

Preventing Degenerative Diseases Through Screening, Education, and Local Fruit and Vegetable Juices among Older Adults in Paya Tampah Village, Aceh Tamiang, Indonesia

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ABSTRACT

Background: Degenerative diseases represent a major non-communicable disease burden and are associated with ageing, physical inactivity, and unhealthy dietary patterns. In Aceh, their prevalence remains substantial, while remote communities often have limited access to health promotion. Paya Tampah Village, Aceh Tamiang, has abundant local fruits and vegetables but limited community awareness of degenerative disease prevention.

Objective: To improve older adults' health status, knowledge, attitudes, and self-management capacity through point-of-care screening, health education, and practical demonstrations of locally sourced fruit and vegetable juice preparation.

Methods: A descriptive-analytical community engagement programme using a single-group pre-test/post-test design was conducted on 29–30 April 2026 in Paya Tampah Village and Selele Public Health Center, Aceh Tamiang. Thirty older adults with complaints or histories of hypertension, diabetes mellitus, or hyperuricaemia participated. Blood pressure, fasting capillary blood glucose, and serum uric acid were measured, followed by structured education and supervised juice preparation. Knowledge and attitudes were assessed before and after the intervention using a 30-item questionnaire and attitude scale. Data were analysed descriptively using frequencies, percentages, and absolute percentage-point changes.

Results: Screening identified elevated blood pressure in 17 participants (56.7%), fasting blood glucose in 18 (60.0%), and serum uric acid in 17 (56.7%). Before intervention, 10 participants (33.3%) had good knowledge and 15 (50.0%) demonstrated positive attitudes. Following the programme, all participants (100%) achieved good knowledge and positive attitudes, representing improvements of 66.7 and 50.0 percentage points, respectively.

Conclusion: Integrated screening, structured education, and skills-based demonstrations were feasible and associated with substantial short-term improvements in knowledge and attitudes while identifying considerable cardiometabolic risk. Sustained screening, education, and follow-up by primary healthcare providers are recommended.

INTRODUCTION

Degenerative disorders are non-communicable diseases that are closely associated with advancing age. They arise from the progressive and largely physiological decline in the function of cells, tissues and organ systems that accompanies the ageing process [1]. This intrinsic biological susceptibility is compounded by modifiable behavioural exposures, most notably insufficient physical activity and unhealthy dietary patterns, which accelerate the onset and progression of disease [2]. Degenerative conditions impair functional capacity and quality of life and, in a substantial proportion of cases, necessitate repeated outpatient consultations or hospital admission [3]. Although such conditions have conventionally been regarded as disorders of later life, they are increasingly encountered at younger ages; cardiovascular disease, stroke, hypertension, diabetes mellitus and hyperuricaemia are among the most frequently reported entities. The global magnitude of this burden is considerable. Conditions such as hypertension, diabetes mellitus, stroke and ischaemic heart disease are leading contributors to premature mortality worldwide, accounting for approximately 17 million deaths each year [4], [5]. In Indonesia, national risk-factor surveillance conducted in 2018 estimated the overall burden of degenerative disease at 65.7% [6]. A recurrent difficulty in this context is that individuals typically seek health assessment only after symptoms have become manifest, by which stage pathophysiological damage may already be established. Early detection therefore remains a central, and frequently underused, strategy for interrupting disease progression [7]. The burden is unevenly distributed across Indonesia, and Aceh Province records one of the highest reported prevalences of degenerative disease nationally, at approximately 43% [8]. Routine analysis of data from public health centres and the district hospital in Aceh Tamiang Regency indicates a persistent dual burden, in which a high load of communicable disease coexists with a rising incidence of non-communicable conditions, particularly diabetes mellitus and hypertension [9]. Service statistics from Selele Public Health Center

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for 2024 illustrate this pattern clearly: 4,807 visits were recorded for diabetes mellitus, 3,226 for hypertension, 2,126 for hyperuricaemia and 979 for dyslipidaemia [10]. Degenerative diseases are frequently identified only once complications have developed, which contributes directly to excess morbidity and mortality [11]. Although these conditions cannot ordinarily be cured, they can be controlled through sustained modification of lifestyle, including dietary regulation, regular physical activity, adequate consumption of fruit and vegetables, and appropriate pharmacological therapy [12]. Several determinants recur across community studies: limited access to accurate health information, shifts in dietary behaviour associated with rising household income, competing time demands, and the growing popularity of energy-dense convenience foods in the absence of corresponding nutritional literacy [13]. Health education and community outreach represent established and comparatively low-cost means of raising awareness of modifiable risk factors, whether delivered through mass and social media or through printed materials such as brochures, posters and leaflets, supplemented by facilitated lectures and discussion [3], [14]. Previous community engagement studies have demonstrated that structured education can meaningfully improve participants' knowledge and, in several instances, translate into changes in health-related behaviour [15], [16], [17]. Evidence of this kind provides a rationale for delivering preventive interventions at village level, where the reach of formal health services is often constrained.

