular disease in the next 10 years. The study highlights the importance of early detection and community-based interventions to reduce the burden of cardiovascular disease in middle-income countries such as Indonesia.

One of the main challenges in the community is the low awareness of risk factors early on, which is exacerbated by limited access to community-based screening programmes. Although the government has launched the POSBINDU (Integrated Development Post) program for NCD screening and education, research by Mashuri et al., (2024) shows that although access to POSBINDU is associated with better knowledge (aOR: 1.4; 95% CI: 1.2–1.8), the association with better attitudes and practices is still unclear. This program still needs to improve quality to change people's attitudes and practices in controlling hypertension.

Intervention research in rural communities in Magetan by Dyah et al., (2024) proves that health counseling programs by experts are effective in increasing public knowledge about cardiovascular diseases. The study reported a significant improvement in knowledge scores after intervention ($p = 0.007$), with the highest prevalence of risk factors being diabetes mellitus (33.33%) and 6.67% of participants having abnormal electrocardiography results (Dyah et al., 2024). Similarly, research by Momot et al., (2025) in the working area of the Mariat Health Center showed that before the counseling, all participants (100%) had low knowledge of risk factors for cardiovascular disease, but after the counseling, 68.9% of participants had good knowledge and 31.1% had sufficient knowledge.

Many cases of death from heart attacks occur outside of hospitals due to lack of knowledge about symptoms and delays in treatment. Research by Samara et al., (2025) on cleaners in Jakarta showed that education about risk factors for coronary heart disease succeeded in increasing participants' understanding by 37.5%, but challenges were still found in understanding atypical symptoms and myths circulating in the community (Momot et al., 2025). Another study also found that before the educational intervention, only 22% of respondents understood that e-cigarettes could not reduce the risk of coronary heart disease, and only 35.4% understood that a family history increases the risk of coronary heart disease (Dyah et al., 2024).

Based on this background, this community service activity is designed to empower the community through a "Recognize, Prevent, and Respond" approach to heart and blood vessel diseases. This activity integrates early detection of risk factors using standardized WHO SEAR-B Carta instruments as well as health education in various community settings (posyandu, study groups, and visits of high-risk individuals), with the goal of reducing morbidity and mortality due to cardiovascular disease at the community level.

2. Identification problem

A preliminary community assessment in the working area of Lok Bahu Health Center, Samarinda City, identified limited public awareness of cardiovascular disease risk factors and low participation in routine preventive health screening. Community-based early detection programmes were not implemented systematically, resulting in many individuals with modifiable cardiovascular risk factors remaining unidentified. In addition, limited knowledge regarding healthy lifestyles, early warning signs of cardiovascular diseases, and appropriate preventive measures highlighted the need for an integrated community service programme combining cardiovascular risk screening using the WHO SEAR-B instrument with targeted health education.

3. Implementation methodology

The community service programme was conducted from 3 March to 18 April 2026 in RT 34, the working area of Lok Bahu Health Center, Samarinda City, targeting adult and older adult community members. The programme was implemented in three sequential phases. The first phase focused on assessment and planning through door-to-door visits conducted by a team of lecturers and students to identify residents at risk of cardiovascular disease using the WHO SEAR-B cardiovascular risk assessment chart. The assessment collected information on age, blood pressure, smoking status, alcohol consumption, physical activity, body mass index, and family history of cardiovascular disease to determine individual risk profiles and identify participants requiring further intervention.

The second phase consisted of programme implementation through community-based health education and individual counselling. Group education sessions were delivered during posyandu and community study group activities using interactive lectures, discussions, and educational materials. The educational content included recognition of cardiovascular disease risk factors and warning signs, differences between angina pectoris and myocardial infarction, healthy dietary practices, regular physical activity, smoking cessation, and other lifestyle modifications to reduce cardiovascular risk. In addition, residents identified as having three or more cardiovascular risk factors received individual counselling through home visits, focusing on personalised lifestyle modification, medication adherence for individuals with hypertension or diabetes, and appropriate emergency responses to symptoms suggestive of acute cardiovascular events.

