Indonesia Berdaya, 7(3) 2026: 621-632
https://doi.org/10.47679/ib.20261495

P-ISSN 2502-4825
E-ISSN 2502-9495

Enhancing Elderly Health Cadre Capacity Through Church-Based Community Training for Early Detection of Non-Communicable Diseases in Southwest Papua

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Published online: 26 April 2026

ABSTRACT

Non-communicable diseases remain a leading cause of morbidity among the elderly, particularly in underserved regions with limited access to preventive health services. This study aimed to evaluate the effectiveness of a church-based community training program in improving the capacity of elderly health cadres for early detection of non-communicable diseases in Southwest Papua. A participatory action research design with a one-group pre-test–post-test approach was applied to 17 cadres from seven congregations. The intervention consisted of interactive lectures, hands-on practice, and simulation using a structured training manual. The results showed a significant increase in knowledge scores from 54.1±12.3 to 86.5±8.7 ($p<0.001$), with a large practical effect. All participants achieved independence in blood pressure measurement and anthropometry, while 82.4 percent demonstrated competence in blood glucose testing. Participant satisfaction was high, with an average score of 4.7 out of 5. The findings indicate that integrating community training with church-based structures can effectively strengthen early detection practices and improve community participation. This model offers a practical and scalable approach for enhancing preventive health services in resource-limited settings.

Keywords: community empowerment; elderly health services; health cadre training; participatory approach; preventive health; primary healthcare

INTRODUCTION

Non-communicable diseases such as hypertension, diabetes mellitus, and coronary heart disease continue to rise and remain the leading causes of morbidity and mortality among the elderly population in Indonesia. Data from the 2018 Basic Health Research reported that the prevalence of hypertension among older adults reached 63.2 percent, while diabetes mellitus accounted for 10.9 percent. More recent evidence from the 2023 Indonesian Health Survey indicates a further increase in disease burden, particularly in eastern regions, including Southwest Papua (Arifin et al., 2022; Puspitasari et al., 2026). These figures are not merely statistical. In everyday practice, they reflect a real and growing burden, especially when older individuals face delayed diagnosis due to limited access to early detection services.

Southwest Papua presents a complex set of structural challenges. Preventive healthcare services remain difficult to access, the distribution of health workers is uneven, and community health literacy is relatively low. This combination increases the likelihood of delayed intervention and heightens the risk of preventable complications. Prior research has demonstrated that limited access to primary healthcare in remote settings is strongly associated with low screening coverage and a high proportion of undiagnosed cases (Laksono et al., 2023). At the same time, shifts in lifestyle and increased exposure to risk factors are accelerating the epidemiological transition among the elderly population in Papua, making the situation more urgent than it may appear on paper.

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Under these conditions, community-based strategies offer a practical and often more effective pathway. The Protestant Church in Indonesia (GPI) Klasis Sorong holds a central position in the social fabric of the community. It functions not only as a place of worship but also as a trusted space for interaction, communication, and collective decision-making. Evidence suggests that interventions delivered through religious institutions tend to achieve higher levels of participation, particularly in resource-limited settings where formal systems struggle to reach the population effectively (Ahmed et al., 2024; Lwin et al., 2026; Odukoya et al., 2022). There is a sense of familiarity and trust embedded in these spaces. Health messages introduced in such environments are often received with less resistance and greater engagement.

Initial observations and focus group discussions conducted in January 2026 revealed a critical service gap. None of the seven partner congregations had trained health cadres capable of conducting routine screening for non-communicable diseases. Most elderly individuals had not undergone blood pressure or blood glucose checks in the previous six months, even though symptoms such as dizziness, fatigue, and headaches were frequently reported. This situation highlights a weak early detection system at the community level. Previous studies consistently show that structured cadre training can significantly improve knowledge, technical skills, and the reach of preventive services (Oldenburg, 2022; Samaran et al., 2025).

The challenges identified extend beyond the absence of cadres. Limited technical competence, the lack of simple and applicable training materials, insufficient screening equipment, and weak referral connections between community structures and primary healthcare facilities all contribute to the problem. These findings suggest that isolated educational interventions are unlikely to be sufficient. A more integrated approach is required, one that combines capacity building, resource support, and system linkage within a single framework.

