



Self-Reported Physical Activity, Dietary Habits, and Perceived Physical Fitness in Rural Indonesian Older Adults

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ABSTRACT

This study described self-reported physical activity, dietary habits, and perceived physical fitness among older adults and examined their associations. A cross-sectional correlational survey involved 30 purposively sampled older adults aged ≥ 60 years (mean 70.0 ± 7.4 years) in Nagari Gurun Panjang Utara, Pesisir Selatan Regency, West Sumatra. Data were collected using a researcher-developed five-point Likert questionnaire (five items per variable); no objective dietary or fitness measurements were taken. Items were valid and reliable (Cronbach's $\alpha = 0.92-0.96$). Spearman's rank correlation was used for non-normal data. Physical activity was mostly moderate (80.0%; mean = 3.17; SD = 0.50), dietary habits mostly less balanced (43.3%; mean = 2.79; SD = 1.06), and perceived physical fitness mostly poor (43.3%; mean = 2.93; SD = 1.24). Dietary habits were strongly and positively associated with perceived physical fitness ($\rho = 0.800$; $p < 0.001$), which should be interpreted with caution because both were self-reported in a small sample. Physical activity was not significantly associated with perceived physical fitness ($\rho = 0.092$; $p = 0.628$) or dietary habits ($\rho = 0.041$; $p = 0.829$). Causal relationships cannot be inferred. Community programs may combine nutrition support with structured physical activity, but their effectiveness was not tested.

Keywords: physical activity, dietary habits, perceived physical fitness, older adults, correlational study



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INTRODUCTION

Older adults are individuals aged 60 years or older (Wardhani & Salim, 2024). Globally, one in six people will be aged 60 years or older by 2030, and the number of people in this age group is projected to rise from 1.4 billion in 2030 to 2.1

billion in 2050 (World Health Organization, 2024). In Indonesia, the proportion of older adults increased from 8.43% in 2015 to 12.00% in 2024 (Badan Pusat Statistik, 2024) and is projected to reach 20.31% of the population, or approximately 65.8 million people, by 2045 (Badan Pusat Statistik, 2023). Aging is accompanied by gradual physiological, psychological, and social changes, including declines in cardiovascular, musculoskeletal, immune, and cognitive functions, which increase vulnerability to degenerative and chronic diseases (Sumarni, 2025). Reduced muscle mass, decreased bone density, and weakened metabolic capacity further contribute to declining physical fitness, which limits older adults' independence in daily activities.

Physical activity is one of the main modifiable factors related to physical fitness in later life. Regular exercise is associated with slower loss of muscle mass, maintained bone density, and better metabolic capacity (Dalle Carbonare et al., 2023). Aerobic activities such as walking and leisurely cycling are linked to better cardiorespiratory fitness and a lower risk of chronic diseases (Madden et al., 2026); resistance training helps maintain muscle mass and prevent sarcopenia (H. Zhao et al., 2022); and mind-body exercises such as tai chi improve physical function in older adults with sarcopenia and frailty (Zhou et al., 2026). Physical activity interventions have also been shown to improve physical function even among older persons with limited mobility (van Garderen et al., 2026; Jain et al., 2026). In Indonesia, such activities are commonly practiced through senior exercise classes (senam lansia) and morning exercise groups. Conversely, low physical activity is a major risk factor for obesity, type 2 diabetes, and cardiovascular disorders, while adequate activity supports functional capacity and well-being (An et al., 2020; Huang et al., 2020).

Physical activity in older adults also requires adequate nutritional support, particularly protein, vitamins, and minerals, to maintain muscle tissue, bone density, and energy metabolism (SiMa et al., 2026; Booth et al., 2026). Systematic evidence shows that exercise-based interventions consistently improve muscle strength, walking speed, and frailty status, whereas nutritional supplementation alone yields limited and inconsistent benefits; combining exercise with protein or vitamin D supplementation produces greater improvements than single interventions (Kim et

al., 2026; Lin et al., 2026; Zhang & Nan, 2026). Network meta-analyses further indicate that multicomponent programs integrating exercise and nutrition are the most effective in reducing frailty (Yang et al., 2026), and recent reviews describe diet and physical activity as complementary determinants of healthy aging (Sołtysik, 2026).

