Research Article

EDUCATING THE ELDERLY ON CHOLESTEROL CONTROL THROUGH HEALTHY AND LOW-CALORIE DIETARY PRACTICES

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Abstract

Background: Hypercholesterolemia is a key risk factor for non-communicable diseases (NCDs) and a leading cause of cardiovascular morbidity and mortality, especially among the elderly. According to the World Health Organization (WHO), approximately 39% of adults worldwide have elevated total cholesterol levels, contributing to over 2.6 million deaths annually. In Indonesia, national health surveys indicate that around 28% of the population experiences high cholesterol, with many cases remaining undiagnosed or unmanaged. Among older adults, the prevalence is particularly concerning due to age-related metabolic changes, dietary habits, and limited access to preventive education. Despite its significant burden, awareness of cholesterol management remains low, making health education a crucial preventive measure. This community service program aimed to increase elderly participants' knowledge of cholesterol control through healthy and low-calorie dietary practices. **Method:** The program was conducted in RT.18, Persada Raya IV, South Kalimantan, and involved 12 elderly participants. The intervention included a pre-test, an interactive lecture session, distribution of educational leaflets, and a post-test. Topics covered included the definition, causes, signs and symptoms, types, and prevention of high cholesterol. The effectiveness of the intervention was assessed through a comparison of pre- and post-test scores. **Results:** The average pre-test score was 49.6%, which increased significantly to 93.8% in the post-test. A pie chart comparison also showed that the overall knowledge contribution rose from 35% to 65% following the session. Participants actively engaged in discussions, asked questions, and responded positively to the educational materials. **Discussion:** This program demonstrated that structured, community-based health education can significantly improve elderly knowledge regarding cholesterol prevention. Such interventions are vital for supporting healthy aging and reducing the burden of NCDs in Indonesia.

Keywords: Cholesterol Control, Community Service, Elderly Health, Health Education; Low-Calorie Diet

Background

Non-communicable diseases (NCDs) remain a leading global health burden and are responsible for the majority of morbidity and mortality in aging populations. Among these, hypercholesterolemia has emerged as a silent threat, especially for the elderly. Cholesterol, a waxy, fat-like substance produced by the liver and obtained from dietary sources, plays a vital physiological role in hormone production, cell membrane integrity, and vitamin D synthesis. However, elevated cholesterol levels—particularly low-density lipoprotein (LDL)—have been directly associated with atherosclerosis, coronary artery disease, stroke, and other cardiovascular complications (Utami et al., 2024).

The elderly are particularly vulnerable to cholesterol-related complications due to age-related metabolic changes, sedentary lifestyles, and long-term exposure to unhealthy dietary habits. As liver function declines with age, the body's ability to metabolize and eliminate excess cholesterol also decreases, thereby increasing the risk of plaque accumulation in the arteries (Fary et al., 2025). What makes this issue more dangerous is the asymptomatic nature of hypercholesterolemia. It is often referred to as a "silent killer" because it typically goes undetected until a major health event occurs, such as a myocardial infarction or stroke (Indrawati et al., 2022).

According to the World Health Organization (WHO), approximately 40% of women and 37% of men worldwide have elevated cholesterol levels. In low- and middle-income countries, including Indonesia, the burden is steadily rising due to changes in diet and physical activity. In Indonesia alone, 28% of the population is estimated to suffer from hypercholesterolemia (Gantoro et al., 2025). Despite its seriousness, public awareness of cholesterol management remains low, particularly among the elderly. This lack of awareness leads to delays in diagnosis and limited adherence to preventive strategies such as healthy diet, regular exercise, and routine health checks (Kumalasari et al., 2023).

Lifestyle-related factors are the most common causes of high cholesterol. Diets rich in saturated and trans fats, insufficient physical activity, obesity, smoking, and chronic stress are widely recognized contributors. Moreover, underlying medical conditions like diabetes, hypothyroidism, and genetic disorders such as familial hypercholesterolemia further increase the risk of lipid abnormalities (Mutiara Hikmah & Dwi Cahyani, 2024). In elderly populations, these factors are compounded by cognitive decline, limited mobility, and decreased social support, which hinder the adoption of healthier behaviors.

