

**Jurnal Info Kesehatan**

Vol. 23, No. 3, September 2025, pp. 507-517

P-ISSN 0216-504X, E-ISSN 2620-536X

DOI: [10.31965/infokes.Vol23.Iss3.2151](https://doi.org/10.31965/infokes.Vol23.Iss3.2151)

Journal homepage: <https://jurnal.poltekkeskupang.ac.id/index.php/infokes>



**RESEARCH**

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## **The Activity of Older People Determining Their Functional Abilities During Old Age: A Cross-Sectional Study in Two Major Cities In Indonesia**

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Received: 2 September 2025

Revised: 11 September 2025

Accepted: 11 September 2025

### **Abstract**

Amidst Indonesia's aging population, this study explores key determinants influencing productivity, the indicators of functional abilities, among older adults in diverse urban/rural settings of East Java and Yogyakarta. The study design used a cross-sectional study surveyed 220 adults ( $\geq 60$  years; mean age 65.3) via stratified probability sampling. Structured questionnaires assessed holistic health (biological, psychological, social, spiritual, cultural), active ageing determinants (social, habitual, physical, personal, economic, service access), and elderly capability improvement (physical, mental, social, spiritual, cultural health). Binary logistic regression identified predictors of productivity status. The study results showed that holistic health conditions ( $\text{Exp}(B) = 0.983$ ,  $p = 0.050$ ), active ageing determinants ( $\text{Exp}(B) = 1.168$ ,  $p = 0.000$ ), and improvements in elderly capabilities ( $\text{Exp}(B) = 1.090$ ,  $p = 0.005$ ) were significant positive predictors of productivity. This Indonesian study demonstrates that specific active ageing determinants and enhanced capabilities are more critical to elderly productivity than general holistic health in a multivariate context. It highlights the need for targeted, regionally adaptable community interventions and age-friendly policies to support productive aging.

**Keywords:** Activity, Older People, Functional Ability, Physical Activity, Quality of Life.

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## 1. INTRODUCTION

Aging is a biological process characterized by a gradual decline in physiological functions, including muscle capacity, cognitive function, and independence, increasing the risk of frailty, disability, and a reduced quality of life in older adults. This decline is influenced by changes in the musculoskeletal, cardiovascular, and nervous systems, as well as increased oxidative stress and inflammation, which accelerate tissue degeneration. Physical activity has been consistently shown to slow functional decline by improving muscle capacity, cardiovascular function, and brain health, as well as reducing oxidative stress and inflammation. Physical exercise also increases neurogenesis, improves brain connectivity, and maintains muscle tissue integrity, thereby slowing the aging process and maintaining independence in older adults (El-Assar et al., 2022; Grevendonk et al., 2021; Moreno-Agostino et al., 2020). This decline can lead to dependence in daily activities, increase the risk of falls, and reduce the quality of life of the elderly (Arosio et al., 2023; Izquierdo et al., 2021; Mendonca et al., 2017; Merchant et al., 2021). However, various international studies have shown that regular physical activity can slow this process and maintain the independence of the elderly.

Globally, moderate to intensive physical activity has been associated with a reduced risk of dependence in daily activities (Wang et al., 2024). A study in Mexico found that elderly individuals who engage in moderate to high-intensity physical activity have a lower risk of dependence in daily instrumental activities (Martínez-Hernández et al., 2022). In addition, strength training has been shown to improve functional capacity and health in older adults, including increased muscle strength and aerobic capacity, as well as decreased risk of falls and depressive symptoms (Lima et al., 2021). Meanwhile, a systematic review by Paterson and Warburton (2010) demonstrated that aerobic physical activity and strength training significantly reduce the risk of functional limitations and disability in older adults. They found that moderate to high intensity physical activity was effective in reducing the risk of functional limitations by up to 50%.