However, most of this evidence comes from intervention trials and meta-analyses conducted in clinical populations or high-income countries, which test whether exercise, nutrition, or both change outcomes in selected participants. Community-based data describing the self-reported physical activity, dietary habits, and perceived physical fitness of older adults living in Indonesian villages, and how these variables are related to one another, remain limited. Such data are needed as a basis for designing locally relevant health programs for older adults.

This study differs from the studies cited above in three ways. First, rather than testing an intervention, it provides an observational, community-level baseline for independently living older adults in a rural village, where daily activity may come mainly from farming and household work rather than from structured exercise. Second, it examines physical activity, dietary habits, and perceived physical fitness simultaneously in the same respondents. This matters because exercise and nutrition are described as complementary determinants of healthy aging and are combined in multicomponent programs (Moradell et al., 2025; Sołtysik, 2026; Yang et al., 2026); whether the two actually go together in a given community, and which of them is more closely associated with fitness, determines whether a program can address them jointly or must target each separately. Third, the variables are explicitly operationalized as self-reported behaviors and perceptions measured with a short field questionnaire that is feasible for older adults with limited literacy, so the findings are interpreted as associations among self-reported indicators rather than as objective nutrient intake or fitness performance.

Therefore, this study aimed to (1) describe the levels of self-reported physical activity, dietary habits, and perceived physical fitness among older adults in Gurun Panjang Utara Village, and (2) examine the associations among these three variables. The findings are intended as a baseline for planning locally relevant programs and for generating hypotheses for future studies with stronger designs.

METHOD

Research Design

This study employed a quantitative descriptive correlational design with a cross-sectional survey approach. Data were collected at a single point in time in Gurun Panjang Utara Village, Bayang District, Pesisir Selatan Regency, West Sumatra Province, Indonesia, in August 2026.

Population and Sample

The population comprised all older adults aged ≥ 60 years residing in Gurun Panjang Utara Village, totaling 489 people based on village records. A total of 30 respondents were selected using purposive sampling. The sample size was based on the minimum of 30 participants commonly recommended for correlational studies (Fraenkel et al., 2012); with $n = 30$, $\alpha = 0.05$ (two-tailed), and a power of 0.80, the study could detect correlations of approximately $r \geq 0.50$, so smaller associations may not have reached significance. This technique was chosen because the study required respondents who were able to understand and respond to the questionnaire and who were still engaged in daily activities, so that information on physical activity, dietary habits, and perceived fitness could be reported reliably. The inclusion criteria were: (a) aged ≥ 60 years; (b) residing in Gurun Panjang Utara Village; (c) able to perform daily activities independently; (d) able to communicate verbally and understand the questionnaire items; and (e) willing to participate by signing an informed consent form. The exclusion criteria were: (a) having an acute illness or injury that prevented participation at the time of data collection; (b) having cognitive or hearing impairment that hindered understanding of the questionnaire; and (c) being bedridden or dependent on others for daily activities. The characteristics of the respondents are presented in Table 1.

Research Instrument

Data were collected using a closed-ended questionnaire developed by the researchers with reference to the Physical Activity Scale for the Elderly (PASE) for physical activity (Washburn et al., 1993), the Mini Nutritional Assessment (MNA) for dietary habits (Guigoz et al., 1996), and the International Fitness Scale (IFIS), which has been validated for older adults, for perceived physical fitness (Merellano-Navarro et al., 2017). Each variable was measured with five items rated on a five-point Likert scale (1 = very poor/never to 5 = very good/always). The physical

activity indicators were frequency, duration, and intensity of activity, participation in exercise (e.g., senam lansia or walking), and involvement in household or occupational activities. The dietary habit indicators were meal frequency, consumption of protein sources, consumption of vegetables and fruits, fluid intake, and dietary variety. The perceived physical fitness indicators were cardiorespiratory endurance, muscle strength, flexibility, balance, and the ability to perform daily activities without excessive fatigue.