This community service program was therefore designed as a structured intervention to address these interconnected needs through church-based training of elderly health cadres. The program emphasizes experiential learning through hands-on practice, simulation, and guided mentoring. Participants are expected not only to understand key concepts but also to perform essential screening procedures independently. This approach reflects the principles of participatory action research, where community members are actively involved as agents of change rather than passive recipients of information.

A key contribution of this program lies in its integrated model. It combines technical training for early detection of non-communicable diseases with the strategic use of church-based social structures as a delivery platform for health services. While community-based health programs are not new, the structured integration of religious institutions as operational hubs for screening and referral remains limited, particularly in eastern Indonesia. Existing initiatives tend to focus on general Posyandu strengthening without systematically leveraging the social capital and trust embedded within faith-based communities. This study therefore proposes a replicable model that connects individual capacity, community trust, and health system access in a more cohesive way.

The objective of this program is to improve the knowledge, technical skills, and confidence of health cadres in conducting early detection and prevention of non-communicable diseases among the elderly. It also aims to establish a more structured screening practice at the congregation level while strengthening collaboration between community networks and primary healthcare services. Over time, this approach is expected to contribute not only to improved quality of life among older adults but also to a more responsive and accessible community-based health system in Southwest Papua.

LITERATURE OR CONCEPTUAL REVIEW

Non-communicable diseases have become a dominant global health challenge, particularly among the elderly population. The World Health Organization estimates that more than 70 percent of global deaths are caused by non-communicable diseases, with the highest burden borne by older

adults due to cumulative exposure to behavioral and metabolic risk factors over the life course. This trend carries consequences beyond mortality. It gradually reduces functional capacity, limits independence, and places sustained pressure on families and health systems. In Indonesia, the pattern is increasingly evident, where hypertension, diabetes mellitus, and cardiovascular diseases consistently rank as the leading causes of morbidity among older adults. This epidemiological transition, marked by a shift from infectious to chronic diseases, tends to intensify in regions with constrained healthcare access, including Southwest Papua.

Within this landscape, early detection is widely recognized as a cornerstone of non-communicable disease control. Screening enables the identification of risk factors at an earlier stage, allowing timely intervention before complications develop. Yet the implementation of routine screening at the community level remains uneven. (Kamvura et al., 2022) showed that limited access to primary healthcare services is strongly associated with low screening uptake and a high proportion of undiagnosed conditions. This finding resonates with broader evidence from low-resource settings, where structural barriers often undermine preventive efforts. In such environments, relying solely on facility-based services is rarely sufficient, and alternative delivery approaches become necessary.

Community-based strategies, particularly those involving lay health workers or cadres, have emerged as a pragmatic response to these limitations. (Collins et al., 2026) demonstrated that community health worker involvement significantly improves screening coverage and early detection outcomes, especially in areas with shortages of professional health personnel. Similar patterns are reported by (Samaran et al., 2025), who found that cadre-based interventions in Papua Barat Daya not only increased knowledge scores but also expanded the reach of preventive services. Taken together, these findings suggest a consistent trend: when community members are actively engaged as part of the health system, service accessibility improves in a meaningful way.

Even so, the effectiveness of such approaches depends heavily on the capacity of the cadres themselves. Without adequate preparation, their role tends to be limited to information dissemination, with minimal impact on actual health practices. Evidence indicates that training design plays a decisive role in shaping outcomes. (Sultan et al., 2025) observed that practice-oriented training produces stronger improvements in both knowledge and technical competence compared to lecture-based methods. This observation aligns with findings from (Hayer et al., 2022), where hands-on experience and repeated practice were critical for mastering skills such as blood pressure measurement and glucose testing. The convergence of these studies points to a clear implication: training that emphasizes active participation and skill rehearsal is more likely to produce functional competence, not just conceptual understanding.

