

# Community-Based Health Screening and Education for the Elderly in Nagari Batagak: Strengthening Healthy Aging and Disaster Preparedness in Support of the SDGs

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## Abstract

In rural areas of Indonesia, such as Nagari Batagak, West Sumatra, limited access to health services emphasizes the need for promotive and preventive interventions. The program aims to increase awareness of regular health check-ups and the prevention of degenerative diseases. The program method was implemented on June 16, 2025, involving 35 elderly people aged 60–80 years in Jorong Sawah Liek, Nagari Batagak, Agam Regency, West Sumatra. Activities included basic health checks (blood pressure, blood sugar, Body Mass Index, mid-upper arm circumference), nutritional screening (MNA), sarcopenia screening (SARC-F and handgrip strength), and cognitive screening (MMSE). Health education was provided on healthy aging, nutrition, rational drug use, and sarcopenia prevention. Data analysis was conducted using frequency distribution, univariate, and bivariate analyses. The results showed that the majority of participants were aged 60–70 years (71.4%) and female (82.9%). Obesity was not significantly associated with blood pressure, blood sugar, cholesterol, or uric acid levels. However, older adults without obesity remain at risk for hypertension, diabetes, hypercholesterolemia, and hyperuricemia. Handgrip strength testing showed that 56% of participants experienced muscle weakness, with a slightly higher prevalence in men (60%) than in women (55%). These findings indicate a high risk of sarcopenia, which increases susceptibility to mobility limitations and the risk of falls. Therefore, community-based health screening and education are important regardless of obesity status.

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## Keywords

Community Health Programs, Disease Prevention, Elderly, Grip Strength, Sarcopenia.



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## 1. INTRODUCTION

Indonesia is entering a demographic transition era, marked by a significant increase in the number of elderly people. According to data from the Central Statistics Agency (BPS) in 2024, the elderly population has reached more than 12% of the total population. This situation presents a unique

challenge, particularly in a healthcare system that is not yet fully prepared to address the complexity of geriatric health issues, particularly in rural areas (Central Statistics Agency of the Republic of Indonesia, 2024). However, the increasing number of elderly people is not accompanied by the readiness of the health system to optimally handle geriatric health problems, especially in rural areas that have limited health facilities and trained medical personnel (Meidiansyah, nd).

Nagari Batagak is an area in Agam Regency, West Sumatra, with a relatively high population of elderly people. Elderly people in this area face various health challenges, particularly those related to malnutrition, sarcopenia, hypertension, diabetes, stroke, and cognitive disorders such as dementia. Limited access to healthcare means many elderly people do not receive routine health screenings, often only detecting their illnesses when they are already in an advanced stage.

Furthermore, Nagari Batagak is located at the foot of Mount Marapi, one of Indonesia's most active volcanoes. This geographical location makes the village prone to natural disasters, such as volcanic eruptions, earthquakes, and landslides. In emergency situations, the elderly are among the most vulnerable due to limited mobility and often relying on others for evacuation (Bogdan et al., 2024);(Liao & Hu, 2025). However, the elderly's level of preparedness in facing disasters is still very low, especially in terms of understanding disaster mitigation steps and preparing a "Disaster Preparedness Bag" containing essential equipment in emergency situations.

To address these challenges, integrated, community-based interventions are needed, including health education, basic health checks, early detection of nutritional and muscle strength issues, and disaster preparedness training for the elderly. Therefore, the Medical Study Program, Faculty of Medicine, Padang State University (UNP), initiated the development of "Geriatrics Class: Education and Basic Health Checks for the Elderly," as part of the Study Program and Village Integration Program (PIP).

