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Process Evaluation of the SEIRAMA PADAMU Program: Retention and Baseline Cardiovascular Risk Among Older Adults

Ika Ainur Rofi'ah[1✉], Lasiyati Yuswo Yani[2]
Faculty of Health Science, Bina Sehat PPNI Mojokerto University, East Java, Indonesian
Email: ikaainur.ns@gmail.com[1✉]

Abstrak

Faktor risiko kardiovaskular seperti hipertensi, gangguan regulasi glukosa, dan dislipidemia berperan penting dalam terjadinya sindrom koroner akut pada lansia. Namun, bukti terkait retensi peserta dan gambaran risiko kardiovaskular awal dalam program pencegahan berbasis komunitas masih terbatas. Penelitian ini bertujuan untuk mengevaluasi retensi peserta serta mendeskripsikan risiko kardiovaskular awal pada lansia yang mengikuti program berbasis komunitas SEIRAMA PADAMU. Evaluasi proses kuantitatif dengan desain kuasi-eksperimental one-group time series dilakukan di lingkungan komunitas. Penelitian melibatkan 50 lansia yang terdaftar di Pos Pelayanan Terpadu (Posyandu) Lansia di Sidoarjo, Indonesia, dengan teknik total sampling. Retensi peserta dipantau melalui empat kali pengukuran bulanan berturut-turut. Indikator risiko kardiovaskular yang dinilai meliputi tekanan darah sistolik, kadar glukosa darah, dan trigliserida, yang diklasifikasikan berdasarkan ambang batas internasional. Analisis data dilakukan secara deskriptif untuk menilai pola retensi dan distribusi risiko awal. Hasil menunjukkan retensi peserta yang tinggi (>90%) pada seluruh periode tindak lanjut dengan kehilangan peserta yang minimal. Sebagian besar lansia memiliki kompleksitas klinis rendah, namun proporsi yang signifikan termasuk dalam kategori risiko kardiovaskular meningkat atau borderline, khususnya pada tekanan darah, glukosa, dan trigliserida. Mayoritas peserta memiliki setidaknya satu faktor risiko kardiovaskular pada baseline. Program SEIRAMA PADAMU menunjukkan kelayakan dan penerimaan yang baik, sekaligus menegaskan pentingnya deteksi dini dan pemantauan berkelanjutan dalam pencegahan kardiovaskular berbasis komunitas.

Kata Kunci: *Risiko Kardiovaskular, Sindrom Koroner Akut, Lansia, Program Berbasis Komunitas*

Abstract

Cardiovascular risk factors, including elevated blood pressure, impaired glucose regulation, and abnormal lipid profiles, substantially contribute to acute coronary syndrome in older adults. However, evidence on participant retention and baseline cardiovascular risk in community-based prevention programs remains limited. This study aimed to evaluate participant retention and describe baseline cardiovascular risk among older adults participating in the SEIRAMA PADAMU community-based program. A quantitative process evaluation using a quasi-experimental one-group time series design was conducted in a community setting. The study involved 50 older adults registered at an Elderly Integrated Service Post in Sidoarjo, Indonesia. Total sampling was applied. Participant retention was monitored across four consecutive monthly measurements. Cardiovascular risk indicators included systolic blood pressure, blood glucose, and triglyceride levels, classified using internationally accepted thresholds. Data were analyzed descriptively to assess retention patterns and baseline risk distribution. Participant retention remained high throughout the study, exceeding 90% across all follow-up measurements, with minimal attrition after the initial assessment. Most participants demonstrated low clinical complexity in terms of medication use and comorbidities. However, a substantial proportion of older adults were classified into elevated or borderline cardiovascular risk categories, particularly for blood pressure, glucose, and triglyceride levels. The majority of participants presented with at least one cardiovascular risk factor at baseline. The SEIRAMA PADAMU program demonstrated strong feasibility and acceptability, reflected by high retention and consistent follow-up. Despite low clinical complexity, baseline cardiovascular risk remained considerable, highlighting the importance of early detection and continuous monitoring in community-based prevention.