Alongside capacity development, the choice of implementation platform also matters. Recent literature has increasingly highlighted the role of community institutions in strengthening public health interventions. Religious organizations, in particular, offer a unique advantage. (Christopher et al., 2025) noted that faith-based institutions often operate within strong networks of trust, which can significantly enhance community engagement. This insight is reinforced by (Setianti et al., 2025), who emphasized that value-driven and community-embedded approaches contribute to the sustainability of health programs. When interventions are delivered through familiar and trusted environments, participation tends to increase, and resistance decreases. These dynamics are especially relevant in settings where formal health systems are perceived as distant or difficult to access.

Despite the growing recognition of both cadre-based strategies and faith-based engagement, their integration remains limited in practice. Most community health programs continue to treat these components separately. Posyandu strengthening efforts, for instance, often focus on service delivery mechanisms without fully leveraging existing social structures such as religious communities. At the same time, training programs frequently prioritize knowledge transfer while giving less attention to the development of practical skills. This fragmented approach reduces the overall effectiveness of interventions and limits their long-term impact.

This gap opens space for a more integrated model of community empowerment. An approach that combines structured cadre training with the strategic use of church-based social networks offers a more coherent pathway. Such a model does not rely on a single intervention component. Instead, it

connects three critical elements: individual capacity, social trust, and access to health services. The interaction between these elements creates a reinforcing system, where improved skills enable action, trusted environments facilitate acceptance, and service linkages ensure continuity of care.

Based on this perspective, the conceptual framework of the present program positions cadre training as the primary driver of change, supported by the social infrastructure of the church community. Increased knowledge and technical competence are expected to translate into improved early detection practices at the congregation level. At the same time, the involvement of church institutions is likely to expand outreach and strengthen participation among older adults. This reciprocal relationship forms the foundation of a community-based early detection system that is not only functional but also sustainable within resource-limited settings.

MATERIALS AND METHODS

This community service employed a participatory action research design using a one-group pre-test and post-test approach to evaluate the effectiveness of a structured training program for elderly health cadres. This design was selected to allow active participant involvement while capturing measurable changes in knowledge and skills following the intervention. Although the absence of a control group limits causal inference, the approach remains appropriate for evaluating community-based capacity-building programs in real-world settings.

The intervention was conducted on Saturday, April 18, 2026, from 09.00 to 16.00 WIT at the multipurpose hall of GPI Betlehem Sorong, Southwest Papua, Indonesia. The venue was intentionally chosen due to its central location and accessibility for participants from seven congregations within the GPI Klasis Sorong network. This consideration is important in geographically dispersed regions, where distance and transportation often limit participation in health programs.

Participants were selected through nomination by church leaders based on predefined criteria. Eligible individuals were aged 45–70 years, able to read and write, willing to serve as elderly Posyandu cadres, and free from severe mobility limitations. A total of 17 participants attended the training, representing all seven congregations, with an attendance rate of 81 percent from the initial target of 21 individuals. This sample reflects the total available cadre pool within the partner congregations, which is consistent with participatory community-based interventions. The involvement of church leadership, including the Head of GPI Klasis Sorong and the Vice Head for community services, strengthened institutional support and participant engagement throughout the activity.

The implementation team consisted of three lecturers from Poltekkes Kemenkes Sorong, with Alva Cherry Mustamu serving as team leader, supported by Elisabeth Samaran and Rizqi Alvian Fabanyo. Fourteen final-year nursing students participated as facilitators and technical assistants. They supported practical sessions, assisted participants in completing questionnaires, particularly those with reading difficulties, and ensured smooth logistical coordination. This high facilitator-to-participant ratio allowed close supervision during skill-based training and contributed to a more effective learning process.

Training materials were compiled into a printed manual titled “Buku Panduan Kader Posyandu Lansia,” which was distributed to all participants. The manual covered cadre roles, basic concepts of non-communicable diseases, early detection techniques including blood pressure measurement, blood glucose testing, and anthropometric assessment, as well as preventive strategies such as balanced diet (G4-G1-L5), physical activity, smoking cessation, stress management, communication skills, recording systems, and referral procedures. The content was adapted from established cadre training frameworks and simplified to ensure clarity and usability for non-medical participants.