The final phase involved programme evaluation and reporting. Community impact was evaluated descriptively using screening results from the WHO SEAR-B assessment, random blood glucose examination, and pre- and post-intervention knowledge assessments conducted among participants receiving health education. The evaluation focused on changes in participants' knowledge of cardiovascular disease prevention and the identification of individuals requiring referral or further follow-up through primary healthcare services. The findings were summarised using descriptive statistics to evaluate the effectiveness of the community service programme and inform future community-based cardiovascular disease prevention initiatives.

4. Results and Discussion

Implementation Results

The community service programme was conducted in the working area of Lok Bahu Health Center, Samarinda City, involving 75 community members. The programme consisted of three main stages: (1) door-to-door cardiovascular risk screening using the WHO SEAR-B instrument and random blood glucose (GDS) examination, (2) community health education delivered through interactive lectures, discussions, and educational leaflets at posyandu and community study groups, and (3) individual counselling for participants identified as having moderate to very high cardiovascular risk.

Baseline screening successfully collected demographic characteristics, WHO SEAR-B cardiovascular risk classifications, and GDS results from all 75 participants (Table 1). Based on the screening findings, 31 residents identified as having moderate to very high cardiovascular risk

participated in the targeted educational programme and completed the pre- and post-intervention knowledge assessments (Table 2).

Table 1. Characteristics of programme participants (n = 75)

Characteristic	Category	n	%
Age (years)	35–45	24	32.0
	46–55	21	28.0
	56–65	18	24.0
	>65	12	16.0
Sex	Male	28	37.3
	Female	47	62.7
WHO SEAR-B cardiovascular risk category	Green (low risk)	53	70.7
	Orange (moderate risk)	11	14.7
	Yellow (high risk)	9	12.0
	Red (very high risk)	2	2.7
Random blood glucose (RBG)	Normal (<140 mg/dL)	41	54.7
	Prediabetes (140–199 mg/dL)	18	24.0
	Diabetes (≥200 mg/dL)	16	21.3
Total		**75**	**100.0**

Table 1 summarizes the characteristics of programme participants. Most participants were aged 35–45 years (32.0%) and were female (62.7%). Cardiovascular risk screening using the WHO SEAR-B instrument showed that 70.7% of participants were classified as having low cardiovascular risk, whereas 29.3% were identified as having moderate to very high cardiovascular risk. In addition, random blood glucose screening revealed that 45.3% of participants had impaired glucose metabolism, including prediabetes and diabetes, indicating the need for continued community-based prevention and follow-up.

Table 2. Characteristics of programme participants (n = 75)

Characteristic	n	%
Poor (0–40)	6 (19.4)	0 (0.0)
Fair (41–60)	17 (54.8)	0 (0.0)
Good (61–80)	8 (25.8)	5 (16.1)
Excellent (81–100)	0 (0.0)	26 (83.9)
Total	**31 (100.0)**	**31 (100.0)**

Table 2 shows a substantial improvement in participants' knowledge following the educational programme. Before the intervention, most participants (74.2%) were classified as having poor or fair knowledge, whereas after the programme, 83.9% achieved an excellent level of knowledge. These findings indicate that the educational intervention effectively improved participants' understanding of cardiovascular disease risk factors, early detection, and preventive health behaviours.

Table 3. Knowledge scores before and after the educational programme

Variable	Pre-test	Post-test
Minimum score	40	75
Maximum score	80	100
Mean score	55.5	91.1
Minimum score	40	75

Table 3 demonstrates a marked improvement in participants' knowledge scores following the educational programme. The mean score increased from 55.5 before the intervention to 91.1 afterward, while both the minimum and maximum scores also improved, indicating better knowledge acquisition across participants.

Figure 1. Data collection in the Community

Figure 2. Education to People at Risk of PJB at the Posyandu Merah Delima

Figure 3. Education to the Community at Jami Al Mustofa Mosque

Figure 4. Emergency Nursing Laboratory Team at the time of Conducting Health Service to the Community

Community Impact

The community service programme positively impacted the community by improving awareness of cardiovascular disease prevention and facilitating the early identification of individuals at increased cardiovascular risk. Community screening identified that 29.3% of participants had moderate to very high cardiovascular risk, while 45.3% had impaired glucose metabolism, highlighting the need for continued preventive interventions and follow-up through primary healthcare services.