## **2. METHODS**

This community service activity uses a community-based program design with a participatory approach. Implementation took place on June 16, 2025, in Jorong Sawah Liek, Nagari Batagak, Agam Regency, West Sumatra. Participants were elderly people aged  $\geq 60$  years who lived in Nagari Batagak and were willing to participate in health checks and education. Of the total 96 people who attended, only 35 elderly people met the inclusion criteria (aged  $\geq 60$  years, able to complete the examination). Data were analyzed specifically for the elderly group. The inclusion criteria were elderly people aged  $\geq 60$  years, domiciled in Jorong Sawah Liek, able to communicate well, and willing to participate. Meanwhile, the exclusion criteria were elderly people with acute conditions (such as severe stroke) that prevented them from participating in the examination. This activity is expected to increase awareness of the elderly and their families regarding the importance of regular check-ups and proper health management, as well as establish a sustainable support system through local cadres who are trained and accompanied by professional health workers.

This activity consists of three stages: Preparation, Implementation, and Evaluation. The first stage is the preparation stage, which aims to ensure the readiness of the program implementation by conducting coordination, recruiting health cadres, and developing educational materials and health screening tools. Coordination with the Village Government and Community Health Centers was carried out to obtain full support from stakeholders and identify target groups for the elderly based on population data and their health history. In addition, recruitment of elderly health cadres from the local community was carried out, who will later play a role in ongoing mentoring and education. At this stage, an elderly health education module was also developed, covering the concept of healthy aging, safe medication use, and diet and physical activity to prevent malnutrition and sarcopenia. Furthermore, a disaster preparedness guidebook for the elderly was also prepared, namely the preparation of the "Disaster Preparedness Bag". To support health screening, the procurement and calibration of examination tools are carried out, including tensiometers, glucometers, Body Mass Index (BMI) measuring tools, handgrip strength testing tools, Muscle Mass Assessment (MMA) for evaluating

muscle mass, as well as screening questionnaires such as the Mini Nutritional Assessment (MNA), SARC-F Questionnaire, and Mini-Mental State Examination (MMSE).

The second stage is the implementation stage, which consists of four main activities: basic health checks and screening for the elderly, geriatric health education, disaster preparedness training, and the formation and mentoring of elderly health cadres. The activities carried out include several stages. First, initial outreach and coordination with village officials and community health centers (*Puskesmas*) to reach the elderly and their families. Second, elderly health checks include blood pressure, blood sugar, Body Mass Index (BMI), mid-upper arm circumference (MUAC), malnutrition screening with MNA, sarcopenia screening with SARC-F and handgrip strength, and cognitive screening with MMSE. Third, health education is carried out with materials on healthy aging and a balanced lifestyle, rational use of drugs, elderly nutrition, and sarcopenia prevention. Fourth, elderly health cadres are also assisted in examining and monitoring the health conditions of the elderly. This activity is carried out by a committee consisting of lecturers, educational staff, and students from the Faculty of Medicine, Padang State University.

The third stage of this activity is the evaluation phase. After the entire implementation process is completed, an evaluation of the program's impact is conducted. Evaluation of program effectiveness is conducted through observation and interviews to assess changes in behavior and habits of the elderly in maintaining their health. In addition, the evaluation phase also measured the relationship between body mass index (BMI), blood pressure, and the biochemical profile of the elderly in Nagari Batagak. Data were analyzed using frequency distribution to describe participant characteristics, univariate analysis for health examinations, and bivariate tests (Chi-Square and Odds Ratio with 95% CI) to assess the relationship between obesity and blood pressure and biochemical profiles. The analysis was also supplemented with multivariate logistic regression to assess risk factors for hypertension.

### 3. FINDINGS AND DISCUSSION

The community service program in Nagari Batagak began with health education for the elderly, covering the concept of healthy aging, safe medication use, and diet and physical activity to prevent malnutrition and sarcopenia. This education is an effort to change community behavior through an educational approach, carried out through a series of active activities involving individuals, groups, and communities in order to solve problems faced by the community (Gama et al., 2025). Education was delivered by a resource person with the assistance of the Head of the Community Health Center, then continued with an interactive question and answer session with participants.