The training was delivered through a structured combination of interactive lectures, demonstrations, hands-on practice, and simulation. The initial session introduced key concepts related to non-communicable diseases and cadre responsibilities. Practical sessions were then organized into four stations focusing on blood pressure measurement, blood glucose testing, anthropometry, and health education delivery. Participants rotated across stations and practiced each skill repeatedly under supervision until they demonstrated independent competence. Simulation exercises using case scenarios allowed participants to apply both technical and communication skills in realistic situations. Knowledge assessments were conducted before and after the training using structured questionnaires.

Data collection employed three instruments. Knowledge was assessed using a ten-item multiple-choice questionnaire covering key topics such as disease definitions, risk factors, normal clinical values, lifestyle recommendations, and emergency responses. Each item carried equal weight, resulting in a maximum score of 100. The questionnaire was adapted from existing training materials and reviewed by the implementation team to ensure content relevance and clarity. Practical skills were evaluated using an observation checklist comprising five domains: blood pressure measurement, blood glucose testing, anthropometric assessment, delivery of health education based on G4-G1-L5 principles, and identification of danger signs with appropriate referral actions. Each domain was rated dichotomously as competent or not yet competent. Participant satisfaction was measured using a 14-item Likert-scale questionnaire ranging from one to five, capturing perceptions of training quality, facilitators, facilities, and overall usefulness.

Data were analyzed using descriptive statistics, including mean, standard deviation, and percentage distribution. Differences between pre-test and post-test knowledge scores were examined using a paired t-test with a significance level of 0.05. All analyses were performed using IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA).

Ethical considerations were addressed prior to implementation. The activity received approval from the institutional leadership of Poltekkes Kemenkes Sorong. All participants were informed about the purpose and procedures of the program and provided written informed consent. Confidentiality was maintained throughout the study, and participants were given the right to withdraw at any time without any consequences.

Several technical challenges occurred during implementation, including malfunction of two digital sphygmomanometers and one glucometer due to unreadable test strips. Backup equipment, including two manual sphygmomanometers and an additional glucometer, was prepared in advance to ensure continuity of the training process. Devices for cholesterol and uric acid testing were not utilized due to technical constraints, although these were not included as core competencies in the training design.

RESULTS AND DISCUSSION

Participant Characteristics

A total of 17 elderly health cadres participated in the training program, representing seven church congregations. The majority of participants were aged 60–69 years (58.8 percent), followed by those aged 45–59 years (23.5 percent) and ≥70 years (17.6 percent). Most participants were female (70.6 percent), reflecting the typical gender distribution in community-based health activities. Educational attainment was relatively low, with nearly half of the participants having completed only primary school (47.1 percent). Representation across congregations was evenly distributed, although Betlehem contributed the largest number of participants (23.5 percent). Table 1 presents the detailed demographic profile of participants. Overall, the characteristics indicate that the training reached a population group that is often underserved yet plays a critical role in community health delivery.

Table 1. Characteristics of participants (n=17)

Characteristic	n	%
Age (years)		
45–59	4	23.5
60–69	10	58.8
≥70	3	17.6
Sex		
Male	5	29.4
Female	12	70.6
Education		
Did not complete primary school	3	17.6
Primary school	8	47.1
Junior high school	4	23.5
Senior high school	2	11.8
Congregation		
Bukit Zaitun	2	11.8
Petra	2	11.8
Betlehem	4	23.5
Galilea	2	11.8
Diaspora	3	17.6
Getsemani	2	11.8
Karmel	2	11.8

Knowledge Improvement

The training produced a marked increase in participants' knowledge of non-communicable diseases and early detection practices. The mean score increased from 54.1±12.3 in the pre-test to 86.5±8.7 in the post-test, with a mean difference of 32.4 points. Statistical analysis using a paired t-test showed that this improvement was highly significant ($p<0.001$). The calculated effect size (Cohen's $d = 3.04$) indicates a very large practical impact of the intervention. The improvement in knowledge is presented visually in Figure 1. The graph illustrates a consistent increase across all topics, with the most pronounced gains observed in daily salt intake and stroke warning signs. While baseline knowledge varied considerably between topics, post-test scores converged at a higher level, indicating a more uniform understanding after the training.