Keywords: *Cardiovascular Risk, Acute Coronary Syndrome, Older Adults, Community-Based Program*

INTRODUCTION

Cardiovascular risk factors such as hypertension, hyperglycemia, and dyslipidemia have been consistently identified as major contributors to the development of acute coronary syndrome (ACS). Global evidence indicates that approximately 70-80% of ACS cases are attributable to modifiable risk factors, with hypertension and diabetes mellitus being the most prevalent among older adults (Agung & Anindya, 2024; Kraler et al., 2025). In Indonesia, national health data show that more than 34% of adults aged ≥55 years have hypertension, while over 11% present with impaired glucose regulation, substantially increasing their risk of ACS (Arsyad et al., 2022). Similar findings have been reported in hospital-based studies, where hypertension and dyslipidemia were present in over 60% of ACS patients (Qothi et al., 2021; Raesi et al., 2023).

Community-oriented cardiovascular screening and monitoring initiatives have proven beneficial in identifying high-risk individuals and enhancing early risk identification. Research from Indonesia and other nations indicated that community health screening

programs identified previously undetected hypertension in 25-40% of older individuals and aberrant lipid profiles in 30-50% of the tested populations (Anthony, 2025; Wahyuni et al., 2025). A comprehensive analysis conducted by Azami-aghdash et al (2025) revealed that community-based treatments markedly enhanced blood pressure regulation and risk awareness, especially when programs incorporated continuous follow-up and the involvement of local health professionals. International evidence similarly indicates that prolonged engagement is a crucial predictor of program success, with retention rates exceeding 85-90% regarded as indicative of favorable feasibility in older populations (Asare & Echols, 2025).

Maintaining high participant retention is essential in longitudinal cardiovascular preventive programs, as attrition can result in inaccurate risk estimations and diminished intervention efficacy. Prior research indicates that community-based programs with systematic follow-up attained retention rates between 80% and 95% over a period of 6 to 12 months, especially when services were provided in familiar community environments (Asare & Echols, 2025; Azami-aghdash et al., 2025). Ongoing surveillance of systolic blood pressure, blood glucose, and triglyceride levels is particularly pertinent in older adults, as fluctuations in these metrics correlate with a heightened incidence of acute coronary syndrome and significant adverse cardiovascular events (Dagvajantsan et al., 2025; Zahger et al., 2024).

The SEIRAMA PADAMU program aligns with global and national standards that emphasize early risk identification, ongoing monitoring, and community-centered management of cardiovascular risk in older persons. The program addresses significant unmet needs in preventative cardiovascular care by focusing on key modifiable factors linked to acute coronary syndrome, namely blood pressure, blood glucose, and triglyceride levels. The evaluation of participant retention alongside baseline cardiovascular risk provides valuable insight into the program's feasibility and sustainability, underscoring its potential as a scalable strategy for cardiovascular disease prevention in aging populations (Kraler et al., 2025; McEvoy et al., 2024).

RESEARCH METHOD

This study employed a quantitative approach as part of a process evaluation to describe participant retention and baseline cardiovascular risk in the SEIRAMA PADAMU program. The program was implemented in a community setting to address major cardiovascular risk factors among older adults. A quasi-experimental design with a one-group time series framework was used, emphasizing implementation processes rather than

effectiveness comparison. The variables assessed included systolic blood pressure, blood glucose levels, and triglyceride levels as key indicators of cardiovascular risk.

The study population consisted of older adults registered at the Elderly Integrated Service Post (Posyandu Lansia) within the working area of the Ganting Public Health Center, Sidoarjo, Indonesia. A total of 50 participants were recruited at baseline using a total sampling technique. Participant retention was monitored across four consecutive monthly measurements. Individuals who did not attend at least one follow-up assessment were categorized as lost to follow-up and were excluded from subsequent stage-specific analyses.