Health education interventions targeted at older adults have proven to be effective in improving knowledge and encouraging behavioral change. Community-based health promotion programs, particularly those focusing on dietary education, play a vital role in cholesterol management and prevention of related complications. A healthy, low-calorie diet is known to reduce LDL cholesterol while promoting high-density lipoprotein (HDL), the so-called “good” cholesterol (Ollin et al., 2024). Additionally, proper nutrition is essential for maintaining optimal body weight and preventing comorbidities such as hypertension and type 2 diabetes, which are often associated with high cholesterol levels.

In May 2025, a health education initiative was conducted in RT.18 Komplek Persada Raya IV, Barito Kuala District, South Kalimantan, Indonesia. A preliminary survey revealed that 8 out of 14 elderly individuals in the community had high cholesterol levels, while two others had a history of hypercholesterolemia. This alarming data prompted the implementation of a health promotion activity titled "Elderly Education on Cholesterol Control through a Healthy and Low-Calorie Diet". The main objective of this intervention was to increase elderly participants’ understanding of cholesterol control by emphasizing the importance of dietary modification and regular cholesterol monitoring.

The intervention employed an interactive approach, including a lecture session supported by visual aids and leaflets, followed by a question-and-answer session. A pre-test and post-test design was used to assess changes in knowledge before and after the session. The results indicated a significant improvement in the participants’ understanding, with the average score increasing from 35% on the pre-test to 65% on the post-test. These findings support previous research that suggests structured health education can significantly improve the awareness and attitudes of older adults toward cholesterol management (Hadriyati et al., 2023; Harini et al., 2024).

Health education that is tailored to the needs of the elderly is critical. It should be delivered in a manner that is accessible and engaging, considering age-related sensory and cognitive limitations. Moreover, involving healthcare professionals, caregivers, and family members can further enhance the effectiveness of such programs. Sustainable changes in dietary behavior and lifestyle require continuous support and follow-up, especially in populations at higher risk of cardiovascular events.

In conclusion, the growing prevalence of hypercholesterolemia among the elderly demands urgent public health attention. Health promotion efforts focusing on dietary education and lifestyle changes are essential to empower older adults with the knowledge and skills needed to manage their cholesterol levels effectively. The success of the community-based intervention described in this manuscript highlights the importance of collaborative, context-specific health education strategies as a means to reduce the burden of chronic disease and improve the quality of life in aging populations.

Method

This community service program employed a one-group pre-test–post-test design to evaluate the effectiveness of structured health education in improving elderly participants’ knowledge of cholesterol control. The activity was carried out on May 9, 2025, in RT.18 of the Persada Raya IV housing complex, located in Berangas Timur Village, Alalak Subdistrict, Barito Kuala

Regency, South Kalimantan, Indonesia. A total of 12 elderly individuals aged 60 years and above were selected through purposive sampling based on their availability and consent to participate. The program was implemented in three stages: preparation, implementation, and evaluation. In the preparatory phase, coordination was established with local authorities to obtain permission and engage the community. Educational materials including PowerPoint slides, printed leaflets, and pre–post questionnaires were developed based on current evidence and national health recommendations.

At the start of the session, participants completed a structured pre-test consisting of ten questions designed to assess their baseline knowledge of cholesterol, including causes, symptoms, risks, and prevention. The health education session was then delivered through an interactive lecture supported by visual media and printed materials. The content of the education focused on eight main topics: (1) the definition and function of cholesterol; (2) causes and risk factors of high cholesterol; (3) signs and symptoms of hypercholesterolemia; (4) possible complications such as atherosclerosis and cardiovascular disease; (5) cholesterol screening methods and interpretation of normal values; (6) dietary recommendations for cholesterol control—emphasizing low-calorie and low-saturated-fat meals, increased fiber intake, and healthy cooking methods; (7) the importance of physical activity and lifestyle modifications such as smoking cessation; and (8) correction of common myths and misconceptions related to cholesterol. Leaflets were distributed to support retention of information, and visual aids such as food charts and illustrations of blocked arteries were used to enhance understanding. To keep participants engaged, a short ice-breaking activity related to food classification was conducted mid-session.