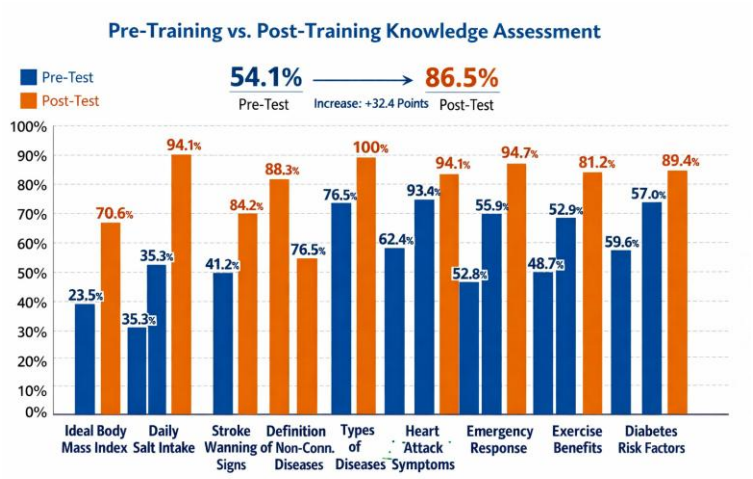

Figure 1 Pre- and Post-Training Knowledge Scores Across NCD Topics

Practical Skills Performance

Observation results revealed strong competency gains across all measured skill domains. All participants (100 percent) were able to independently measure blood pressure and perform anthropometric assessments, including weight, height, and body mass index calculation. The ability

to conduct blood glucose testing reached 82.4 percent, with a small proportion of participants still requiring assistance, particularly during finger-prick procedures and sample application. Skills related to health education delivery and recognition of danger signs also showed high levels of independence, at 88.2 percent and 94.1 percent respectively. Figure 2 presents the proportion of participants who achieved independent competency across each skill domain. Independence was highest in blood pressure measurement and anthropometry, both reaching full competency. Slightly lower performance was observed in blood glucose testing, reflecting the additional technical and procedural complexity of this skill.

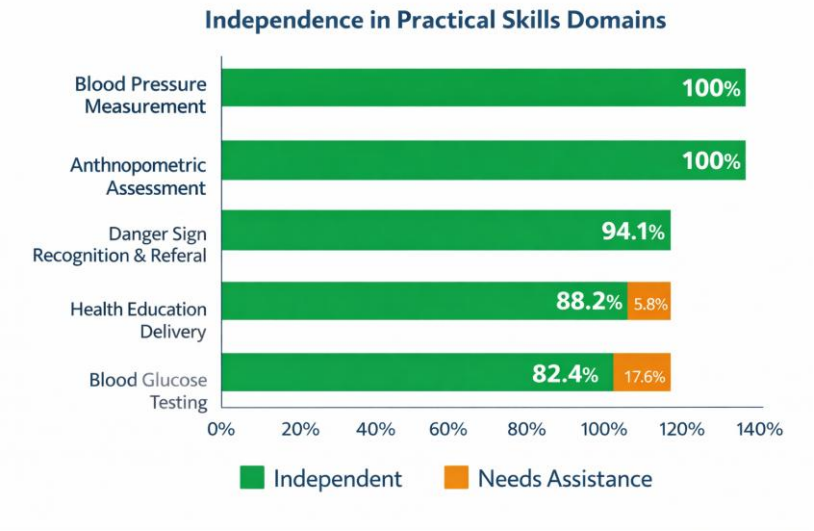

Figure 2 Independent Competency in Practical Skills Among Health Cadres

Participant Satisfaction

Participant satisfaction with the training was consistently high, with an overall mean score of 4.7±0.4 on a five-point Likert scale. The highest-rated aspects included facilitator responsiveness and perceived usefulness of the training for elderly care services, both scoring 4.9. Slightly lower scores were observed for duration of training (4.4), although still within a positive range. Participant satisfaction is summarized in Figure 3. All domains received high ratings, with facilitator performance and perceived benefits achieving the highest scores. Although the duration of training received slightly lower ratings, the overall evaluation remained strongly positive.