Paya Tampah is classified as a highly remote village within the catchment area of Selele Public Health Center, Karang Baru Subdistrict, Aceh Tamiang Regency. The village possesses extensive arable land that remains largely unexploited for the cultivation of fruits and vegetables that could contribute to the prevention of degenerative disease. Most residents have completed primary education only, the majority are engaged in rubber and oil palm smallholding, and household economic status is predominantly low to lower-middle. Preliminary observation identified cases of degenerative disease among both older adults and younger residents. Exploratory interviews indicated that community understanding of degenerative disease was rudimentary and that health education activities addressing these conditions had been infrequent, with the consequence that awareness of the role of physical activity and dietary choice in preventing symptomatic recurrence remained low, particularly among older adults.

Most community-based programmes reported to date have relied on didactic education delivered in isolation, without concurrent biomedical assessment or transfer of practical skills. The present initiative was therefore designed on the premise that combining point-of-care screening, structured education and supervised demonstration of juice preparation from locally available produce would be more responsive to community need and more likely to be sustained than education alone. The approach also aligns with the tridharma mandate of Indonesian higher education institutions, under which community engagement constitutes a core academic responsibility. Accordingly, this initiative aimed to improve the health status and self-management capacity of older adults in Paya Tampah Village by detecting elevated blood pressure, blood glucose and serum uric acid, strengthening knowledge and attitudes regarding degenerative disease, and building practical skills in preparing health-promoting juices from locally cultivated fruits and vegetables.

METHODS

Study design and setting

This community engagement initiative employed a descriptive-analytical design incorporating a single-group pre-test/post-test evaluation of participant knowledge and attitude. Activities were conducted over two consecutive days, on 29 and 30 April 2026, at the hall of the village head's office in Paya Tampah Village and at the hall of Selele Public Health Center, Karang Baru Subdistrict, Aceh Tamiang Regency, Aceh Province, Indonesia.

Preparatory phase

Before implementation, the academic team undertook a preparatory site assessment and a series of stakeholder consultations with the village head and health cadres of Paya Tampah, and with the head and staff of Selele Public Health Center. These meetings established the scope of activities, the designation of resource persons, the schedule, the venue and the criteria for participant selection. Both institutions endorsed the programme; the public health center physician agreed to serve as a resource person, and the nursing staff and village midwife agreed to support implementation.

Participants

Thirty older adults were purposively recruited. Eligibility required current complaints or a documented history of at least one degenerative condition of interest, namely hypertension, diabetes mellitus or hyperuricaemia. Recruitment prioritised individuals who also held a community role likely to amplify the reach of the intervention, including village health cadres and members of the family welfare empowerment (PKK) and religious study groups. All invited participants attended both days in full. Educational sessions were delivered by resource persons drawn from Selele Public Health Center and from the academic team of Poltekkes Kemenkes Aceh, Langsa Campus.

Intervention

The programme was delivered over two days. Day one comprised participant registration, point-of-care screening, administration

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of the pre-test, and stratification of participants into three working groups, each containing individuals with hypertension, diabetes mellitus and hyperuricaemia so as to promote peer exchange across conditions. The programme was formally opened by the village head of Paya Tampah in the presence of the head of Selele Public Health Center. Educational sessions on day one addressed the concept of healthy ageing, balanced nutrition for older adults, an overview of degenerative disease, hypertension, and rheumatoid arthritis and hyperuricaemia, and concluded with a supervised demonstration of the preparation of juices intended to support blood pressure reduction. Day two comprised a guided physical exercise session, educational sessions on diabetes mellitus and hyperuricaemia, supervised demonstrations of juice preparation directed at glycaemic and uric acid control, administration of the post-test, a quiz-based reinforcement activity, handover of equipment to the village, and formal closure. Session materials were additionally distributed to participants through a dedicated messaging group to support subsequent review and onward dissemination.