The questionnaire is a short, researcher-developed form and not a translated or standardized version of the PASE, MNA, or IFIS; these instruments served as conceptual references. Indicators were selected from the domains that each instrument covers (for the PASE: frequency, intensity, exercise, and household and occupational activity; for the MNA: meal frequency, protein, vegetable and fruit, and fluid intake; for the IFIS: self-rated cardiorespiratory fitness, muscular strength, and flexibility), and one item was written for each indicator and rated on the five-point scale. Items on balance and on the ability to perform daily activities were added to the fitness scale because they are central to physical function in later life but are not part of the IFIS. Each scale was limited to five items to keep the face-to-face interview short for older respondents. Expert (content) validation of the items was not conducted; item quality was assessed only empirically, as described below.

Because the questionnaire measured self-reported behavior and perceptions, the variables were operationally defined as follows. Physical activity refers to self-reported activity, not activity measured objectively with a pedometer or accelerometer. Dietary habits (used here as an indicator of nutritional intake) refer to self-reported frequency and variety of food consumption, not quantitative nutrient intake assessed through food recall, food records, or biochemical measures. Perceived physical fitness refers to the respondent's self-assessed physical fitness, not objective physical fitness measured through performance tests. No objective dietary or fitness measurements were taken in this study.

Item validity was tested using corrected item-total correlation (valid if r count $>$ r table; r table = 0.361 for $n = 30$ at $\alpha = 0.05$), and reliability was tested using Cronbach's alpha (reliable if $\alpha \geq 0.70$). The results are presented in Table 6.

Data Collection and Analysis

The questionnaire was administered face-to-face; for respondents with limited literacy or vision, the items were read aloud by the researchers and responses were recorded as given. Data were analyzed using SPSS version 26.0. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used to describe the respondents' characteristics and each variable. Mean scores were categorized into three levels using the same class-interval rule for all variables, with an interval width of $(5 - 1)/3 = 1.33$: high/balanced/good (3.67–5.00), moderate/less balanced/fair (2.34–3.66), and low/unbalanced/poor (1.00–2.33).

Before the correlation analysis, normality was tested using the Shapiro–Wilk test, which is appropriate for samples of fewer than 50, and linearity was tested using the deviation from linearity test. Pearson product-moment correlation was used when these assumptions were met; otherwise, Spearman's rank correlation was applied. The strength of correlation was interpreted as very weak (0.00–0.19), weak (0.20–0.39), moderate (0.40–0.59), strong (0.60–0.79), or very strong (0.80–1.00), with significance set at $p < 0.05$. Because of the cross-sectional design, the correlation results were interpreted as associations rather than causal effects.

Ethical Considerations

Permission for the study was obtained from the Gurun Panjang Utara village government. All respondents received an explanation of the purpose and procedures of the study and provided written informed consent before data collection. Participation was voluntary; respondents were free to withdraw at any time, and their identities were kept confidential.

RESULT AND DISCUSSION

Results

The 30 respondents had a mean age of 70.0 ± 7.4 years (range 60–87 years). Most were female and aged 60–69 years, half had no schooling or only elementary education, half were mainly engaged in farming or gardening, and only 6.7% participated regularly in senior exercise classes (Table 1).

Table 1. Characteristics of the Respondents (n = 30)

Characteristic	Category	n	%
Sex	Male	12	40.0
	Female	18	60.0
Age (years)	60–69	16	53.3
	70–79	11	36.7
	≥80	3	10.0
Education	No schooling/Elementary	15	50.0
	Junior/Senior high school	14	46.7
	Diploma/University	1	3.3
Main daily activity	Farming/gardening	15	50.0
	Trading/other work	1	3.3
	Household/not working	14	46.7
Participation in senior exercise	Regular	2	6.7
	Irregular/none	28	93.3
Total		30	100.0

Physical activity was mostly in the moderate category (mean = 3.17; SD = 0.50), and no respondent was in the low category (Table 2).

Table 2. Description of Physical Activity Data

No.	Interval	f	%	Category
1	3.67 – 5.00	6	20.0	High
2	2.34 – 3.66	24	80.0	Moderate
3	1.00 – 2.33	0	0.0	Low
Total		30	100	

Dietary habits were mostly less balanced (mean = 2.79; SD = 1.06); together with the unbalanced category, 83.3% of respondents reported dietary habits that were not yet balanced (Table 3).