Cardiovascular risk indicators were categorized according to internationally accepted standards for older persons. Systolic blood pressure was classified as normal (<120 mmHg), prehypertension (120–139 mmHg), and hypertension (≥140 mmHg) according to the recommendations established by the World Health Organization and the International Society of Hypertension. Blood glucose levels were categorized as normal (<140 mg/dL), borderline high (140-199 mg/dL), and high (≥200 mg/dL) according to the standards established by the American Diabetes Association and the World Health Organization. Triglyceride levels were categorized as normal (<150 mg/dL), borderline high (150-199 mg/dL), and high (≥200 mg/dL) in accordance with the guidelines of the European Society of Cardiology and AHA/ACC. While treatment objectives may vary in older demographics, the diagnostic thresholds employed in this investigation are uniform across adult age categories. They are endorsed for cardiovascular risk evaluation in community settings.

RESULTS AND DISCUSSION

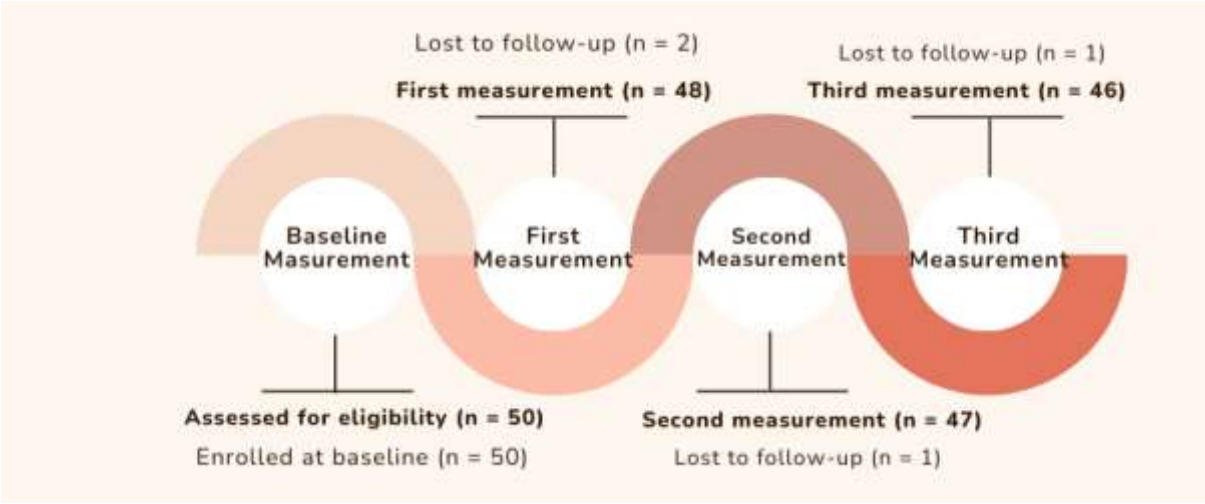

Figure 1. Flow Diagram of Participant Recruitment, Follow-Up, and Retention Across Baseline, First, Second, and Third Measurements in the SEIRAMA PADAMU Program Among

Older Adults

Figure 1 depicted the process of participant recruiting, follow-up, and retention during the SEIRAMA PADAMU program. Fifty older persons were evaluated for eligibility and enrolled at baseline. During the transition from baseline to the initial measurement, two participants were lost to follow-up, leading to 48 participants completing the first measurement. Consequently, one more person failed to attend the second assessment, resulting in 47 people available for analysis at that point. One additional person was lost before the third measurement, resulting in a final sample of 46 participants who completed all follow-up tests.

The program exhibited a substantial retention rate during four successive monthly assessments, with 92.0% of participants retained at the first follow-up, 94.0% at the second follow-up, and 92.0% completing the third measurement compared to baseline enrollment. The observed gradual attrition was negligible and aligned with predictions for community-based treatments targeting older individuals. The findings demonstrated that the execution of the SEIRAMA PADAMU program was both possible and acceptable within a community context, hence reinforcing the trustworthiness of the longitudinal cardiovascular risk data gathered during the study duration.