Measurements and instruments

Blood pressure was measured in the seated position after at least five minutes of rest using a calibrated digital sphygmomanometer, and was classified as elevated, normal or low according to prevailing national clinical criteria. Fasting capillary blood glucose and serum uric acid were determined using validated point-of-care testing devices following a fast of at least eight hours, and were similarly classified as elevated, normal or low; total cholesterol was additionally measured in a subset of participants. Knowledge was assessed using a 30-item questionnaire covering degenerative disease, its risk factors and its prevention, completed within 30 minutes and dichotomised as good or insufficient. Attitude towards preventive behaviour was assessed using a structured scale and categorised as positive or negative. Identical instruments were administered before the first educational session and after the final session.

Data analysis

Data were analysed descriptively. Categorical variables were summarised as frequencies and percentages. Change in knowledge and attitude was expressed as the absolute difference in the proportion of participants in each category between the pre-test and the post-test, reported in percentage points. Given the single-group design and the small sample, no inferential hypothesis testing was undertaken, and the findings are presented as descriptive evidence of programme performance rather than as an estimate of causal effect.

Ethical considerations

Formal permission to conduct the activity was obtained from the village head of Paya Tampah and from the head of Selele Public Health Center. All participants received an explanation of the purpose, procedures, potential benefits and risks of the activity, and of their right to decline or withdraw at any point without consequence, and consent was obtained before any measurement was undertaken. Individual results were disclosed only to the participant concerned, and all data were handled in aggregate and anonymised form. Participants found to have markedly abnormal screening results received immediate counselling from the attending clinician and were referred to Selele Public Health Center for further management.

RESULTS

Implementation and preparatory phase

The community engagement programme was implemented in full and in accordance with the agreed protocol. The preparatory phase, comprising site assessment and consultation with the village administration and Selele Public Health Center, is documented in Figure 1. All 30 invited participants attended both days of the programme, and no participant withdrew or was lost to follow-up.



Figure 1. Preparatory site assessment and stakeholder consultation at the office of the village head of Paya Tampah and at Selele Public Health Center

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Screening for blood pressure, blood glucose and serum uric acid

Point-of-care screening conducted at registration on day one revealed a substantial burden of uncontrolled cardiometabolic risk within this group of older adults. As shown in Table 1, 17 of the 30 participants (56.7%) had elevated blood pressure, 12 (40.0%) were normotensive and one (3.3%) recorded a low reading. Elevated fasting blood glucose was the most frequent abnormality, identified in 18 participants (60.0%), with the remaining 12 (40.0%) within the normal range and no participant recording a low value. Elevated serum uric acid was documented in 17 participants (56.7%), while 13 (43.3%) were within the reference range. Taken together, these findings indicate that more than half of the participants met the criteria for at least one abnormal metabolic or haemodynamic parameter at the point of entry into the programme.

Table 1. Blood pressure, fasting blood glucose and serum uric acid of participants in the community engagement programme on the prevention of degenerative diseases, Paya Tampah Village, Karang Baru Subdistrict, Aceh Tamiang Regency, 2026 (n = 30)

No.	Parameter	Category	n	%
1	Blood pressure	Elevated	17	56.7
		Normal	12	40.0
		Low	1	3.3
		Total	30	100.0
2	Fasting blood glucose	Elevated	18	60.0
		Normal	12	40.0
		Low	0	0.0
		Total	30	100.0
3	Serum uric acid	Elevated	17	56.7
		Normal	13	43.3
		Low	0	0.0
		Total	30	100.0

Source: primary data, processed (2026).

Knowledge and attitude before the intervention

Baseline assessment of knowledge and attitude, undertaken immediately after screening and before the first educational session, indicated a considerable preventive knowledge deficit. Only 10 participants (33.3%) demonstrated good knowledge of degenerative disease and its prevention, while 20 (66.7%) were classified as having insufficient knowledge (Table 2). Attitude towards preventive behaviour was evenly divided at baseline, with 15 participants (50.0%) expressing a positive attitude and 15 (50.0%) a negative attitude (Table 3).

Table 2. Level of knowledge regarding degenerative disease and its prevention before and after the intervention (n = 30)

Level of knowledge	Before the intervention		After the intervention	
	n	%	n	%
Good	10	33.3	30	100.0
Insufficient	20	66.7	0	0.0
Total	30	100.0	30	100.0

Source: primary data, processed (2026).