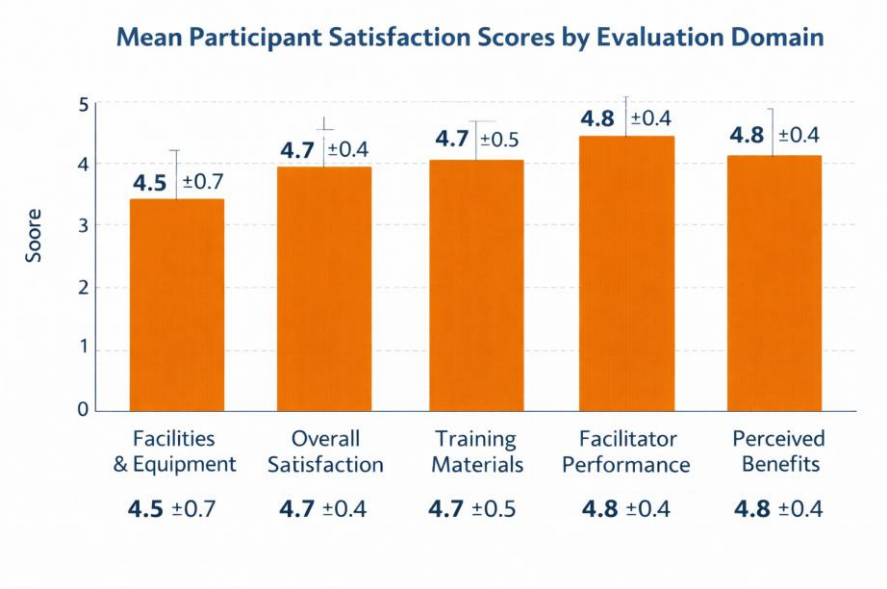

Figure 3 Participant Satisfaction Scores Across Training Domains

Training Documentation

The implementation process is documented in Figure 4–6. Figure 4 shows the participants and facilitators during the opening session, reflecting institutional and community engagement. Figure 5 captures supervised hands-on practice of blood pressure measurement, highlighting the experiential learning approach. Figure 6 presents the distribution of the training manual, which served as a key learning resource for participants.

Figure 4 Group photo

Figure 5 Practical session

Figure 6 Manual distribution

DISCUSSION

The findings indicate that a structured, community-based training model can meaningfully transform both knowledge and practical competencies of elderly health cadres. The magnitude of improvement suggests that the intervention functioned as more than a simple knowledge transfer. It reshaped how participants understood and approached non-communicable disease prevention in their daily roles. This pattern is consistent with prior evidence showing that well-designed cadre training enhances screening capacity in underserved settings (Fritz et al., 2024). At a broader level, these results reinforce the argument that active community participation is not an auxiliary component, but a central mechanism for expanding access to primary healthcare in geographically constrained regions (Shrestha et al., 2024).

A more detailed reading of the results reveals that knowledge gains were not evenly distributed across topics. The most substantial improvements occurred in areas that are rarely discussed in routine community interactions, such as salt intake recommendations and early recognition of stroke symptoms. This suggests that the primary barrier was not resistance to behavior change, but limited exposure to accurate and accessible information. When health messages were delivered using simple language and familiar analogies, participants were able to absorb and retain them effectively. This supports the broader view that the success of health education depends as much on communication strategy as on content accuracy (Singhal & Bhaskar, 2026). At the same time, the relatively modest improvement in understanding physical activity highlights a more persistent cognitive gap. Daily routines were often perceived as sufficient exercise, indicating that certain misconceptions are more deeply embedded and require repeated reinforcement rather than one-time instruction.

The strong performance in practical skills underscores the value of experiential learning. Skills such as blood pressure measurement and anthropometry were acquired with full independence by all participants, suggesting that these competencies can be effectively transferred through demonstration and guided repetition. However, the lower proficiency observed in blood glucose testing points to an important nuance. Skill acquisition is not uniform and may be influenced by both technical complexity and psychological readiness. Fear of finger-pricking and reduced motor control among older participants played a role in limiting performance. Similar patterns have been documented by (Tsiakiri et al., 2025), who emphasized that certain diagnostic procedures require more intensive and adaptive training strategies. This distinction matters because it highlights the need to design training programs that are sensitive to both the physical and emotional dimensions of learning.