Physical activity has been shown to play an important role in maintaining the functional capacity of the elderly. A study by Nurhayati et al., 2024 in Yogyakarta showed a positive correlation between the level of physical activity and fitness of the elderly, with a correlation value of  $r = 0.657$  ( $p < 0.001$ ). Likewise, a study in Surabaya found that most elderly people have good muscle strength and aerobic endurance but showed weaknesses in coordination and dynamic balance (Purwantini & Lestarina, 2024). Furthermore, a study by Lima et al. (2021) showed that moderate to high intensity strength training provided benefits for the elderly through increasing muscle strength and aerobic capacity, which reduced the risk of falls, as well as reducing blood pressure and depressive symptoms, both in healthy and comorbid elderly. This suggests the need for targeted physical activity interventions to enhance the components of functional fitness that are lacking among older adults.

Urbanization and lifestyle changes in Indonesia, especially in Yogyakarta and Surabaya, are making older persons less active, which is speeding up functional decline and adding to the public health burden. Research conducted in Yogyakarta has shown that treatments based on local wisdom, such as senior exercise programs and psychoeducation, can increase older individuals' engagement in physical activity and boost their quality of life. However, a number of social, psychological, and environmental obstacles, along with a dearth of locally relevant programs, continue to contribute to the low levels of physical exercise involvement among older persons. Similar issues exist in Surabaya, a metropolitan area, where a lack of open areas and community support causes older persons to become more sedentary (Purwantini & Lestarina, 2024).

Despite the well-established benefits of physical activity, local research on the effectiveness of structured physical activity interventions for older adults in Yogyakarta and Surabaya remains limited. This gap is crucial to address, given the differences in socio-cultural

and environmental characteristics between the two cities. Studies assessing the impact of community-based physical activity programs and local wisdom on the functional capacity of older adults are urgently needed to generate relevant and applicable intervention recommendations.

However, effective implementation of physical activity for older adults requires an approach that takes into account local conditions and culture (Butson et al., 2025). Yogyakarta and Surabaya were chosen as study locations because both are large cities with significant elderly populations and have different socio-cultural characteristics. Yogyakarta is known for its elderly community that is active in social and cultural activities, while Surabaya has government programs that support physical activity for the elderly. The activity of older people is important for maintaining their abilities and functional capacity in older adults, as well as the differences in demographic and social characteristics between Yogyakarta and Surabaya. A comparative study is needed to understand how older adults' activity affects their abilities during old age in both cities. However, most of these studies were conducted in developed countries with different social and cultural contexts of Indonesia. Therefore, studies that adapt to the local context are needed to understand how the activity of older people affects the ability and functional capacity of elderly people in Indonesia. Therefore, this study aims to evaluate the role of physical activity in maintaining function and independence among older adults in Yogyakarta and Surabaya, as well as to identify factors that inhibit and support their participation in physical activity. The study results are expected to form the basis for developing contextual and sustainable community-based interventions to improve the quality of life and slow functional decline in older adults in both cities.

## 2. RESEARCH METHOD

This research used the analytical observational method. This study explains the influence of variables, especially the variables that affect the personal ability of the elderly, based on active aging determinants and holistic care concepts in East Java and Yogyakarta. Data were analyzed using both descriptive and inferential statistical methods. The statistical program, IBM SPSS Statistics version 26, was used to analyze the data. Descriptive analysis was used to summarize the socio-demographic characteristics and calculate mean scores and standard deviations for each study variable. For inferential analysis, normality testing was conducted using the One-Sample Kolmogorov-Smirnov test. The association between categorical variables was examined using Chi-Square tests, and binary logistic regression analysis was performed to determine the influence of holistic health condition, active ageing determinants, and elderly capability improvements on elderly productivity status. The research variables, on average, have Cronbach's Alpha values  $> 0.6$ .