Table 3. Attitude towards the prevention of degenerative disease before and after the intervention (n = 30)

Attitude	Before the intervention		After the intervention	
	n	%	n	%
Positive	15	50.0	30	100.0
Negative	15	50.0	0	0.0
Total	30	100.0	30	100.0

Source: primary data, processed (2026).

Delivery of the educational and demonstration sessions

The programme was formally opened in the presence of the academic team, the village head, the head of Selele Public Health Center and the head of its administrative unit, the participants and the supporting personnel. Registration, pre-testing and screening proceeded without interruption (Figure 2). Educational delivery combined lecture, facilitated discussion and practical demonstration, and proceeded according to the planned schedule on both days (Figures 3 and 4). Participant engagement was high throughout: attention during sessions was sustained, questions continued beyond the time allocated for discussion, and participation in the juice

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preparation demonstrations was active, with participants preparing and consuming the juices in full.



Figure 2. Participant registration, administration of the pre-test, and measurement of blood pressure, serum uric acid, blood glucose and, in selected participants, total cholesterol



Figure 3. Delivery of educational sessions on day one, covering the concept of healthy ageing, rheumatoid arthritis and hyperuricaemia, together with the supervised juice preparation demonstration



Figure 4. Delivery of sessions on day two, comprising guided physical exercise, nutrition for older adults, diabetes mellitus, and the supervised juice preparation demonstration

Knowledge and attitude after the intervention

Reassessment following the final educational session demonstrated a marked improvement in both outcomes. All 30 participants (100%) achieved a good level of knowledge at post-test, compared with 10 (33.3%) at baseline, corresponding to an absolute increase of 66.7 percentage points and the elimination of the insufficient-knowledge category (Table 2). A parallel change was observed for attitude: all 30 participants (100%) expressed a positive attitude at post-test, compared with 15 (50.0%) at baseline, an absolute increase of 50.0 percentage points (Table 3).

The closing session proceeded as planned and comprised participant reflections on the programme, handover of equipment to the village, and closing remarks by the lead of the academic team and the village head of Paya Tampah, followed by a group photograph (Figure 5). Implementation was made possible through the combined support of Poltekkes Kemenkes Aceh, the village administration of Paya Tampah, and the head and staff of Selele Public Health Center together with the village midwife.

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Figure 5. Closing session, handover of equipment to the village, and group photograph with participants and stakeholders

DISCUSSION

This community engagement initiative yielded two principal findings. First, systematic point-of-care screening detected a high burden of elevated blood pressure, fasting blood glucose and serum uric acid among older adults in a remote village setting, with each abnormality present in more than half of the participants. Second, a two-day package combining screening, structured education and supervised demonstration of juice preparation was associated with substantial short-term gains in both knowledge and attitude, with all participants reaching the good-knowledge and positive-attitude categories at post-test.

The screening results are consistent with the epidemiological profile of the catchment area and with provincial surveillance data. Service statistics from Selele Public Health Center for 2024 documented several thousand visits for diabetes mellitus and hypertension and more than two thousand for hyperuricaemia [10], while Aceh Province has been reported to have one of the highest prevalences of degenerative disease in Indonesia [8]. The proportions observed here should not be interpreted as population prevalence estimates, since participants were purposively selected on the basis of existing complaints or known disease. They are nonetheless informative in a different respect: a majority of individuals already in contact with the health system, or already aware of their diagnosis, presented with values outside the reference range. This pattern is consistent with the well-documented tendency for health assessment to be sought only after symptoms emerge, rather than as part of routine preventive practice [7], and it underlines the value of bringing measurement directly into the village setting. The referral of participants with markedly abnormal results to Selele Public Health Center represents a concrete and immediate output of the activity, independent of any educational effect.

The improvement in knowledge observed after the intervention is congruent with the broader community engagement literature, in which structured education delivered to older adults has repeatedly been shown to raise knowledge of degenerative disease and its prevention [1], [15], [16], [17]. Several features of the present programme are likely to have contributed to the magnitude of the change. Content was delivered by clinicians already known to the community, which is likely to have enhanced perceived credibility; sessions combined didactic presentation with facilitated discussion and a quiz-based reinforcement activity; and educational materials were distributed through a messaging group, allowing review after the sessions had concluded. The parallel shift in attitude is also consistent with prior reports that the provision of health information can alter not only what participants know but how they appraise preventive behaviour [15], [16]. Importantly, however, knowledge and attitude are intermediate outcomes. Their improvement is a necessary but not sufficient condition for sustained behaviour change, and the present design cannot establish whether the observed gains translated into altered dietary or activity patterns, still less into improved blood pressure, glycaemic or uric acid control.