Following the lecture, participants completed a post-test identical to the pre-test to evaluate changes in knowledge. Throughout the session, facilitators also observed participant engagement, responsiveness, and participation in discussions. Pre- and post-test results were analyzed descriptively to determine the effectiveness of the educational intervention in improving participants' understanding of cholesterol and its management.

Results and Discussion

This study evaluated the effectiveness of a health education intervention on cholesterol control among elderly participants through a structured pre-test and post-test design. A total of 12 older adults participated in the activity, with all completing both the pre- and post-test assessments. The results demonstrated a significant increase in knowledge following the educational session.

Table 1. Comparison of Pre-Test and Post-Test Scores among Participants (n = 12)

Participant	Pre-Test Score (%)	Post-Test Score (%)
1	50.0	87.5
2	37.5	75.0
3	50.0	100.0
4	50.0	100.0
5	67.5	100.0
6	37.5	100.0
7	25.0	75.0
8	25.0	100.0
9	67.5	100.0
10	50.5	87.5
11	67.5	100.0
12	67.5	100.0
Mean	49.6	93.8

Prior to the intervention, the mean pre-test score was 49.6%, indicating limited knowledge related to cholesterol, its associated risk factors, and preventive measures. Following the delivery of health education, which focused on a healthy and low-calorie diet, the participants' mean post-test score increased to 93.8%, reflecting a substantial improvement in understanding. All participants exhibited knowledge gain, and nine out of twelve participants achieved a perfect score (100%) in the post-test assessment.

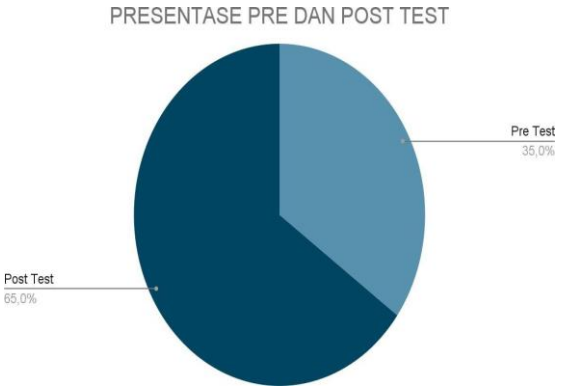

Figure 1. Proportion of Pre-Test and Post-Test Scores

The figure illustrates the percentage of correct answers in the pre-test and post-test evaluations. The pre-test accounted for 35% of total knowledge, while the post-test accounted for

65%, indicating a clear enhancement in participants' understanding after the educational session.

This result reflects a 30% increase in collective knowledge, confirming the effectiveness of the intervention. The improvement can be attributed to the use of multiple educational strategies—including interactive lectures, visual media, and printed materials—which catered to various learning styles and cognitive capacities among elderly participants.

Discussion

This community service program aimed to evaluate the effectiveness of a health education intervention in improving elderly knowledge regarding cholesterol control through healthy, low-calorie dietary practices. The intervention, conducted within a local community setting, yielded favorable outcomes, as demonstrated by the significant increase in participants' knowledge, reflected in the comparison of pre- and post-test scores (Table 1). The average pre-test score of 49.6% increased substantially to 93.8% in the post-test, while the proportion shown in Figure 1 highlights a shift from 35% to 65% in knowledge acquisition after the educational session.

These results affirm that a well-designed health education component within a community service program can enhance the understanding of cholesterol management in older adults. The findings are in line with prior reports emphasizing the impact of community-based health promotion initiatives, especially when content is adapted to local culture and population needs (Kumalasari et al., 2023; Hadriyati et al., 2023).