After that, a health check was conducted for the elderly, which included measuring blood pressure, blood sugar, Body Mass Index (BMI), mid-upper arm circumference (MUAC), malnutrition screening using the Mini Nutritional Assessment (MNA), sarcopenia screening using the SARC-F and handgrip strength instruments, and cognitive screening using the Mini-Mental State Examination (MMSE). In addition, participants also received a disaster preparedness guidebook for the elderly, which was used in evacuation simulations and the preparation of "Disaster Preparedness Bags." This series of activities is documented as shown in Figure 1.



Figure 1. Implementation of elderly health education activities and health checks

Ninety-six people participated in this community service activity, but after data cleaning based on inclusion criteria, only 35 elderly people aged  $\geq 60$  years were analyzed further. The majority of respondents were in the 60–70 age group (71.4%), followed by those aged 70–80 years (22.9%), and those aged  $>80$  years (5.7%). Based on gender, the majority of respondents were female (82.9%). These findings indicate that respondents in this study were predominantly in the early elderly age group and female, as can be seen in Table 1.

Table 1. Demographic Data

| Category        | Frequency | Percentage |
|-----------------|-----------|------------|
| <b>Age</b>      |           |            |
| 60-70 years old | 25        | 71.4       |
| 70-80           | 8         | 22.9       |
| $>80$ th        | 2         | 5.7        |
| <b>Gender</b>   |           |            |
| Man             | 6         | 17.1       |
| Woman           | 29        | 82.9       |

The evaluation results included demographic data and an analysis of the relationship between elderly health checks, including Body Mass Index (BMI), blood pressure, and biochemical profiles. Muscle strength was also assessed by gender.

Based on haBased on the results of health checks on the elderly in Nagari Batagak, data on the frequency of body mass index, systolic and diastolic blood pressure, blood sugar, uric acid, and cholesterol were obtained from participants as in Table 2.

**Table 2.** Frequency of BMI, Systolic and Diastolic Blood Pressure, Blood Sugar, Uric Acid, and Cholesterol in the Elderly in Nagari Batagak

| Variables                | Category          | Frequency | Percentage (%) |
|--------------------------|-------------------|-----------|----------------|
| Body Mass Index          | Normal            | 16        | 45.7           |
|                          | Overweight        | 9         | 25.7           |
|                          | Obesity I         | 3         | 8.6            |
|                          | Obesity II        | 7         | 20             |
| Systolic Blood Pressure  | Normal            | 9         | 25.7           |
|                          | Prehypertension   | 10        | 28.6           |
|                          | Hypertension St.1 | 12        | 34.3           |
|                          | Hypertension St.2 | 4         | 11.4           |
| Diastolic Blood Pressure | Normal            | 21        | 60             |
|                          | Prehypertension   | 8         | 22.9           |
|                          | Hypertension St.1 | 6         | 17.1           |
| Blood sugar              | Normal            | 26        | 74.3           |
|                          | Prediabetes       | 3         | 8.6            |
|                          | Diabetes          | 6         | 17.1           |
| Gout                     | Normal            | 28        | 80             |
|                          | Hyperuricemia     | 5         | 14.3           |
|                          | Low               | 2         | 5.7            |
| Cholesterol              | Normal            | 15        | 42.9           |
|                          | Borderline High   | 12        | 34.3           |
|                          | High              | 8         | 22.9           |

Based on table 2 above, the results of the nutritional status examination show that 45.7% of the elderly are in the normal BMI category, while 25.7% are overweight, 20.0% are obese II, and 8.6% are obese I. The distribution of blood pressure shows that 34.3% of the elderly have stage 1 hypertension, 28.6% prehypertension, 25.7% normal, and 11.4% stage 2 hypertension. Blood sugar examination shows that 74.3% are normal, 8.6% prediabetes, and 17.1% diabetes. In the cholesterol examination, 42.9% are in the normal category, 34.3% borderline high, and 22.9% high. Meanwhile, 14.3% of respondents have hyperuricemia. These findings illustrate that although the majority of respondents are in normal conditions for several parameters, there is still a fairly large proportion at risk of hypertension, diabetes, hyperuricemia, and hypercholesterolemia.