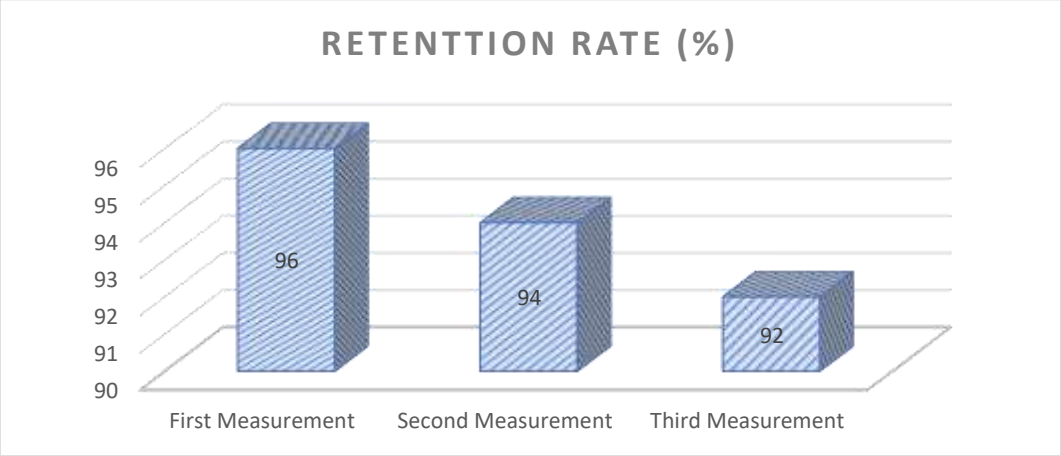

Figure 2.a Retention and Attrition Rates By Measurement Phase: Retention Rate

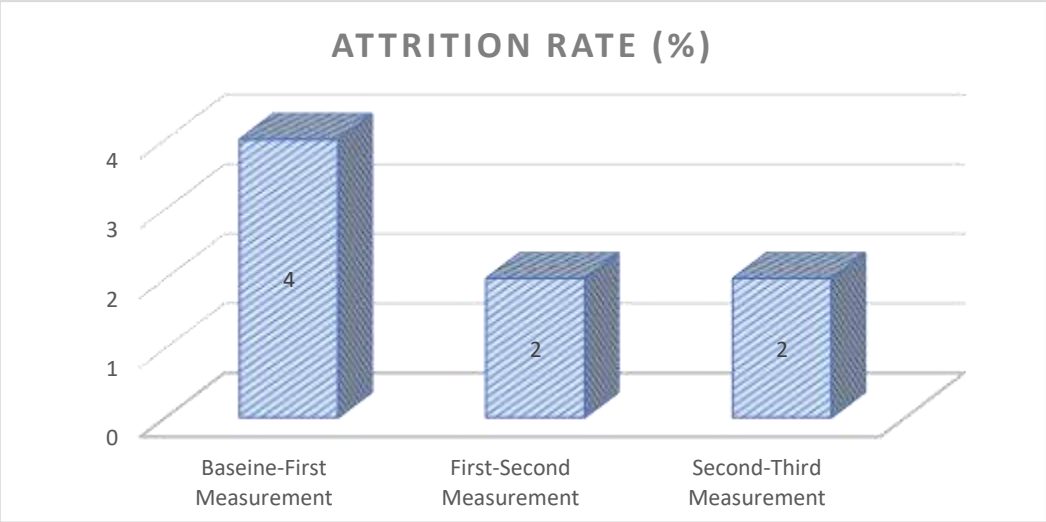

Figure 2.b Retention and Attrition Rates By Measurement Phase: Attrition Rate

Figure 2. an illustrated participant retention rate across the several measurement phases of the SEIRAMA PADAMU program. Retention peaked during the initial measurement phase at 96%, thereafter declining to 94% in the second phase and 92% in the third. Notwithstanding this decline, retention continuously remained elevated during the study period, signifying robust participant involvement and the practicality of recurrent evaluations among older persons in a community-based context.