Researchers conducted validity and reliability tests on the questionnaire items, with the results showing that both had an average Cronbach's Alpha value of  $> 0.6$ . Official approvals were obtained from the Health Research Ethics Committee, Institute of Health Science STRADA Indonesia, with approval number 2956/KEPK/V/2022. All participants were provided with information regarding the study's purpose, procedures, and confidentiality, and gave their written informed consent before participation.

## 3. RESULTS AND DISCUSSION

**Table 1.** Socio-demographic Characteristics.

| Qualitative Characteristics | n   | %    |
|-----------------------------|-----|------|
| Age                         |     |      |
| 60-74 years old             | 200 | 90.9 |
| 75-90 years old             | 19  | 8.6  |
| >90 years old               | 1   | 0.5  |
| Occupation                  |     |      |

| <b>Qualitative Characteristics</b>  | <b>n</b>    | <b>%</b>  |
|-------------------------------------|-------------|-----------|
| Unemployed                          | 166         | 75.5      |
| Farmer                              | 5           | 2.3       |
| entrepreneur                        | 19          | 8.6       |
| Self-employed                       | 17          | 7.7       |
| Casual Labourer                     | 3           | 1.4       |
| Retired                             | 6           | 2.7       |
| Other                               | 4           | 1.8       |
| <b>Health Status and Disease</b>    |             |           |
| Healthy                             | 133         | 60.5      |
| Hypertension                        | 26          | 11.8      |
| Diabetes Mellitus                   | 21          | 9.5       |
| Hypotension                         | 2           | 0.9       |
| Others                              | 38          | 17.3      |
| <b>Number of Elderly in Family</b>  |             |           |
| ≤2 Elderly                          | 204         | 92.7      |
| >2 Elderly                          | 16          | 7.3       |
| <b>Quantitative Characteristics</b> | <b>Mean</b> | <b>SD</b> |
| Age                                 | 65.323      | 0.578     |

The sociodemographic profile of the elderly participants is presented in Table 1. The majority were 60 to 74 years old (90.9%), with smaller proportions aged 75 to 90 years (8.6%) and over 90 years (0.5%). The mean age was  $65.323 \pm 0.578$  years, indicating a predominantly younger-old population. Most participants were unemployed (75.5%), followed by entrepreneurs (8.6%) and self-employed individuals (7.7%). Regarding health status, 60.5% reported being healthy, while hypertension (11.8%) and diabetes mellitus (9.5%) were the most common chronic conditions. Most families (92.7%) had two or fewer elderly members.

**Table 2.** Determinants of Productive Elderly.

| <b>Variables</b>                             | <b>Mean</b> | <b>SD</b> | <b>p-value</b> |
|----------------------------------------------|-------------|-----------|----------------|
| <b>Elderly Health Condition Holistically</b> |             |           |                |
| Biologically                                 | 5.955       | 4.033     | 0.000          |
| Psychologically                              | 6.586       | 1.722     | 0.000          |
| Socially                                     | 6.377       | 2.109     | 0.000          |
| Spiritually                                  | 8.618       | 2.194     | 0.000          |
| Culturally                                   | 7.436       | 2.571     | 0.000          |
| Total                                        | 34.973      | 6.242     | 0.009          |
| <b>Active Ageing Determinant</b>             |             |           |                |
| Social Aspect                                | 11.536      | 2.745     | 0.000          |
| Habits                                       | 12.168      | 2.983     | 0.000          |
| Physical                                     | 5.568       | 2.154     | 0.000          |
| Personal                                     | 12.486      | 2.549     | 0.000          |
| Economic                                     | 2.505       | 1.112     | 0.000          |
| Social and Health Services                   | 3.782       | 1.028     | 0.000          |
| Total                                        | 48.045      | 9.246     | 0.000          |
| <b>Improving the Ability of the Elderly</b>  |             |           |                |
| Physically Healthy                           | 11.777      | 2.235     | 0.000          |
| Mentally Healthy                             | 14.041      | 3.268     | 0.000          |

| Variables                                      | Mean   | SD    | p-value |
|------------------------------------------------|--------|-------|---------|
| Social Relationship Healthy                    | 13.768 | 3.044 | 0.000   |
| Spiritual Activity Healthy                     | 7.514  | 1.563 | 0.000   |
| Implementing the Applicable Culture of Healthy | 8.836  | 1.977 | 0.000   |
| Total                                          | 55.936 | 9.246 | 0.000   |