Figure 2. Committee of lecturers, educational staff, and students of the Faculty of Medicine, Padang State University.

Bivariate analysis showed no significant association between obesity and hypertension, blood sugar, cholesterol, or uric acid levels ( $p > 0.05$ ). Similarly, multivariate analysis showed that BMI, age,

gender, blood sugar, cholesterol, and uric acid were not significantly associated with hypertension (Table 3).

**Table 3.** The Relationship Between Body Mass Index and Blood Pressure and Biochemical Profile of the Elderly in Nagari Batagak

| Variables                | BMI Category | No Cases n (%) | Case n (%) | p-value | OR    | CI 95%         |
|--------------------------|--------------|----------------|------------|---------|-------|----------------|
| Systolic Blood Pressure  | Not Obese    | 14 (74%)       | 11 (69%)   | 0.748   | 1,273 | 0.293 – 5.534  |
|                          | Obesity      | 5 (26%)        | 5 (31%)    |         |       |                |
|                          | Total        | 19 (100%)      | 16 (100%)  |         |       |                |
| Diastolic Blood Pressure | Not Obese    | 21 (72%)       | 4 (67%)    | 0.777   | 1,313 | 0.200 – 8.624  |
|                          | Obesity      | 8 (28%)        | 2 (33%)    |         |       |                |
|                          | Total        | 29 (100%)      | 6 (100%)   |         |       |                |
| Blood sugar              | Not Obese    | 18 (69%)       | 7 (78%)    | 0.625   | 0.643 | 0.109 – 3.806  |
|                          | Obesity      | 8 (31%)        | 2 (22%)    |         |       |                |
|                          | Total        | 26 (100%)      | 9 (100%)   |         |       |                |
| Cholesterol              | Not Obese    | 12 (80%)       | 13 (65%)   | 0.331   | 2,154 | 0.451 – 10.287 |
|                          | Obesity      | 3 (20%)        | 7 (35%)    |         |       |                |
|                          | Total        | 15 (100%)      | 20 (100%)  |         |       |                |
| Gout                     | Not Obese    | 20 (71%)       | 5 (71%)    | 1       | 1     | 0.160 – 6.255  |
|                          | Obesity      | 8 (29%)        | 2 (29%)    |         |       |                |
|                          | Total        | 28 (100%)      | 7 (100%)   |         |       |                |

The study results showed that although most elderly people had a normal BMI, the proportion of hypertension (34.3%), diabetes (17.1%), dyslipidemia (22.9%), and hyperuricemia (14.3%) remained quite high. This is in line with the report by Rahajeng & Tuminah (2009) which confirmed that hypertension is a major health problem for elderly people in Indonesia, as well as global findings that degenerative diseases in elderly people are multifactorial (Whelton et al., 2018; Franklin et al., 2020). Age, hormonal changes, and a less active lifestyle also contribute to the risk of cardiometabolic disease (Grassi et al., 2021; Li et al., 2020).

Furthermore, handgrip strength tests on 25 elderly people showed that 56% experienced muscle weakness, with a higher prevalence in men (60%) than women (55%). This indicates a relatively high risk of sarcopenia in the elderly community in Nagari Batagak. The results of this examination can be seen in table 4.

**Table 4.** Distribution of Average Handgrip Strength in the Elderly by Gender (Age ≥60 years)

| Gender       | Weak (n) | Normal (n) | Total (n) | Weak (%) | Normal (%) |
|--------------|----------|------------|-----------|----------|------------|
| <b>Man</b>   | 3        | 2          | 5         | 60.0%    | 40.0%      |
| <b>Woman</b> | 11       | 9          | 20        | 55.0%    | 45.0%      |
| <b>Total</b> | 14       | 11         | 25        | 56.0%    | 44.0%      |

These results indicate that muscle weakness (low muscle strength) is a dominant problem in the elderly population, both men and women. Interestingly, the proportion of muscle weakness is higher in men (60%) than in women (55%), despite physiologically men typically having greater muscle mass. This may be influenced by aging, the presence of chronic diseases, and low physical activity in the elderly population.