Figure 2.b depicted attrition rates throughout several measurement phases. The peak attrition rate transpired between the baseline and first measurements (4%), followed by consistent and diminished attrition rates between the first and second (2%) and the second and third measurements (2%). The data demonstrated that participant attrition was minimal following the initial follow-up and continued to be negligible in succeeding phases, thus affirming the stability of the study group across time.

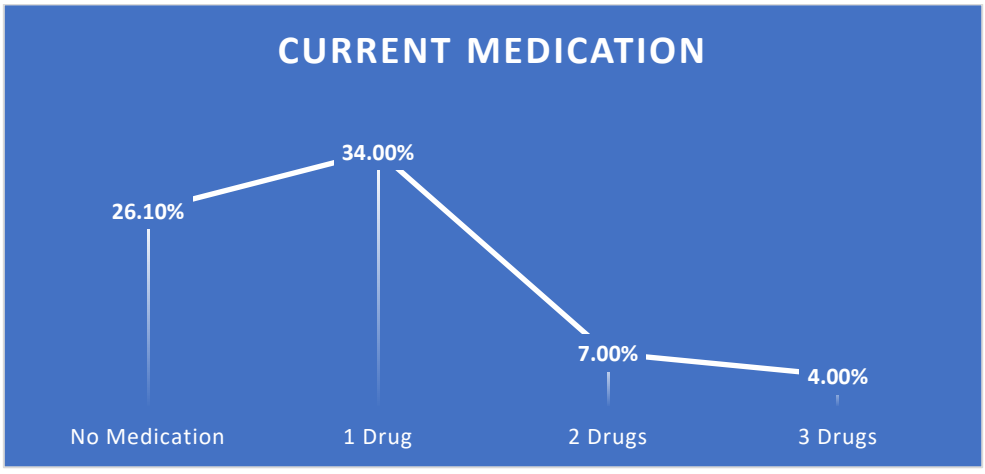

Figure 3.a Baseline Clinical Complexity of Respondents: Current Medication

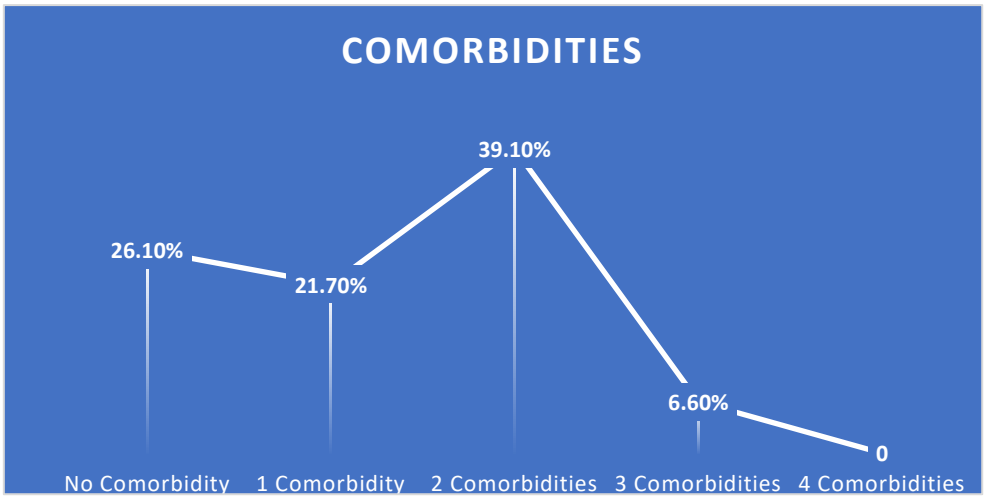

Figure 3.b Baseline Clinical Complexity of Respondents: Comorbidities

Figure 3 a illustrated the distribution of respondents based on the quantity of drugs utilized at baseline. The predominant percentage of participants was on a single medication (34.0%), signifying that monotherapy was the prevalent treatment modality among older persons in the program. Over one quarter of respondents (26.1%) indicated that they did not utilize any medication at baseline. A lesser percentage of people were administered two medications (7.0%), whereas merely 4.0% were utilizing three medications. The data indicated that, at baseline, most respondents had modest pharmacological complexity and minimal exposure to polypharmacy.