Several factors likely contributed to the success of this intervention. The use of interactive lectures, supported by PowerPoint slides and educational leaflets, enabled participants to engage through visual and auditory learning. This multimodal approach is especially important for elderly populations, who may experience age-related impairments (Ilmi et al., 2025). In addition, the health education was delivered using simple, relatable language and examples relevant to the participants' daily lives, promoting better understanding and retention.

Observational feedback during the program indicated a high level of participant enthusiasm and engagement. Many attendees actively asked questions, shared personal dietary habits, and demonstrated a genuine interest in learning. This reinforces the idea that when educational content is personalized and delivered respectfully, older adults are highly capable of engaging in health learning (Harini et al., 2024).

Moreover, the high prevalence of hypercholesterolemia within the community, as discovered in the initial survey (57.1% with high cholesterol, 14.3% with a history of high cholesterol), underscored the relevance of the topic. These findings resonate with national data showing elevated cholesterol rates across Indonesian elderly populations (Gantoro et al., 2025). Thus, the community engagement activity was timely and addressed a locally pressing health concern.

The success of this health education effort can also be interpreted through contemporary models of health behavior change. Recent studies emphasize that behavior adoption in older adults is significantly influenced by perceived susceptibility, perceived benefits, and perceived self-efficacy—factors strongly linked to how individuals evaluate their risk and ability to take preventive action (Choi et al., 2022; Wulandari & Pramesti, 2023). In this community setting, most participants had either experienced or were aware of cholesterol-related illnesses within their families, which likely increased their perceived vulnerability and motivated them to engage more actively with the educational content.

This finding is consistent with a study by Choi et al. (2022), which reported that elderly individuals are more likely to adopt health-promoting behaviors, including dietary changes, when they understand the severity and risks of chronic diseases such as cardiovascular disorders. Furthermore, Wulandari and Pramesti (2023) found that health education programs which address personal relevance and provide practical solutions are more likely to result in sustained behavioral change among older adults.

However, the community service program had certain limitations. The small number of participants (n = 12) limits the generalizability of the findings. Additionally, assessments were conducted immediately after the intervention, without long-term follow-up to determine knowledge retention or behavioral change.

Future community programs should include larger sample sizes, longer timelines, and follow-up evaluations to better assess sustained impact.

It is also important to note that increased knowledge does not automatically translate into lifestyle change. Factors such as income, access to healthy food, physical ability, and family support play crucial roles in enabling or hindering health behavior. Thus, health education should be integrated into broader community support frameworks, including follow-up visits, peer support, and collaboration with local health centers (Ollin et al., 2024).

Despite these limitations, the program's success has practical implications. It shows that community-based health education, even when conducted in a single session, can produce meaningful knowledge gains. The structured method—lecture, discussion, visual reinforcement, and simple evaluation—can be replicated by public health professionals, students, or local volunteers in other regions with minimal resources.

In conclusion, this community service program demonstrated that targeted health education significantly improved elderly participants' understanding of cholesterol control. The effectiveness of the intervention, supported by test results (Table 1) and the knowledge distribution shown in Figure 1, confirms the value of incorporating health education into community engagement efforts. Moving forward, such programs should be sustained, scaled up, and integrated into broader public health strategies to address the increasing burden of non-communicable diseases among older adults in Indonesia and beyond.

Conclusion

This community service program showed that structured health education on cholesterol control through healthy, low-calorie diets effectively improved knowledge among elderly participants. A significant increase in post-test scores indicated the success of the intervention in addressing knowledge gaps. Participant engagement further supported the relevance and impact of the educational content.

Given the high prevalence of high cholesterol in the community, such initiatives are essential for preventing cardiovascular risks. Future programs should consider long-term follow-up to evaluate behavioral changes and health outcomes. Overall, community-based education remains a valuable strategy to support healthy aging and reduce the burden of non-communicable diseases.

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