
The Relationship Between Body Mass Index And Physical Activity Among Older Adults At The Harapan Bunda Elderly Integrated Health Service Post (Posyandu Lansia)

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Abstract

The increasing elderly population in Indonesia has led to various health problems, particularly related to nutritional status and physical activity. Body Mass Index (BMI) is a simple indicator used to assess nutritional status, while physical activity plays an important role in maintaining energy balance and body composition. Elderly individuals with low levels of physical activity are at greater risk of having abnormal BMI, which may lead to degenerative diseases. This study used an analytic design with a cross-sectional approach. The research sample consisted of 109 elderly individuals at Posyandu Lansia Harapan Bunda who met the inclusion criteria. Body Mass Index (BMI) was measured by assessing body weight and height and calculated using the BMI formula (kg/m^2), while physical activity levels were assessed using the Physical Activity Scale for the Elderly (PASE) questionnaire. Data were analyzed using univariate and bivariate analyses. The Spearman correlation test was applied with a significance level of $p < 0.05$ to determine the relationship between BMI and physical activity. The findings showed a significant relationship between body mass index and physical activity among the elderly. Elderly individuals with low physical activity levels tended to have overweight and obesity categories of BMI, while those with moderate to high physical activity tended to have normal BMI. There is a relationship between body mass index and physical activity among the elderly at Posyandu Lansia Harapan Bunda. Higher levels of physical activity contribute to maintaining BMI within the normal range.

Keywords: *Body Mass Index, Physical Activity, Elderly, Pase.*

INTRODUCTION

The increasing number of older adults in many countries, including Indonesia, has led to growing health challenges among the elderly population. According to data from Statistics Indonesia (BPS, 2023), older adults account for 11.75% of Indonesia's total population, and this proportion is projected to increase to 19.6% by 2045. This rise in the elderly population reflects the success of development in the health sector; however, it also highlights various challenges, particularly those related to physical health and overall well-being (KEMENKES, 2018).

Research in Indonesia shows that the prevalence of obesity among older adults is approximately 18.8%, with variations across age groups and study locations. A community-based study in Sidoarjo found that 31.43% of older adults were overweight, 11.43% were obese, and 57.14% had a normal BMI (Nur Fadila, Arif Wijaya, 2024). Similar findings from major cities indicate high rates of overweight and obesity among both elderly men and women, emphasizing the need for physical activity and healthy lifestyle interventions to reduce excess weight and the burden of non-communicable diseases (KEMENKES, 2018).

Body Mass Index (BMI) is a widely used anthropometric indicator for assessing nutritional status in older adults. Although age-related physiological changes, such as sarcopenia and reduced basal metabolism, may affect its interpretation, BMI remains an important screening tool for identifying health risks and functional decline (Ilyasin et al., 2018).

Physical activity plays a key role in maintaining energy balance, muscle mass, insulin sensitivity, and functional independence in older adults (WHO, 2020; ACSM, 2021). The World Health Organization (2020) recommends at least 150 minutes of moderate-intensity physical activity per week. However, national data indicate that more than half of Indonesian older adults do not meet this recommendation, particularly in urban areas (KEMENKES, 2023). Low physical activity

contributes to weight gain, visceral fat accumulation, reduced functional capacity, and higher BMI (Santosa & Wulandari, 2020).

Several studies have demonstrated a significant relationship between physical activity and BMI among older adults. Research by (Nur Fadila, Arif Wijaya, 2024) found that older adults with lower physical activity tended to have higher BMI values ($p < 0.05$). Similar findings were reported by (Salsabilla et al., 2021), showing that physical activity is associated with nutritional status and quality of life. International evidence also supports this relationship. (Uysal et al., 2021) reported that among postmenopausal women in Turkish nursing homes, BMI was negatively correlated with body perception ($r = -0.398$; $p = 0.004$), while physical activity showed a strong positive correlation with body perception ($r = 0.751$; $p < 0.001$). Likewise, (Darwis & Safei, 2022) found that lower physical activity was significantly associated with higher BMI and an increased risk of overweight and obesity.

Most previous studies were conducted in general communities or nursing homes rather than community-based health service settings such as Posyandu Lansia. Posyandu Lansia provides regular health monitoring, including body weight assessment, blood pressure measurement, and education on physical activity and nutrition as part of Indonesia’s National Action Plan for Elderly Health (KEMENKES RI, 2021). Nevertheless, research examining the relationship between BMI and physical activity among older adults attending Posyandu remains limited.