A distinguishing feature of this initiative was the integration of a practical, skills-based component grounded in locally available produce. Rather than limiting guidance to generic dietary advice, participants prepared and consumed juices under supervision, using fruits and vegetables that can be cultivated on land already available within the village. The rationale for the specific preparations demonstrated is supported by a body of small-scale Indonesian intervention research: cucumber and papaya juice have been associated with reductions in blood pressure among individuals with hypertension [18], [19]; bitter melon and dragon fruit juice with reductions in blood glucose among individuals with type 2 diabetes mellitus [20], [21]; and pineapple and soursop juice with reductions in serum uric acid among older adults [22], [23], [24]. Other locally accessible plant materials, including banana stem, have likewise attracted attention for their nutritional properties [25]. This evidence base consists largely of small, short-duration studies with heterogeneous methodology, and the demonstrations were therefore framed to participants as a complement to prescribed therapy and established dietary modification rather than as a substitute for either. Situating the practical component within locally available resources nonetheless addresses a recurrent barrier to dietary change in low-income rural settings, namely the cost and availability of recommended foods, and aligns the intervention with the principle of drawing on local wisdom and existing agricultural capacity.

The selection of participants merits comment as a design feature rather than an incidental characteristic. By prioritising health cadres and members of the PKK and religious study groups, the programme targeted individuals occupying established positions within

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existing community networks. This creates a plausible pathway for onward dissemination of both knowledge and practical skills beyond the 30 direct participants, an approach consistent with cadre-based models of health promotion that are already embedded within the Indonesian primary care system. Whether such secondary diffusion occurred was not measured and would require dedicated follow-up assessment.

Several limitations should be acknowledged when interpreting these findings. The single-group pre-test/post-test design, without a comparison group, does not permit attribution of the observed changes to the intervention alone; testing effects, social desirability and the immediate proximity of the post-test to the educational sessions may all have contributed. The post-test was administered directly after the final session, so the durability of the observed gains is unknown. The sample was small and purposively selected from a single village, which limits generalisability. Knowledge and attitude instruments were locally developed and their psychometric properties were not formally established. Biomedical parameters were measured on a single occasion using point-of-care devices and were not repeated after the intervention, so no statement can be made about physiological effect. Finally, dietary intake, physical activity and medication adherence were not quantified. Future iterations would be strengthened by the addition of a follow-up assessment at three and six months, repeat biochemical measurement, validated instruments, and documentation of whether participants subsequently cultivated and consumed the produce demonstrated.

Notwithstanding these constraints, the initiative demonstrates that an integrated screening, education and skills-transfer package can be delivered feasibly and at modest cost in a remote village, through collaboration between an academic institution, the village administration and the local public health center. The model is readily replicable in comparable settings, and its sustainability depends primarily on the continued involvement of the public health center and the village midwife in periodic monitoring of older residents.

CONCLUSION

Point-of-care screening among 30 older adults in Paya Tampah Village identified elevated blood pressure in 56.7%, elevated fasting blood glucose in 60.0% and elevated serum uric acid in 56.7% of participants, confirming a substantial and largely uncontrolled burden of degenerative disease within this community. Before the intervention, 66.7% of participants had insufficient knowledge of degenerative disease and its prevention and half held a negative attitude towards preventive behaviour. Following a two-day programme combining screening, structured education and supervised preparation of juices from locally available fruits and vegetables, all participants achieved a good level of knowledge and a positive attitude, representing absolute gains of 66.7 and 50.0 percentage points respectively.

These findings support the continuation and expansion of combined screening and education activities as an accessible strategy for the early prevention of degenerative disease in remote village settings. Selele Public Health Center and the village midwife are encouraged to sustain routine monthly monitoring and evaluation of the health status of older residents, with structured referral for those identified as having abnormal results. Continued collaboration between Poltekkes Kemenkes Aceh and the village of Paya Tampah in subsequent years is recommended, with future activities extended to include family members and carers of older adults alongside older adults themselves. Participants, in particular health cadres, are encouraged to disseminate the knowledge and skills acquired within their immediate communities and to remain engaged with the programmes offered by the public health center. Subsequent evaluation should incorporate longer-term follow-up of knowledge retention, behavioural change and biochemical parameters in order to establish whether the short-term gains reported here are sustained.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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