The finding of muscle weakness in more than half of respondents (56%) strengthens the evidence of the risk of sarcopenia. The Asian Working Group for Sarcopenia (2019) emphasized that muscle weakness is a key indicator of sarcopenia, which is associated with an increased risk of falls and

decreased physical function. Meanwhile, the consensus of the European Working Group on Sarcopenia (2019) also indicates that handgrip strength is a simple and effective tool for detecting sarcopenia. Research by Yu et al. (2016) supports that sarcopenia is common in older Asians, especially when there is inadequate nutritional intake. Interestingly, the proportion of muscle weakness was higher in men (60%) than in women (55%). This condition is consistent with the findings of Sandberg & Ji (2012) who stated that gender differences can influence the risk of hypertension and decreased muscle function, even though physiologically men usually have greater muscle mass. This can be caused by chronic diseases, low physical activity, and an unhealthy lifestyle.

Furthermore, the context of Nagari Batagak as a disaster-prone area makes these screening results have broader practical significance. Studies by Bogdan et al. (2024) and Liao & Hu (2025) emphasize the importance of disaster preparedness for elderly people with physical limitations. Therefore, elderly health programs in Nagari Batagak need to be integrated with disaster preparedness education and evacuation simulations.

Application of Science in Education and Health Check-ups for the Elderly This activity is based on the principles of evidence-based medicine (EBM), which refers to the latest medical guidelines in providing education and conducting health check-ups for the elderly. The educational materials provided to participants refer to several international standards, such as the WHO on Healthy Aging, (WHO, 2023) related to drug management in the elderly (Bogdan et al., 2024), as well as Geriatric Service Guidelines (Ministry of Health of the Republic of Indonesia, 2020). In terms of health screening, this program uses a multifactorial screening method based on medical science to detect early risk factors for degenerative diseases and common conditions frequently experienced by the elderly.

The practical implication of these findings is the need to strengthen the elderly community health posts (*Posyandu*) as a means of routine health screening, including blood pressure, blood sugar, cholesterol, and uric acid levels, as well as muscle strength assessments using handgrip strength. Furthermore, interventions such as simple resistance-based physical exercise (such as elderly gymnastics and the use of resistance bands) and education on high-protein nutrition are crucial for preventing sarcopenia. Health cadres can play a role in daily support for the elderly, particularly in monitoring nutritional status and the rational use of herbal or medical medications.

Furthermore, given that Nagari Batagak is a disaster-prone area, integrating elderly health programs with disaster preparedness is essential. Elderly individuals with physical frailties are at higher risk during a disaster, making evacuation simulation training and the development of Disaster Preparedness Bags for the elderly crucial strategies for reducing the vulnerability of this age group. Overall, these findings and discussion demonstrate the need for a multidimensional approach to maintaining elderly health, encompassing medical, nutritional, physical activity, social, and environmental preparedness aspects.

Technological advances in the healthcare sector have enabled more effective and efficient examinations and education for the elderly. This program leverages medical technology through the use of portable examination tools, such as digital blood pressure monitors and glucometers. Furthermore, digital media is used to support health education, such as interactive educational videos accessible to the elderly through social media and community WhatsApp groups, as well as digital infographics designed for ease of understanding by the elderly.

#### 4. CONCLUSION

The Geriatric Class Program in Nagari Batagak found that many elderly people experience hypertension, diabetes, high cholesterol, and gout, even though most had a normal BMI. More than half of the elderly also experienced muscle weakness based on handgrip examinations, indicating a risk of sarcopenia. These results indicate that elderly health needs to be addressed holistically, not only in terms of weight but also muscle strength, diet, and physical activity. Therefore, routine screening at elderly health posts (*Posyandu*), training of health cadres, education on high-protein nutrition, simple

physical exercise, and disaster preparedness are needed. These efforts are crucial for maintaining independence and improving the quality of life for elderly people in rural areas.

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