The educational programme also substantially improved participants' knowledge of heart and blood vessel diseases. The proportion of participants with excellent knowledge increased from 0% before the intervention to 83.9% afterward, while the mean knowledge score improved from 55.5 to 91.1 (Table 2). In addition, participants demonstrated greater awareness of healthy lifestyle practices, routine health screening, and the importance of early detection, indicating that combining community-based screening with targeted health education is a practical strategy for strengthening cardiovascular disease prevention.

Discussion and Practical Reflection

From the results of door-to-door data collection on residents, most of them are in the productive age group to the early elderly. This shows that service activities have successfully reached various age groups, including populations that are starting to enter the high-risk phase of PJP. Research shows that the risk of cardiovascular disease increases significantly after the age of 45 in men and 55 years in women (Arsyad et al., 2025). Sawitri & Maulina (2023) reinforce these findings by proving that the age of >41 years is an independent predictor of high CHD risk with an odds ratio of 11.52. The presence of many young respondents (35–45 years old) (32%) is an opportunity to carry out early prevention interventions before the accumulation of risk factors occurs. This is in line with the research of Simanjuntak et al., (2026) which confirms that the age of ≥40 years is a critical window for cardiometabolic early screening. Furthermore, Rakhmania, Melanie, & Setiawan, (2025) recommended annual screening and promotive-preventive interventions for the productive age population considering the high prevalence of pre-hypertension (42.6%) and excess BMI (36.6%) in this group.

The data obtained shows that most respondents are women (62.7%), this reflects the social reality that housewives are more often at home when *door to door activities* are carried out and are more active in participating in posyandu activities and studies. This pattern of participation is in line with the findings of Pelletier et al., (2014) that women's social role as family health managers makes them more accessible to community-based health programs. Nonetheless, the involvement of men at 37.3% remains significant and needs to be considered because men generally have a more severe risk factor profile. A national study by Sigit et al., (2024) proves that the average 10-year risk of cardiovascular disease in Indonesian men reaches 14.3% (with 37.3% of men at high risk), far above women who are only 8.0%. Furthermore, Adipati et al., (2024) identified that men of productive age have a higher tendency to experience hypertension due to a combination of biological factors (the influence of testosterone), unhealthy behavior (heavy smoking was found in 57.4% of male respondents with a hypertension rate of 88.7%), and low awareness for routine health checkups. Therefore, future service strategies need to consider specific approaches to reaching men, for example through workplace health posts or more diverse community-based activity groups.

The identification results based on the SEAR-B CARTA showed that most respondents were in the green category (low risk), but overall, there were 29.3% of residents who were indicated to have a medium to very high risk of PJP. These findings are in line with the report of Aini et al., (2019) which found that the proportion of moderate–high cardiovascular risk in rural communities reached more than 25%. A national study by Sujarwoto et al., (2025) on 903,130 Indonesian adults reported that 18.8% of the population was at high risk according to the WHO/ISH SEAR-B instrument, but more worryingly, only 25.7% of high-risk individuals received optimal preventive therapy. The Red category (very high) found in 2 respondents (2.7%) in our activity indicates the need for immediate referral to advanced health facilities. This is reinforced by the research of Aini et al., (2019) on people with type 2 DM who reported a very high proportion of risk of 4.5%, as well as Septiani et al. (2018) who even found figures of up to 22.43% in certain populations. The risk of fatal cardiovascular events in the next 10 years in this red category group is very high, so immediate intervention in the form of medication management (antihypertensives, statins, antiplatelets) and intensive lifestyle modifications is a must to prevent recurrent and first cardiovascular events.