Table 3. Description of Dietary Habits Data

No.	Interval	f	%	Category
1	3.67 – 5.00	5	16.7	Balanced
2	2.34 – 3.66	13	43.3	Less Balanced
3	1.00 – 2.33	12	40.0	Unbalanced
Total		30	100	

Perceived physical fitness was mostly poor (mean = 2.93; SD = 1.24), and only one in five respondents rated their fitness as good (Table 4).

Table 4. Description of Perceived Physical Fitness Data

No.	Interval	f	%	Category
1	3.67 – 5.00	6	20.0	Good
2	2.34 – 3.66	11	36.7	Fair
3	1.00 – 2.33	13	43.3	Poor
Total		30	100	

Table 5. Descriptive Statistics of the Research Variables

Variable	Mean	SD	Dominant Category	Distribution (%)
Physical Activity	3.17	0.50	Moderate	High 20.0 – Moderate 80.0 – Low 0.0
Dietary Habits	2.79	1.06	Less Balanced	Balanced 16.7 – Less Balanced 43.3 – Unbalanced 40.0
Perceived Physical Fitness	2.93	1.24	Poor	Good 20.0 – Fair 36.7 – Poor 43.3

The standard deviations of dietary habits (1.06) and perceived physical fitness (1.24) were considerably larger than that of physical activity (0.50), indicating that respondents were more heterogeneous in their dietary habits and perceived fitness than in their activity levels. The results of the validity and reliability tests of the questionnaire are presented in Table 6.

Table 6. Results of the Questionnaire's Validity and Reliability Tests

Variable	Numbers of Items	Valid Items	Invalid Items	Cronbach's Alpha	Notes
Physical Activity	5	5	0	0.92	Reliable
Dietary Habits	5	5	0	0.94	Reliable
Perceived Physical Fitness	5	5	0	0.96	Reliable

All items had corrected item-total correlations above the *r* table value of 0.361 (physical activity: 0.78–0.84; dietary habits: 0.80–0.90; perceived physical fitness: 0.87–0.91), and the Cronbach's alpha values were 0.92, 0.94, and 0.96,

respectively. Thus, all items were statistically valid and the three scales were internally consistent for measuring self-reported physical activity, dietary habits, and perceived physical fitness in this sample. Before the correlation analysis, the assumptions of normality and linearity were tested. The results of the normality test are presented in Table 7.

Table 7. Results of the Normality Test

Variable	Shapiro-Wilk Statistic	df	p	Interpretation
Physical Activity	0.899	30	0.008	Not normal
Dietary Habits	0.852	30	0.001	Not normal
Perceived Physical Fitness	0.899	30	0.008	Not normal

The Shapiro-Wilk test showed that none of the three variables was normally distributed ($p < 0.05$), although the deviation from linearity test indicated linear relationships between physical activity and perceived physical fitness ($p = 0.805$), dietary habits and perceived physical fitness ($p = 0.449$), and physical activity and dietary habits ($p = 0.677$). Because the normality assumption was not met, Spearman's rank correlation was used instead of Pearson's product-moment correlation. The results are presented in Table 8.

Table 8. Results of the Spearman Rank Correlation Analysis among Variables (ρ)

Variable	Physical Activity	Dietary Habits	Perceived Physical Fitness
Physical Activity	1.000	0.041 ($p = 0.829$)	0.092 ($p = 0.628$)
Dietary Habits	0.041 ($p = 0.829$)	1.000	0.800 ($p < 0.001$)
Perceived Physical Fitness	0.092 ($p = 0.628$)	0.800 ($p < 0.001$)	1.000

Dietary habits were positively, very strongly, and significantly associated with perceived physical fitness ($\rho = 0.800$; $p < 0.001$). Given $n = 30$, this estimate is imprecise (approximate 95% confidence interval, 0.58–0.91, based on the Fisher z-transformation with the Bonett-Wright standard error). In contrast, physical

activity was not significantly associated with perceived physical fitness ($\rho = 0.092$; $p = 0.628$) or with dietary habits ($\rho = 0.041$; $p = 0.829$), and both coefficients were very weak. These results indicate associations only and do not imply that dietary habits cause changes in perceived physical fitness.

Discussion

To separate what the data show from what is drawn from previous literature or remains conjecture, the interpretations below are labelled as findings of this study, literature-supported interpretations, or speculative explanations that were not tested here.