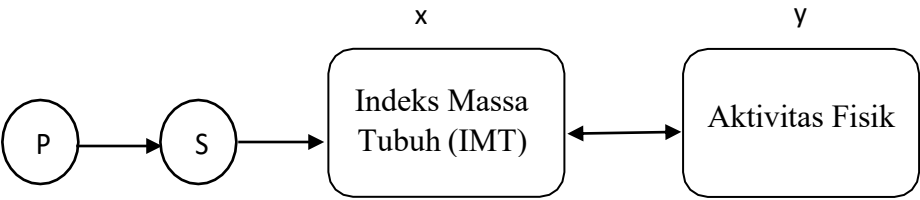
Harapan Bunda Elderly Integrated Health Service Post (Posyandu Lansia Harapan Bunda) in East Jakarta is an active community with a large number of elderly participants. Preliminary observations revealed low participation in physical activities, such as elderly exercise programs, while many participants were classified as overweight or obese. These findings suggest an imbalance between energy intake and expenditure and highlight the need to investigate the relationship between BMI and physical activity in this community. This study is expected to enrich the literature, provide evidence for physical activity and nutrition intervention programs, and support community-based health promotion and disease prevention strategies for older adults.

Based on the description, research on the relationship between Body Mass Index and physical activity in the elderly at the Harapan Bunda Elderly Posyandu Kampung Makassar needs to be conducted to determine the pattern of the relationship between the two variables and to contribute to efforts to improve the quality of life of the elderly.

RESEARCH METHODS

Research Design

The authors applied a correlational method in this study with a cross-sectional approach, conducted at a single point in time without follow-up. This study aimed to determine the correlation between BMI and physical activity in the elderly at the Harapan Bunda Integrated Health Post (Posyandu). The study design can be illustrated in the diagram below:



Population and Sample

Population

In this study, the population of the study was 225 elderly people who met the inclusion criteria at the Harapan Bunda Integrated Health Post (Posyandu) in Makassar District.

Sample

The sample used in this study was drawn from 225 elderly people who met the following inclusion and exclusion criteria:

Inclusion Criteria

1. Subjects aged >60 years
2. Willing to be research respondents
3. Overweight or obese

Exclusion Criteria

1. Uncooperative during the study
2. Subjects in a sick condition

Sample Size

The sample size in this study will be calculated using the Slovin formula to determine the minimum sample size. The population was drawn from the Harapan Bunda Elderly Posyandu (Integrated Health Post) with a sample size error of 5%. Using the Slovin Formula:

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{109}{1 + 109(0.05)^2}$$

$$n = 85,7$$

Description:

n: Number of samples

N: Population size

e: Overall tolerance limit

The calculation results indicate that the sample size is 86 people with a reserve.

Sampling Techniques

1. Select a sample size from the existing population based on predetermined inclusion and exclusion criteria.
2. Determine a sample size of 109 people according to the Slovin formula.

Research Location and Time

The research was conducted at the Harapan Bunda Elderly Health Post (Posyandu Lansia Harapan Bunda) in Makassar District in January 2026.

RESULTS AND DISCUSSION

Univariate Analysis

Results of Descriptive Analysis of Elderly Characteristics

In the underweight BMI category, the majority of respondents had low physical activity (2.8%), followed by 1 (0.9%) with moderate physical activity, and no respondents with high physical activity. Three (2.8%) respondents had a BMI below normal. There were 20 (18.3%) respondents with a normal BMI, with a distribution of 8 (7.3%) with low physical activity, 6 (5.5%) with moderate physical activity, and 6 (5.5%) with high physical activity.

In the overweight BMI category, the largest number of respondents was 47 (43.1%). The majority of respondents in this category (40) had low physical activity, followed by 7 (6.4%) with moderate physical activity, and no respondents with high physical activity. Meanwhile, 39 respondents (35.8%) had an obese BMI, with 31 (28.4%) having low physical activity, 8 (7.3%) with moderate physical activity, and no respondents with high physical activity.

Overall, these results indicate that respondents with a higher Body Mass Index (BMI) tend to have lower levels of physical activity, as evidenced by the predominance of low physical activity in the obesity I and obesity II BMI categories.