Figure 3.b depicted the baseline distribution of comorbid conditions among participants. The largest percentage of participants exhibited two comorbidities (39.1%), followed by those with no comorbidities (26.1%) and those with one comorbidity (21.7%). A lesser percentage of respondents exhibited three comorbidities (6.6%), whilst no participants were found with four comorbidities. This distribution demonstrated that, despite the prevalence of numerous comorbidities within the study group, the overall degree of clinical complexity was modest, with the majority of subjects presenting with two or fewer comorbid diseases at baseline.

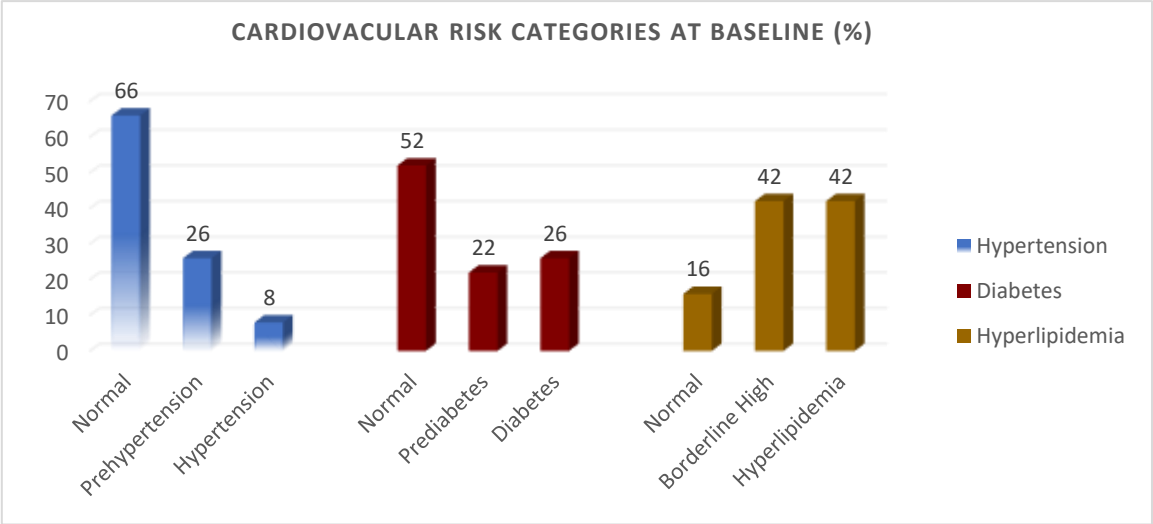

Figure 4. Cardiovascular Risk Categories at Baseline in the SEIRAMA PADAMU Program Among Older Adults

Figure 4 depicted the distribution of cardiovascular risk categories at baseline among older persons engaged in the SEIRAMA PADAMU program. The results revealed that a significant percentage of participants were categorized into elevated risk groups across the evaluated markers, indicating a notable baseline cardiovascular risk load within the research population. Risk levels varied across categories of systolic blood pressure, blood glucose, and triglycerides, with a significant percentage of patients classified as prehypertensive or hypertensive, as well as in borderline or high metabolic risk categories. The baseline distribution indicated that the majority of participants exhibited at least one cardiovascular risk factor, highlighting the need of early risk identification and ongoing monitoring in community-based cardiovascular preventive initiatives for older individuals.