Findings. Older adults in Nagari Gurun Panjang Utara generally reported moderate physical activity, less balanced dietary habits, and poor perceived physical fitness. The predominance of moderate activity is consistent with the respondents' characteristics: half were engaged in farming or gardening, whereas only 6.7% participated regularly in senior exercise classes (Table 1). Their activity therefore appears to come mainly from occupational and household tasks, which are generally of light-to-moderate intensity and are rarely structured to develop strength, endurance, or balance; this is a plausible inference from the sample profile, but activity type and intensity were not measured directly. Literature-supported interpretation. The finding that 83.3% of respondents reported less balanced or unbalanced dietary habits is consistent with the view that older adults are vulnerable to inadequate intake of protein, vitamins, and minerals, which are important for healthy aging (Booth et al., 2026; Dai, 2025), although a self-report measure of dietary habits cannot establish nutrient inadequacy.

Findings. The main finding was the very strong positive association between dietary habits and perceived physical fitness ($\rho = 0.800$; $p < 0.001$): respondents who reported better dietary habits tended to report better physical fitness. Literature-supported interpretation. This pattern is relevant to the review by Dai (2025), which emphasized that adequate intake of protein, vitamins, and minerals supports muscle protein synthesis, bone health, and energy metabolism in later life; insufficient intake of these nutrients may therefore help explain why most respondents in this study also reported poor physical fitness (SiMa et al., 2026). Intervention studies have similarly reported that adequate protein or vitamin D

intake, particularly when combined with exercise, improves muscle mass, strength, and functional capacity (R. Zhao et al., 2025; Kim et al., 2026), and that multicomponent exercise–nutrition interventions reduce frailty (Yang et al., 2026).

However, those studies were experimental and measured nutrient intake or supplementation, whereas the present study observed only cross-sectional associations between self-reported dietary habits and perceived fitness; they therefore offer a plausible mechanism, not confirmation. Cautions and untested alternatives. The strength of the association should be interpreted cautiously because both variables were measured with the same self-report questionnaire, which may inflate their association through common method variance. Reverse or shared-cause explanations are also possible but were not tested: older adults with better physical function may be more able to obtain and prepare varied foods, and age, chronic disease, or income may influence both variables.

Findings. In contrast, physical activity was not significantly associated with perceived physical fitness ($\rho = 0.092$; $p = 0.628$). This result differs from previous evidence that regular physical activity is associated with better cardiorespiratory fitness, muscle strength, and physical function in older adults (Dalle Carbonare et al., 2023; Madden et al., 2026; Tao et al., 2025). Several explanations are possible, and they differ in how well they are supported. First, supported by the present data, the variation in physical activity scores was small ($SD = 0.50$) and 80.0% of respondents fell into the moderate category; such a restricted range, together with the small sample, reduces the likelihood of detecting an association.

Second, supported by the literature and the sample profile, the activity reported by most respondents appears to have come from farming and household work rather than structured exercise, whereas the fitness benefits described in the literature are mainly derived from planned aerobic, resistance, and balance training (H. Zhao et al., 2022; Zhou et al., 2026). Third, speculatively, many older adults in rural communities may continue working out of economic necessity regardless of their physical condition, so their activity level may not reflect their fitness; economic motives were not measured here. Tao et al. (2025) also reported that exercise is associated with better social interaction among older adults; however, social interaction and social support were not measured in the present study, so this

explanation likewise remains speculative and should be examined in future research.

Findings. The association between physical activity and dietary habits was also not significant ($\rho = 0.041$; $p = 0.829$). Literature-supported interpretation. Physical activity and dietary habits in older adults may be shaped by different determinants: physical activity tends to depend on work, functional capacity, and access to exercise groups, whereas dietary habits are more strongly influenced by economic conditions, food availability, family support, oral health, and appetite (Booth et al., 2026; Moradell et al., 2025). Tentative implication. An older adult may thus remain active through farming while still consuming a monotonous diet that is low in protein; this scenario is plausible but was not examined with the present data. In this community, physical activity and nutrition should not be assumed to improve together, and programs for older adults may need to address each component explicitly, as recommended by integrative approaches to healthy aging (Sołtysik, 2026; Zhang & Nan, 2026).