Normality Test

After entering the bivariate analysis, the data must be tested for normality to determine whether the data is normally distributed. The normality test in this study used the Kolmogorov-Smirnov test, where data from more than 50 samples were tested. The resulting hypothesis is: if the P-value is <0.05, the data are not normally distributed (H0 is rejected), and conversely, if the P-value is >0.05, the data are normally distributed (H1 is accepted). The results of this test analysis can be seen in the table above.

Table 1. Normality Test		
Variable	P-Value	Interpretation
Body Mass Index (BMI)	0.00	Non-Normal Distribution
Physical Activity	0.00	Non-Normal Distribution

Based on Table 1 Normality Test, the results of the Kolmogorov-Smirnov test show that the variables Body Mass Index (BMI) and Physical Activity have a significance value (p-value) of 0.00. This value is lower than the significance level of 0.05 ($p < 0.05$), so it is concluded that the BMI and Physical Activity data are not normally distributed. Therefore, further statistical analysis used in this study is a non-parametric statistical test, which is adjusted to the research objectives. Because the data is not normally distributed, the statistical test used next is a non-parametric test, such as the Spearman test, according to the purpose of the analysis.

Bivariate Analysis Results

Bivariate analysis is an analysis carried out to determine the relationship between two research variables, namely the independent variable and the dependent variable. At this stage, the analysis aims to assess whether there is a significant relationship statistics between the variables studied.

Bivariate analysis was carried out using statistical tests appropriate to the type of data and its distribution. The selection of statistical tests begins with the normality test. If the data were normally distributed, the Pearson correlation test was used; if the data is not normally distributed, the Spearman correlation test is used. The results of bivariate analysis are presented as p values and correlation coefficients (r).

Correlation Test (Spearman Test)

Hypothesis testing is used to continue the results of the normality test hypothesis which says the data is not normally distributed (H0 is rejected) using Spearman test analysis. The purpose of this hypothesis test is to find out whether there is a relationship between the two variables in this research.

Table 2. Frequency Distribution of BMI and Physical Activity

Physical Activity		
Variable	P-Value	R
Body Mass Index (BMI)	0.005	-0,265
Physical Activity	0.005	-0,265

Based on the Spearman's Rho test results in Table2 above, a correlation coefficient (r) value of -0.265 was obtained, with an Asimp.Sig value of 0.005. Since the Asimp.Sig value of $0.005 < 0.05$, the result is significant, meaning H1 is accepted and H0 is rejected. The Spearman correlation test results show an r value of -0.265, indicating a weak negative correlation between BMI and physical activity. This means that higher physical activity tends to lower BMI, but the relationship is not strong. Therefore, it can be concluded that there is a relationship between Body Mass Index and Physical Activity in the Elderly at the Harapan Bunda Elderly Posyandu. This means that the higher the BMI, the lower the physical activity level in the elderly at the Harapan Bunda Posyandu.

These results indicate that differences in Body Mass Index are related to respondents' physical activity levels. Individuals with a higher Body Mass Index (BMI) tend to have lower levels of physical activity, which can impact overall health and fitness.

Discussion

Characteristics of Age, Gender, and Education

The study involved 109 older adults from Harapan Bunda Elderly Integrated Health Service Post (Posyandu Lansia Harapan Bunda), with a mean age of 67.36 years (range: 60–75 years). Most

participants were classified as young-old adults (60–69 years), an age characterized by physiological changes such as reduced muscle mass, lower basal metabolic rate, and increased body fat, which may affect nutritional status and physical functioning (Setiati, 2021; Santosa & Wulandari, 2020).

Most respondents were female (65.1%), consistent with national data indicating that women have a longer life expectancy and are more likely to participate in community health services (BPS, 2023; KEMENKES, 2023). Postmenopausal estrogen decline also increases the risk of abdominal fat accumulation and higher BMI (Frontera, 2017). In terms of education, 62.4% had completed senior high school, suggesting a relatively good capacity to understand and adopt healthy lifestyle practices (KEMENKES, 2018).

Description of Body Mass Index Among Older Adults

The findings revealed that 43.1% of participants were overweight, 35.8% were obese, and only 18.3% had a normal BMI, indicating a high prevalence of excess body weight among older adults at Harapan Bunda. Age-related declines in basal metabolism and muscle mass reduce energy requirements, making fat accumulation more likely when caloric intake is not adjusted (Cruz-Jentoft et al., 2019; Frontera, 2017).