DISCUSSION

Participants Retention

The study's findings indicated that participant retention in the SEIRAMA PADAMU program consistently exceeded 90% across all measurement periods. This finding corroborated theoretical perspectives on community-based health interventions, highlighting that accessibility, perceived relevance, and continuity of care are critical determinants of sustained participation, especially among older adults (Asare & Echols, 2025; Azami-aghdash et al., 2025). From a cardiovascular prevention perspective, the consistent monitoring of blood pressure, blood glucose, and triglyceride levels served both as a clinical evaluation and a behavioral reinforcement tool, enhancing participants' awareness of personal health risks and promoting sustained engagement (Arsyad et al.,

2022; Dagvajantsan et al., 2025). The program's integration into an established community health platform corresponded with theoretical models of health behavior, indicating that trust and familiarity with service providers are crucial for sustaining long-term engagement in preventive programs (Anthony, 2025; Wahyuni et al., 2025).

From the researchers' viewpoint, the negligible attrition noted after the initial follow-up indicated both the suitability of the program design and the reported advantages received by participants. Older adults with preexisting cardiometabolic risk factors may have perceived ongoing participation as a means for early detection and reassurance about their cardiovascular health, aligning with prior evidence that associates perceived vulnerability with heightened health-seeking behavior (Agung & Anindya, 2024; Hygriv Rao et al., 2022). The researchers noted that the non-invasive examinations and lack of intricate clinical procedures diminished the burden of involvement, therefore facilitating ongoing retention. The occurrence of early attrition underscored the necessity for improved initial engagement techniques, including more explicit orientation and strengthened communication of program advantages. These findings indicate that the SEIRAMA PADAMU program offers a viable and acceptable framework for community-based cardiovascular risk monitoring, with significant potential for replication in analogous environments.

Retention and Attrition Rates By Measurement Phase

The elevated participant retention noted across the multiple measurement phases of the SEIRAMA PADAMU program indicated robust program acceptance and feasibility among older individuals in a community-based context. Retention rates surpassing 90% were corroborated by findings from community cardiovascular prevention programs, indicating that accessibility, regular monitoring, and perceived health benefits were pivotal in maintaining long-term participation (Arsyad et al., 2022; Azami-aghdash et al., 2025; Dagvajantsan et al., 2025). The Health Belief Model posits that individuals are more inclined to consistently engage in preventive health behaviors when they regard themselves as vulnerable to illness and believe that the advantages of involvement surpass any potential obstacles (Anthony, 2025). This study suggests that consistent monitoring of blood pressure, blood glucose, and triglyceride levels may have enhanced risk awareness and encouraged ongoing participation, as similarly observed in prior longitudinal cardiovascular screening studies involving older demographics (Arsyad et al., 2022; Okkonen et al., 2021; Vito et al., 2025).

Attrition patterns indicated the stability of the study cohort, with the greatest loss occurring in the initial phase and minimal attrition subsequently. This trend corresponds

with previous studies suggesting that early attrition in community-based interventions is frequently linked to initial adjustment difficulties rather than dissatisfaction with the program (Azami-aghdash et al., 2025; Hygriv Rao et al., 2022). The low and stable attrition rates in later phases indicated that after participants acclimated to the program structure, their ongoing engagement became more reliable. Embedding the SEIRAMA PADAMU program within an established Elderly Integrated Service Post improved trust, social support, and routine attendance, which are recognized as facilitators of long-term retention in health programs for older adults (Agung & Anindya, 2024; Rofi'ah & Yani, 2025; Wahyuni et al., 2025). The sustained retention minimized the risk of attrition bias and enhanced the reliability of longitudinal cardiovascular risk data, thereby endorsing the scalability of this community-based model for cardiovascular risk monitoring.

Baseline Clinical Complexity of Respondents

The baseline clinical complexity of participants in the SEIRAMA PADAMU program was marked by a relatively low pharmacological burden, even in the context of multiple comorbid conditions. The majority of participants were either not on medication or receiving monotherapy, with only a minor percentage undergoing polypharmacy. This pattern indicated that, despite the presence of cardiovascular risk factors, the clinical management of participants had not advanced to intricate pharmacological treatments. Prior research indicates that reduced medication counts in older adults within community settings are frequently linked to earlier phases of disease management or restricted access to long-term pharmacological therapies (Hygriv Rao et al., 2022; Okkonen et al., 2021; Vito et al., 2025). Minimizing polypharmacy is particularly significant in older populations, as the use of multiple medications has been consistently associated with heightened risks of adverse drug reactions, decreased adherence, and functional decline (Azami-aghdash et al., 2025; Dagvajantsan et al., 2025).

