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Screening and profiling of blood pressure and glucose levels for early detection of hypertension and diabetes mellitus in Olak Kemang RT 02 community

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Abstract

Background: Hypertension and diabetes mellitus are highly prevalent non-communicable diseases and major causes of morbidity and mortality. Their asymptomatic nature in early stages often delays diagnosis, increasing the risk of serious complications. Early detection through community-based screening is therefore essential. **Objective**: This program aimed to assess blood pressure and glucose profiles of RT 02 Olak Kemang residents in Jambi City and to promote awareness of regular health monitoring. **Methods:** The program screened 25 residents aged ≥30 years using a digital sphygmomanometer for blood pressure and a glucometer for random blood glucose. Participants also received education on healthy lifestyles, including diet, physical activity, and routine check-ups. **Results:** Results demonstrated that a number of participants presented with above-normal blood pressure and glucose levels, highlighting potential susceptibility to hypertension and diabetes mellitus. These outcomes emphasize the presence of unrecognized health risks which could lead to severe complications without proper management. **Conclusion:** This program generated initial health profile data of Olak Kemang RT 02 residents while improving community awareness on early detection and prevention of non-communicable diseases. Integrating community-based screening with health education is crucial to encourage healthy behaviors and lessen disease burden.

Keywords: hypertension; diabetes mellitus; early detection.

Cite This Article

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INTRODUCTION

Olak Kemang Village is one of the administrative areas located in the Danau Teluk District, Jambi City, Jambi Province. The village comprises 13 neighborhood units, with a total population of 4,652 residents (2,331 males and 2,321 females). The demographic composition and socio-economic activities in this area are pretty diverse, with most residents working as traders, daily laborers, employees, and micro-entrepreneurs. Access to primary healthcare facilities such as community health centers and integrated health posts is generally adequate in both physical and geographical terms. However, the community's understanding of non-communicable diseases (NCDs) particularly hypertension and diabetes mellitus—remains relatively low, resulting in suboptimal early detection and risk profiling.

Non-communicable diseases such as hypertension and diabetes mellitus have become increasingly significant public health issues in Indonesia. According to the 2018 National Basic Health Research (Riskesdas), the prevalence of diabetes in Indonesia rose from approximately 6.9% to 8.5% [1–3]. Similarly, the prevalence of hypertension continues to increase along with changes in lifestyle and dietary habits [4,5]. Early detection through blood pressure and blood glucose screening is crucial, as both conditions often remain asymptomatic in their early stages but can lead to serious complications if left unmanaged.

Studies conducted in several regions of Indonesia have revealed that the uptake of hypertension and diabetes screening remains low, particularly among middle-aged adults. For instance, the survey "Hypertension and Diabetes Screening Uptake in Adults Aged 40–70 in Indonesia: A Knowledge, Attitudes, and Practices Study" found that many individuals had never undergone blood pressure or blood glucose checks as recommended by WHO and national health guidelines [3]. Meanwhile, community-based screening and educational initiatives in rural or neighborhood settings have shown positive outcomes in improving awareness and early identification of hypertension and diabetes cases [6–12].

Given the local conditions in Olak Kemang RT 02, early screening and risk profiling for hypertension and diabetes are highly relevant. The population in this area falls within the age group and environmental context that increase the likelihood of developing risk factors such as poor diet, stress, physical inactivity, and limited engagement in preventive healthcare. Conducting blood pressure and random blood glucose examinations among residents aged ≥30 years, accompanied by health education on lifestyle modification, is expected to generate valuable baseline data for future local health interventions.

Therefore, this study aims to conduct screening and profiling of blood pressure and blood glucose levels among the residents of Olak Kemang RT 02 as an initial step toward the early detection of hypertension and diabetes mellitus, as well as to assess community awareness and behaviors related to healthy lifestyles.

METHODS

This community service program was designed as a health screening aimed at the early detection of hypertension and diabetes mellitus among residents of Olak Kemang RT 02, Danau Teluk District, Jambi City. A total of 25 residents aged 35 years and above voluntarily participated in the program. The equipment used in this activity includes a glucometer and glucose strips for random blood glucose testing, lancets for capillary blood sampling, alcohol swabs as antiseptics prior to blood sampling, and digital sphygmomanometers. Data analysis was carried out using a descriptive approach.

RESULTS

The results of the community service activity, which included blood pressure screening, are shown in Figure 1.

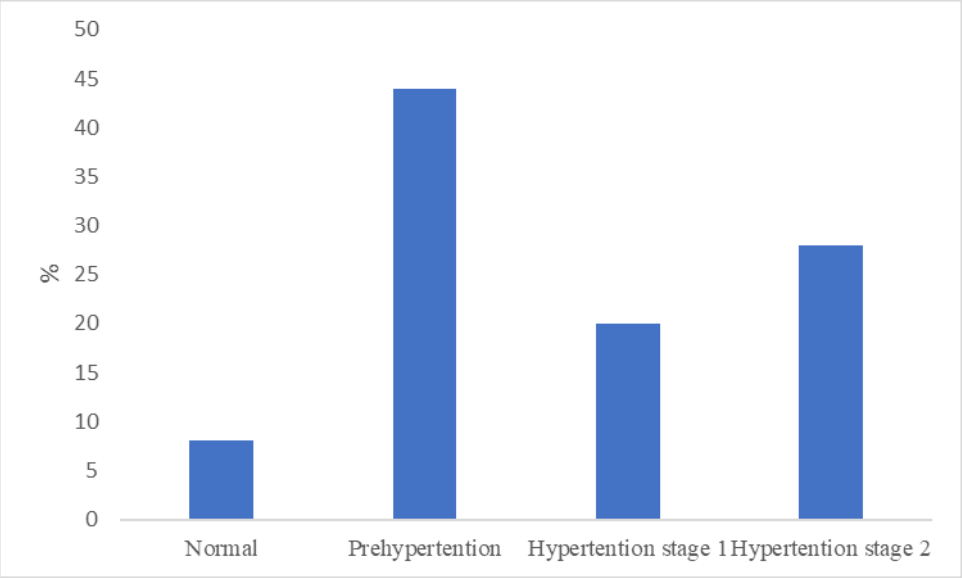

Figure 1. Result of blood pressure screening Sreening

The results of random blood glucose (RBG) measurements using a glucose meter are presented in Table 1