A high BMI in older adults is associated with an increased risk of non-communicable diseases, including hypertension, type 2 diabetes, coronary heart disease, and musculoskeletal disorders such as osteoarthritis (WHO, 2020; Fitriani et al., 2019). These findings are consistent with the increasing prevalence of overweight among older Indonesians reported by the National Basic Health Survey (Riskesdas) (KEMENKES, 2023).

The high prevalence of overweight is likely explained by a combination of physiological changes (reduced metabolism, sarcopenia, increased visceral fat), hormonal changes (declining estrogen and testosterone), low physical activity, unhealthy dietary patterns, and psychosocial factors, such as stress and social isolation; (Santosa & Wulandari, 2020; WHO, 2020; Cleven et al., 2023; Setiati et al., 2021). These findings highlight the importance of comprehensive interventions combining nutrition education, regular physical activity, and continuous social support to prevent and manage overweight among older adults.

Description of Physical Activity Among Older Adults

Based on the Physical Activity Scale for the Elderly (PASE), 74.3% of participants had low physical activity, indicating that most did not achieve the WHO recommendation of at least 150 minutes of moderate-intensity physical activity per week (WHO, 2020). Reduced physical activity among older adults is associated with age-related declines in cardiorespiratory fitness, muscle strength, and chronic diseases that limit mobility (ACSM, 2021). Low activity contributes to decreased muscle mass, increased body fat, poorer body composition, metabolic disorders, and reduced quality of life (Chen et al., 2023; Santosa & Wulandari, 2020). In this study, the high prevalence of low physical activity likely contributed to the high rates of overweight (43.1%) and obesity (35.8%) through chronic energy imbalance, sarcopenia, and sedentary behavior, highlighting the importance of structured physical activity programs for weight management in older adults; (WHO, 2020; Cruz-Jentoft et al., 2019; Cleven et al., 2023; Frontera, 2017).

Relationship Between Body Mass Index and Physical Activity Among Older Adults

Spearman's correlation analysis showed a significant negative relationship between physical activity and BMI ($r = -0.265$, $p = 0.005$), indicating that higher physical activity was associated with lower BMI, although the correlation was weak. This suggests that BMI in older adults is influenced not only by physical activity but also by multiple factors, including genetics, dietary intake, comorbidities, hormonal changes, psychosocial conditions, and age-related body composition changes such as sarcopenia (WHO, 2023; Setiati, 2021; Uysal et al., 2021).

The findings support the theory that regular physical activity promotes energy expenditure, preserves muscle mass, and helps regulate fat and glucose metabolism, thereby reducing the risk of overweight and obesity in older adults (Solikhah, 2020). Similar results were reported by Fadila, Wijaya, and Roni (2024), who found a significant association between physical activity and BMI (p

= 0.029), and by (Salsabilla et al., 2021), who reported that higher physical activity was associated with healthier BMI and better quality of life. International studies by (Uysal et al., 2021) and (Darwis & Safei, 2022). also demonstrated that lower physical activity is associated with higher BMI and increased obesity risk. In contrast, studies among university students reported no significant association, likely due to differences in participant characteristics, homogeneous activity levels, and the influence of dietary intake on energy balance (Ma'arif, 2022; Suryana & Fitri, 2017; Riskawati et al., 2020).

Although the correlation was weak and the cross-sectional design precludes causal inference, the findings indicate that promoting regular, age-appropriate physical activity may help maintain a healthier BMI and improve the overall quality of life among older adults.

CONCLUSION

Based on the findings of this study on the relationship between Body Mass Index (BMI) and physical activity among older adults at Harapan Bunda Elderly Integrated Health Service Post (Posyandu Lansia Harapan Bunda), the following conclusions can be drawn:

1. The respondents had a mean age of 66.54 years, with the majority being male and having completed senior high school education.
2. Most older adults were classified as overweight or obese and had low levels of physical activity, indicating a high prevalence of excess body weight and insufficient physical activity.
3. Assessment of physical activity, including walking, household tasks, and work-related activities, showed that most participants engaged in light to moderate physical activity, suggesting that many older adults remain physically inactive in their daily lives.
4. Spearman's rank correlation analysis revealed a significant relationship between BMI and physical activity ($p = 0.005$; $p < 0.05$).
5. Older adults with a higher BMI tended to have lower levels of physical activity, indicating that BMI and physical activity are significantly associated and jointly influence the health status of older adults.

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