Practical implications. These findings may serve as a basis for community-based programs, such as those integrated into posyandu lansia activities, that include nutrition education and support emphasizing adequate protein, vegetables, and fruits. Given that very few respondents participated regularly in senior exercise classes, such programs could also introduce structured multicomponent exercise (aerobic, strength, and balance training), consistent with international evidence on multicomponent approaches (Jain et al., 2026; Yang et al., 2026) and with evidence that exercise also benefits cognitive function in older adults (Silva et al., 2026). These are suggestions drawn from the pattern of associations and from external evidence; because this study did not test any program, their effectiveness cannot be concluded from the present data and should be evaluated in future intervention studies.

This study has several limitations, and each affects how the results should be read, particularly the association between dietary habits and perceived physical fitness ($\rho = 0.800$). First, the sample was small ($n = 30$) and was selected using purposive sampling from a single village. This limits statistical power and generalizability and makes the coefficients imprecise: the approximate 95%

confidence interval for $\rho = 0.800$ spans about 0.58 to 0.91, so the true association could be considerably weaker or stronger than the point estimate. Low power also means that the non-significant coefficients involving physical activity should not be read as evidence of no association. Because respondents had to be independent and able to answer the questionnaire, the sample may also be healthier and more functional than older adults in the village generally.

Second, the cross-sectional design does not allow causal inference or determination of the direction of the relationships; the association between dietary habits and perceived fitness may therefore reflect the reverse direction (better function enabling a better diet) or shared underlying causes. Third, all variables were measured with the same self-report questionnaire, with only five items per variable, answered by the same respondents at the same time. This makes the results susceptible to recall bias, social desirability bias, and common method variance, which may inflate the observed correlation between dietary habits and perceived fitness. In addition, the items are not a validated or standardized version of the original instruments; they were not reviewed by experts, and their validity and reliability were tested on the same sample; the very high alpha values (0.92–0.96) for five-item scales may partly reflect item redundancy rather than broad coverage of each construct.

Fourth, nutritional intake was assessed only through self-reported dietary habits rather than through quantitative methods such as 24-hour food recall, food records, or standardized nutritional assessment. The results therefore describe associations with eating habits, not with the adequacy of protein, vitamin, or mineral intake, and the nutrient-related explanations in the Discussion are literature-based context rather than findings. Fifth, physical fitness was not measured using objective performance tests such as the Senior Fitness Test, handgrip strength, or the Short Physical Performance Battery. The correlation of $\rho = 0.800$ therefore reflects how respondents perceive their fitness, which may be influenced by general well-being, mood, or health beliefs, rather than their measured physical performance. Moreover, the physical activity scores showed limited variability ($SD = 0.50$), which attenuates correlations involving that variable. Finally, potential confounders such as age, sex, chronic diseases, and socioeconomic status were not controlled; because

only bivariate correlations were computed, part of the association between dietary habits and perceived fitness may be due to these factors. Taken together, the small sample and the restricted range of physical activity may have obscured associations involving physical activity, whereas common method variance, self-perceived fitness, and uncontrolled confounding may have inflated the association between dietary habits and perceived fitness; the latter should therefore be regarded as preliminary and hypothesis-generating. Future studies should use larger and randomly selected samples, objective activity and fitness measures, standardized dietary assessments, and multivariate or longitudinal designs.

CONCLUSION

This study concluded that older adults in Nagari Gurun Panjang Utara predominantly reported moderate physical activity, less balanced dietary habits, and poor perceived physical fitness. Dietary habits were very strongly, positively, and significantly associated with perceived physical fitness, whereas physical activity was not significantly associated with either perceived physical fitness or dietary habits. Thus, older adults who reported better dietary habits tended to report better physical fitness; however, because of the small sample, the self-report measures, and the cross-sectional correlational design, these results do not demonstrate that dietary habits cause improvements in physical fitness. As practical implications, the findings may inform community programs for older adults that combine nutrition education and support with structured multicomponent exercise; the effectiveness of such programs was not tested in this study and should be evaluated in future research. Future research should also use larger samples, objective measures, and experimental or longitudinal designs to examine causal relationships.

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