As presented in Table 2, various domains associated with elderly health and active ageing were assessed. The mean scores for holistic health ranged from 5.96 (biological) to 8.62 (spiritual), with all domains showing statistically significant differences ( $p < 0.001$ ). The total holistic health score averaged 34.97 (SD = 6.24;  $p = 0.009$ ). Similarly, the determinants of active ageing, which included social habits, physical, personal, economic, and service-related aspects, had mean scores ranging from 2.51 (economic) to 12.49 (personal), all of which were highly significant ( $p < 0.001$ ). The overall mean score for active ageing determinants was 48.05 (SD = 9.25;  $p < 0.001$ ). Measures assessing the improvement of elderly capacities across physical, mental, social, spiritual, and cultural dimensions also showed statistically significant results, with a total mean score of 55.94 ( $p < 0.001$ ).

**Table 3.** Crosstab the Effect on Productivity.

| Variables                 | Unproductive |      | Productive |      | Total |      | p-value |
|---------------------------|--------------|------|------------|------|-------|------|---------|
|                           | n            | %    | n          | %    | n     | %    |         |
| Holistic Health           |              |      |            |      |       |      |         |
| Less                      | 14           | 12.2 | 19         | 18.1 | 33    | 15.0 | 0.463   |
| Enough                    | 97           | 84.3 | 83         | 79.0 | 180   | 81.8 |         |
| Good                      | 4            | 3.5  | 3          | 2.9  | 7     | 3.2  |         |
| Active Ageing Determinant |              |      |            |      |       |      |         |
| Less                      | 0            | 0.0  | 0          | 0.0  | 0     | 0.0  | 0.284   |
| Enough                    | 6            | 5.2  | 2          | 1.9  | 8     | 3.6  |         |
| Good                      | 109          | 94.8 | 103        | 98.1 | 212   | 96.4 |         |
| Ability of the Elderly    |              |      |            |      |       |      |         |
| Less                      | 6            | 5.2  | 1          | 1.0  | 7     | 3.2  | 0.000*  |
| Enough                    | 36           | 31.3 | 3          | 2.8  | 39    | 17.7 |         |
| Good                      | 73           | 63.5 | 101        | 96.2 | 174   | 79.1 |         |

Table 3 presents the cross-tabulation between elderly productivity status and three main variables: holistic health, active ageing determinants, and elderly abilities. While the distribution of holistic health and active ageing determinants between productive and unproductive elderly did not show statistically significant differences ( $p = 0.463$  and  $p = 0.284$ , respectively), a significant association was found between elderly ability and productivity status ( $p < 0.001$ ). A notably higher proportion of productive elderly (96.2%) demonstrated “good” ability levels compared to only 63.5% in the unproductive group.

**Table 4.** Logistic Regression of the Effect of Elderly Health Conditions Holistically, Determinants of Active Elderly, Increasing the Ability of the Elderly to Become Productive Elderly.

| Variables                                  | B      | S.E.  | Wald   | Exp(B) | 95% CI |       | p-value |
|--------------------------------------------|--------|-------|--------|--------|--------|-------|---------|
|                                            |        |       |        |        | Lower  | Upper |         |
| Elderly Health Condition Holistically (X1) | -0.017 | 0.026 | 0.435  | 0.983  | 0.934  | 1.034 | 0.050   |
| Determinants of Active Elderly (X2)        | 0.155  | 0.030 | 27.389 | 1.168  | 1.102  | 1.238 | 0.000   |



| Variables                           | B       | S.E.  | Wald   | Exp(B) | 95% CI |       | p-value |
|-------------------------------------|---------|-------|--------|--------|--------|-------|---------|
|                                     |         |       |        |        | Lower  | Upper |         |
| Improving Elderly Capabilities (X3) | 0.086   | 0.031 | 7.972  | 1.090  | 1.027  | 1.158 | 0.005   |
| Constant                            | -12.133 | 2.190 | 30.688 | 0.000  |        |       | 0.000   |