Table 1. Random blood glucose (RBG) measurement results of respondents

Categories	Number of respondents
Normal	23
Prediabetic	2
Diabetic	1

DISCUSSION

In the community screening program conducted in Olak Kemang RT 02 involving 25 respondents (aged ≥30 years), blood pressure measurement using a digital sphygmomanometer and random blood glucose testing using a glucometer provided an initial overview of the risk burden of hypertension and diabetes mellitus within the population. The results of this screening are essential as an early detection measure, since hypertension and diabetes are often asymptomatic in their early stages but can lead to serious complications if left untreated. National and regional studies have shown an increasing trend in the prevalence of these non-communicable diseases in Indonesia, highlighting the importance of community-based interventions for effective prevention and control [3,13–19]. According to the JNC 7 classification (The Seventh Report of the Joint National Committee, 2017), blood pressure categories are defined as follows in Table 2.

Table 2. Classification of hypertension.

Categories	Blood pressure
Normal	<120/80 mmHg
Prehypertension	120–139/80–89 mmHg

Stage 1 Hypertension	140–159/90–99 mmHg
Stage 2 Hypertension	≥160/≥100 mmHg

This distribution indicates that only a small proportion of the community had normal blood pressure, while the majority were in the range of prehypertension to stage 2 hypertension. This finding suggests a relatively high risk of cardiovascular disorders within the community, highlighting the need for continuous promotive and preventive efforts. The 44% proportion of prehypertension indicates that nearly half of the respondents are in the early stage of increased blood pressure, which, if not managed properly, may progress to hypertension. A study by Bhat et al [20] reported that lifestyle factors, including excessive salt intake, lack of physical activity, stress, and smoking habits, contribute significantly to elevated blood pressure.

Furthermore, the groups with stage 1 (20%) and stage 2 hypertension (28%) require special attention due to their increased risk of serious complications such as stroke, heart failure, and chronic kidney disease. According to Maharani et al. (2019), blood pressure elevation of ≥140 mmHg significantly increases the risk of cardiovascular mortality [20]. Screening activities like this play a crucial role in the early detection of hypertension, particularly at the community level, where routine health check-ups may not be readily available. The regular blood pressure monitoring can prevent delayed diagnosis and hypertension-related complications [22].

As a follow-up, health education programs should focus on promoting a balanced diet, limiting salt intake to less than 5 grams per day, engaging in regular physical activity, and avoiding stress and smoking. Implementing the DASH (Dietary Approaches to Stop Hypertension) diet effectively reduces blood pressure among individuals with prehypertension [20]. Therefore, this community service activity not only served as an early detection effort for hypertension but also functioned as a preventive health education platform to reduce hypertension prevalence and raise public awareness of the importance of blood pressure control.

The results of random blood glucose (RBG) examinations among 25 respondents showed values ranging from 84 to 532 mg/dL. According to the criteria of PERKENI (2021) and the American Diabetes Association (ADA, 2022), blood glucose levels are classified as usual (<140 mg/dL), pre-diabetes (140–199 mg/dL), and diabetes mellitus (≥200 mg/dL). Most respondents (80%) had normal glucose levels, 12% were in the pre-diabetic range, and 4% showed very high levels (≥200 mg/dL), indicating uncontrolled diabetes. These findings suggest that although the majority of the community falls within the standard category, there are at-risk groups that require further attention and guidance.

Pre-diabetes represents a transitional phase toward diabetes that can still be prevented through lifestyle modifications, such as dietary regulation, regular physical activity, and weight control. The presence of very high blood glucose levels (≥200 mg/dL) in one respondent indicates significant hyperglycemia, which requires immediate medical management. The lack of early detection and frequent consumption of simple carbohydrates are important factors contributing to the increasing prevalence of diabetes in the community. Blood glucose screening activities like this are crucial as an early detection effort for diabetes mellitus, considering that the disease often remains asymptomatic in its early stages. The community-based blood glucose screening can increase public awareness of diabetes risk and encourage the adoption of healthy lifestyle behaviors.

CONCLUSIONS

The health screening activity, which included blood pressure measurement and random blood glucose testing among 25 respondents, provided an initial overview of the community's health status at the activity site. The blood pressure results showed that only 8% of respondents had normal blood pressure. In comparison, the majority were at risk 44% prehypertensive, 20% with stage 1, and 28% with stage 2 hypertension indicating the need for ongoing education and lifestyle modification. Meanwhile, random blood glucose levels ranged from 84–532 mg/dL, with 80% normal, 12% pre-diabetic, and 4% indicating possible uncontrolled diabetes mellitus. Overall, the screening results suggest that the community has a relatively high risk of hypertension and diabetes, although the majority still fall within standard categories. These findings underscore the importance of early detection, regular health check-ups, and education on healthy lifestyles—including balanced diet management, regular physical activity, and weight control—to prevent complications from non-communicable diseases.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest regarding this study.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

This study used artificial intelligence (AI) tools and methodologies in the following capacities Manuscript writing support: AI-based language models, such as [for example, ChatGPT, Quillbot], were/was employed to: Language refinement (improving the grammar, sentence structure, and readability of the manuscript).

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