Participant satisfaction provides further insight into the feasibility of the intervention. High satisfaction scores indicate that the program was not only effective but also perceived as relevant and supportive. This aspect is often overlooked, yet it directly influences whether newly acquired skills are sustained in practice. The slightly lower rating for training duration suggests that physical fatigue may reduce engagement, particularly among older adults. A more distributed training format may enhance retention without reducing content depth. These considerations point to a broader principle. Effectiveness and acceptability need to move together if community-based programs are expected to produce lasting impact.

Beyond individual outcomes, the study highlights the strategic role of social structures in shaping health interventions. The integration of church-based communities acted as a critical enabling factor. Trust, familiarity, and shared values created an environment where participation became more natural and less constrained by formal barriers. These findings reinforce the idea that social trust structures play a central role in bridging healthcare access gaps in underserved regions. Evidence from (Sobers et al., 2025) supports this perspective, showing that faith-based institutions can enhance both engagement and sustainability of health programs. What emerges here is a reminder that effective healthcare delivery is not only about infrastructure and resources, but also about the social pathways through which services are introduced and accepted.

The collaborative dimension of this program also deserves attention. The interaction between academic institutions, community organizations, and students created a layered implementation model that extended beyond a single intervention. The involvement of nursing students strengthened technical delivery while simultaneously exposing future health professionals to real community contexts. This reflects a service-learning model that has been recognized as an effective approach to community empowerment (Redvers et al., 2024). The value of this approach lies in its reciprocity. The community benefits from improved services, while the education system produces graduates with stronger practical and social competencies.

From a policy perspective, the implications are difficult to ignore. The findings suggest that integrating faith-based organizations into primary healthcare strategies could significantly strengthen early detection systems, particularly in underserved regions. Formal collaboration mechanisms between religious institutions and primary healthcare providers, such as puskesmas, would allow community-based screening to be more systematically linked with referral and follow-up services. Without such integration, many community initiatives remain fragmented and dependent on short-term efforts. With it, they have the potential to become part of a more coherent and responsive health system.

Several limitations should be acknowledged. The sample size was relatively small and limited to a specific geographical setting, which may restrict generalizability. The absence of a control group limits the ability to attribute observed changes solely to the intervention. In addition, the evaluation focused on immediate outcomes, while long-term sustainability of cadre performance was not assessed. Future work should consider longitudinal designs, larger and more diverse samples, and integration with routine health system data to better capture sustained impact.

Taken together, these findings extend beyond the immediate setting of the study. They illustrate how technical training, when combined with trusted social structures and institutional collaboration, can create a functional pathway for improving early detection of non-communicable diseases. The question moving forward is no longer whether this approach works, but how it can be adapted, scaled, and embedded within existing health systems.

KESIMPULAN

The community-based training program demonstrated a substantial improvement in both knowledge and practical skills of elderly health cadres in detecting non-communicable diseases. The intervention effectively addressed critical knowledge gaps and enabled participants to translate learning into measurable competencies through hands-on practice and contextually relevant communication. The use of church-based community structures proved to be a key enabling factor. It strengthened participation, increased acceptance, and created a supportive environment for implementation. This finding highlights the importance of leveraging trusted local institutions as part of health system strategies, particularly in areas where formal services face accessibility challenges. These results suggest that cadre training, when integrated with existing social structures, can serve as a practical entry point for strengthening early detection systems in underserved regions. The model presented in this study offers a scalable approach that connects individual capacity, community trust, and service linkage within a single framework. Future efforts should focus on expanding this model across different settings, strengthening institutional collaboration, and ensuring long-term sustainability through alignment with primary healthcare systems

Acknowledgments

The authors would like to express their sincere gratitude to GPI Klasis Sorong for their collaboration and support throughout the implementation of this program. Appreciation is also extended to Poltekkes Kemenkes Sorong for institutional support, as well as to all participating elderly health cadres for their commitment and active engagement. The authors acknowledge the valuable contributions of nursing students who assisted in facilitating training activities and ensuring the smooth execution of the program.

Conflict of Interests

The authors declared that no potential conflicts of interest with respect to the authorship and publication of this article.

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