As shown in Table 4, logistic regression analysis identified two significant predictors of elderly productivity. Improvements in elderly capabilities (X3) were associated with a 1.09-fold increase in the likelihood of being productive ( $\text{Exp}(B) = 1.090$ ; 95% CI: 1.027–1.158;  $p = 0.005$ ), while active ageing determinants (X2) contributed to a 1.17-fold increase ( $\text{Exp}(B) = 1.168$ ; 95% CI: 1.102–1.238;  $p < 0.001$ ). In contrast, holistic health conditions (X1) did not significantly predict productivity ( $\text{Exp}(B) = 0.983$ ;  $p = 0.509$ ).

In this study, the holistic health of the elderly, encompassing biological, psychological, social, spiritual, and cultural aspects, contributed to their productivity ( $p=0.050$ ). The results of this study are relevant to the findings of other studies that show social aspects. However, biologically, nutritional status, chronic diseases, and functional capacity have a major influence on the quality of life and the ability of the elderly to remain productive (Tek & Kara $\tilde{\text{A}}$ , 2018; Maseda et al., 2018; Pan et al., 2024). From a psychological perspective, social support, emotional intelligence, and proactive coping strategies have been shown to improve the well-being and quality of life of the elderly (Fekete et al., 2020; Frías-Luque & Toledano-González, 2022). Socially, involvement in productive activities such as volunteer work, housework, and social participation is positively associated with well-being and reduces depression (Fekete et al., 2020; Pan et al., 2024). Spiritual and cultural aspects, although not always measured explicitly, are reflected in self-perception, life values, and adaptation to age-related changes that are influenced by community norms and beliefs (Jeste, 2022; Suso-Palau et al., 2022).

The combination of these determinants significantly increases the ability and productivity of the elderly, so interventions that pay attention to all holistic aspects are very important to support the elderly to remain independent and productive (Tek & Kara $\tilde{\text{A}}$ , 2018; Frías-Luque & Toledano-González, 2022; Palestin et al., 2022; Pan et al., 2024). The results of this study were relevant to the findings of other studies that showed social aspects, such as poor family and friendship interactions Åberg et al., (2005) have a significant effect on increasing the status of active elderly (Bowling & Dieppe, 2005; Naah et al., 2020; Plouffe & Kalache, 2010).

A holistic understanding of elderly health conditions emphasizes the interplay between physical, cognitive, social, and environmental factors in determining functional abilities during old age. Functional decline is associated with advanced age, low income, poor self-perceived health, chronic diseases, and physical inactivity, while social and environmental supports can mitigate these effects (Lu, 2025; Nascimento et al., 2012; Welch et al., 2021; Zhang & Wang, 2025). The heterogeneity among older adults means that some maintain or even improve their functional abilities, highlighting the potential for targeted health promotion and rehabilitation interventions (Escourrou et al., 2020; Holstein et al., 2007; Welch et al., 2021).