From the results of the GDS examination, 45.3% of residents have impaired glucose metabolism (from prediabetes and diabetes). This figure is much higher than the national prevalence of diabetes which is around 10.9% (Riskesdas, 2018). However, it should be noted that a recent population-based study by Elysia et al., (2025) actually found that the prevalence of prediabetes in Indonesian adults reached 47.5%, which means that almost half of the adult population has entered the phase of impaired glucose metabolism without realizing it. These findings indicate that the area of our service site may be an area with a high burden of diabetes, which is an independent risk factor for coronary heart disease. Research by Yustisia et al., (2025) on community health screening in South Sulawesi strengthens these findings by showing that blood glucose levels increase significantly with age ($p<0.001$), and hypertension begins to appear at around 40 years of age. Furthermore, if this GDS data is crossed with the interpretation of CARTA, it is found that most of the respondents in the orange, yellow, and red categories also have a GDS of ≥140 mg/dL. This is in line with the research of Aria Wahyuni, et al., (2025) who reported "high clustering of modifiable cardiometabolic risk factors" in the community, where 80% of participants had high blood pressure and 26.3% had abnormal glucose levels, confirming that diabetes and hypertension are often present at the same time (*metabolic syndrome*) and reinforce each other's cardiovascular risks

After education, 83.3% of residents have good to very good category knowledge. This proves the effectiveness of the educational methods provided (interactive lectures, group discussions, and media leaflets) in increasing public health literacy about heart and blood vessel diseases. These findings are in line with the research of Momot et al., (2025) and Samara et al., (2025) which reported a significant increase in knowledge after health counseling interventions. Rivaldi's research, (2024) also reported that the combination of leaflets and posters as supporting media for cardiovascular health education improved participants' knowledge scores from 59.12 before the intervention to 68.82 afterward. Furthermore, Wijayati et al., (2024) reported that interactive

educational methods involving active participant engagement improved knowledge scores and enhanced participants' understanding of cardiovascular disease prevention.Most importantly, RCT research by Azizi et al., (2025) reported that the positive effects of health education were maintained for up to three months after the intervention, indicating the potential for sustained improvements in cardiovascular health literacy. Thus, the educational activities that have been carried out have the potential to have a sustainable impact on improving PJP prevention behavior in the community.

These results show that, the intervention Requires follow-up, because as many as 29.3% of residents with moderate–very high risk require a referral to the health center for further examination (lipid profile, ECG, and integrated management). In addition, targeted education, especially in the group with a GDS of ≥140 mg/dL (45.3%) that requires special education on a low-sugar and simple carbohydrate diet, while the group with the interpretation of the Orange Red CARTA requires education on adherence to taking antihypertensive drugs and smoking cessation. In addition, continuous screening is needed, because the high proportion of previously unknown blood glucose disorders (most residents are unaware of the condition) suggests that community-based screening like this is very effective for early *case finding*.

5. Conclusion

This community service activity successfully identified that 29.3% of residents in the Lok Bahu Health Center area have moderate to very high cardiovascular risk according to the WHO SEAR-B classification (Orange 14.7%, Yellow 12.0%, Red 2.7%), while nearly half (45.3%) exhibit glucose metabolism disorders (prediabetes 24.0%, diabetes 21.3%) a figure significantly higher than the national prevalence. The educational intervention using interactive lectures, group discussions, and leaflet media proved highly effective, increasing the proportion of residents with good to very good knowledge from 25.8% (pre-test) to 83.9% (post-test), with the mean score rising from 55.5 to 91.1.

These findings underscore the urgent need for immediate follow-up, including referral for the 29.3% of high-risk residents, targeted dietary and lifestyle education for those with impaired glucose metabolism, and sustained community-based screening programs integrated with local health centers. The "Recognize, Prevent, and Respond" approach demonstrated in this activity is feasible, effective, and essential for early case finding and prevention of future cardiovascular events in Indonesian communities with limited access to routine screening.

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Recommendations and Sustainability Plan

To sustain the impact of this community service programme, community-based cardiovascular risk screening should be integrated into routine activities at Lok Bahu Health Center, particularly through Posbindu and other community health programmes. Residents identified as having moderate to very high cardiovascular risk should receive regular follow-up, lifestyle counselling, and appropriate referral for further clinical assessment. Continuous health education focusing on healthy diet, physical activity, smoking cessation, and blood glucose control is recommended to reinforce preventive behaviours. Strengthening collaboration among primary healthcare providers, community health volunteers (kader kesehatan), and local community leaders will support early case detection, improve community awareness, and promote sustainable cardiovascular disease prevention.

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