Despite the relatively low level of pharmacological complexity, the presence of comorbidities among a substantial proportion of respondents indicated a moderate level of underlying clinical vulnerability. The predominance of participants with one or two comorbid conditions was consistent with epidemiological evidence showing that multimorbidity was common in older adults but often clustered at a moderate level in community-dwelling populations (Agung & Anindya, 2024; Wahyuni et al., 2025). From the researchers' perspective, this clinical profile represented a critical window for preventive intervention, as individuals with limited comorbid burden and low medication complexity may benefit most from early cardiovascular risk monitoring and lifestyle-oriented programs. Integrating

regular screening within community health services may help prevent progression toward more severe multimorbidity and polypharmacy, thereby supporting healthier aging trajectories and reducing future healthcare burden (Anthony, 2025; Rofi'ah & Yani, 2025).

Cardiovascular Risk Categories at Baseline

The baseline distribution of cardiovascular risk categories in the SEIRAMA PADAMU program revealed that a significant percentage of older adults were classified within elevated or borderline risk levels for essential cardiometabolic indicators. The existence of prehypertensive and hypertensive blood pressure levels, in conjunction with abnormal blood glucose and triglyceride profiles, indicated a significant underlying cardiovascular risk prior to intervention (Regev-Avraham et al., 2021; Siagian et al., 2022; L. Zhang et al., 2021). The findings align with population-based studies indicating that older adults often display clustered cardiometabolic risk factors, even within community settings (Arsyad et al., 2022; Dagvajantsan et al., 2025; Wahyuni et al., 2025). The coexistence of multiple subclinical risk factors supports the concept of cumulative cardiovascular risk, wherein modest abnormalities across various parameters collectively elevate the likelihood of acute coronary events and long-term cardiovascular morbidity (Kraler et al., 2025; Poznyak et al., 2022).

The observed baseline risk profile highlights the strategic significance of early detection and ongoing monitoring in community-based prevention programs from the researchers' perspective. Research indicates that individuals classified as borderline or in pre-disease categories constitute a vital target group for preventive interventions, as prompt lifestyle changes and risk factor management can markedly diminish the likelihood of advancing to overt cardiovascular disease (Anthony, 2025; Azami-aghdash et al., 2025). Metabolic indicators, including elevated triglycerides and dysregulated glucose levels, have been identified as predictors of adverse cardiovascular outcomes, even in individuals without established diabetes or clinical coronary disease (Hori et al., 2021; Zahger et al., 2024; Y. Zhang et al., 2023). The baseline cardiovascular risk distribution identified in this study underscores the significance of the SEIRAMA PADAMU program as an effective platform for cardiovascular risk stratification and prevention in older adults within community contexts.

CONCLUSION

The SEIRAMA PADAMU program effectively addressed cardiovascular risk among older adults by successfully retaining participants throughout repeated measurement phases while identifying a substantial baseline burden of cardiovascular risk factors.

Although the clinical complexity regarding medication use and comorbidities was relatively low, the majority of participants displayed elevated or borderline cardiovascular risk profiles, highlighting a discrepancy between the presence of risk and the intensity of treatment provided. The program demonstrated relevance and responsiveness to its objective of early cardiovascular risk detection and monitoring in older adults, affirming its feasibility and significance as a community-based strategy for cardiovascular disease prevention in this demographic.

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Health Research Ethics Committee (No. 195/KEPK/ITSKES-ICME/IX/2024). Given that the study involved older adults as a vulnerable population, special attention was paid to participant safety, autonomy, and confidentiality. All participants received clear and comprehensive information regarding the study objectives, procedures, potential risks, and benefits, and written informed consent was obtained prior to participation. The study was conducted in accordance with ethical principles for medical research involving human subjects.

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