Active ageing is determined by a complex interplay of personal, physical, habits, social aspects, economic, and health services factors that collectively influence functional abilities in old age. The elderly's output is greatly increased when the variables of the Active Elderly are combined ( $p = 0.000$ ). Key determinants include physical activity, health status, psychological resilience, social participation, and supportive environments, all of which are positively associated with maintaining independence and functional capacity (El-Assar et al., 2022; Chaichuay, 2024; Marzo et al., 2023; Park & Lee, 2024; Rantanen et al., 2018). Regular exercise and engagement in meaningful activities help preserve muscle strength, balance, and cognitive function, reducing the risk of frailty and disability (El-Assar et al., 2022; Tomás et al., 2018). Social support, accessible health services, and a meaningful home environment

further enhance active ageing by enabling older adults to adapt to functional limitations and maintain wellbeing (Chaichuay, 2024; Marzo et al., 2023; Park & Lee, 2024; Slaug et al., 2024). Comprehensive policies and interventions targeting these determinants are essential for promoting active ageing and optimizing quality of life among the elderly (Kabadayi et al., 2020; Marzo et al., 2023).

There was a strong correlation between active older adults and efforts to enhance their abilities ( $p = 0.005$ ). Improving the ability of the elderly to maintain functional abilities during old age requires multifaceted interventions, including structured exercise programs, home-based rehabilitation, and integrated care approaches. Evidence showed that moderate-intensity exercise and functional training significantly enhance strength, flexibility, balance, and overall functional performance in older adults, reduce the risk of falls, and promote independence (Fernández-García et al., 2020; Filho, D.S., 2024; Skelton & Dinan, 2007). Home-based health and social support services, as well as assistive technologies, further support mobility and daily functioning, especially when tailored to individual needs (Cesari et al., 2022; Skelton & Dinan, 2007). Multicomponent interventions that combine physical activity, cognitive stimulation, and nutritional support yield improvements in intrinsic capacity and activities of daily living (Cesari et al., 2022; Fernández-García et al., 2020; Merchant et al., 2024). Integrated, person-centered care models are essential for continuously assessing and addressing the evolving needs of the elderly, thereby optimizing their functional abilities and quality of life (Cesari et al., 2022; Courtney et al., 2012).

#### 4. CONCLUSION

The research concludes that the holistic health of the elderly, the determinants of active elderly, and efforts to improve their capacity are closely related to their productive status. The following policy implications can be used to build an ecosystem that helps older people stay empowered and productive: (1) Holistic Health Policy: The government must create a health policy that addresses the mental, social, and spiritual well-being of the elderly in addition to the treatment of illnesses. For instance, by offering social support groups, relaxation techniques, and counseling services. (2) Flexible Employment Policy: This policy should allow for work flexibility for the elderly, such as part-time, full-time, or remote working; this can improve the general health of the elderly, which is a crucial prerequisite for continuing to be productive. This enables the elderly to maintain their economic contributions without putting undue strain on their physical health. The government can support phased retirement plans or offer tax breaks to businesses that hire senior citizens; (3) Lifelong Learning Policy: This policy should help senior citizens stay up to date on technology and continuously improve their skills. The government can offer easily accessible subsidies or specialized training programs that are pertinent to the demands of the labor market today. This will improve older adults' capacities and create new avenues for them to continue being productive.

The implications for useful and applicable practices are more focused on specific steps that different stakeholders, such as families, communities, and private institutions, can take. Among these useful ramifications are: (1) Empowerment of the Community: Communities can organize interest groups or communities to support the continued social and physical activity of senior citizens. For instance, volunteer organizations, hobby clubs, or groups that engage in mild exercise. In addition to enhancing the social well-being of senior citizens, this creates small-scale opportunities for cooperation and productivity. (2) Company Initiatives: Organizations can put in place programs for knowledge transfer or mentoring between senior staff members and younger generations. This enables senior citizens to keep reaping the rewards of their priceless experience. In order to preserve their physical well-being, businesses can also redesign workspaces to be more senior-friendly and ergonomic, for example, by adding cozy chairs or better lighting. (3) Family Role: Families are essential in helping senior citizens maintain an active lifestyle. These include offering emotional support, inviting older adults to

engage in social activities, and encouraging them to continue participating in family decision-making. Maintaining the mental well-being and drive of older adults to continue being productive depends on this support.

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