

The Effect of Physical Activity on Social Isolation in Elderly

Sri Sunarti^{1,4*}, Khonsaa A. H. Subagyo², Tita Hariyanti³, Achmad Rudijanto⁴, Retty Ratnawati⁵, Setyawati Soeharto⁶, Maryunani⁷

¹ Doctoral Program in Medical Sciences, Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

² Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

³ Department of Public Health, Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

⁴ Department of Internal Medicine, Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

⁵ Departement of Physiology, Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

⁶ Departement of Pharmacology, Faculty of Medicine Universitas Brawijaya, Malang, Indonesia.

⁷ Faculty of Economics and Business Universitas Brawijaya, Malang, Indonesia.

***Corresponding Author:**

Sri Sunarti, MD. Doctoral Program in Medical Science, Faculty of Medicine Universitas Brawijaya. Jl. Veteran, Malang 65145, Indonesia. Email: sri_sunarti.fk@ub.ac.id

ABSTRACT

Background: Elderly people who have poor social relationships have a higher risk of death than those who have strong social networks. Loneliness and social isolation are associated with an increased risk of coronary heart disease and stroke. Physical activity can reduce social isolation, diverting feelings of loneliness by socializing with other people and expanding social networks by participating in the community. This study aimed to determine the effect of physical activity on social isolation in the elderly. **Methods:** A Cross-sectional study was conducted to 181 respondents. The data is collected through interviewing respondents with the International Physical Activity Questionnaire (IPAQ) and social isolation questionnaires. The data was then analyzed descriptively and calculated using Fisher's exact test. Setting: Ardirejo and Panggungrejo villages, Kepanjen District, Malang Regency. **Results:** Based on the Fisher's exact between physical activity and social isolation results were obtained p-value 0.000 (PR = 23.407; 95% CI = 3,117-175,800). **Conclusion:** There is a significant relationship between physical activity and social isolation in the elderly in the community.

Keywords: Social isolation, the elderly, physical activity, social interaction.

INTRODUCTION

The aging process causes various problems. One of the health problems experienced by elderly persons is a psychological problem, loneliness.¹ *The National Council on Aging and Older People* reports that the prevalence of elderly people in America who feel loneliness is 62%.² In Indonesia, the percentage of elderly who experience slight loneliness is 69%, there were 11% having moderate loneliness and 2% having severe loneliness, and 16% others did not experience loneliness. The loneliness felt

by the elderly is generally caused by a lack of social interaction and attention from the surrounding environment.³ This is a triggering factor for depression and other related symptoms, especially in the geriatric population.⁴ Social isolation refers to situations when an individual does not have a sense of belonging to socialize, has no involvement with other people, has a minimal number of social contacts, and unable to have quality relationships.⁵ The occurrence of social isolation can be a potential issue of emotional or psychological symptoms.⁶

Elderly who have poor social relationships have a higher risk of death compared to elderly who have strong social networks. It was also found that loneliness and social isolation are associated with an increased risk of coronary heart disease and stroke.⁷

Interventions to overcome social isolation in the elderly should focus on improving social relationships and interactions. Physical activity is known to reduce the social isolation in adults.⁹ Based on a qualitative study conducted by Robins [2016], elderly people believe that physical activity interventions conducted in groups can help them meet other people, expand their social networks, and help maintain their health by participating in the community. Thus avoiding social isolation being one of the most effective ways to improve psychosocial health.⁸ Currently, there are various physical training programs and exercises for the elderly.⁹ These programs include; daily active life program, physical fitness improvement program, strength improvement, and walking activities.¹⁰ These activities are low-cost alternatives to physical activities that are easy to implement in the elderly community. This can also be done in urban and rural areas.⁴ Based on Arahaf's study [2017], shown 64.2% of the elderly in Malang City can do physical activity independently and 35.8% feel dependence on family members in doing physical activities in daily life[11]. Other data revealed that elder people at Malang city have low level physical activity or inactive (35,4%), minimally activity (52,8%), and high activity (11,8%).¹²

Physical activity, especially regular exercise, is a non-pharmacological therapy that can be used as an intervention in preventing social isolation and managing loneliness in the elderly.¹³ Based on this information, the researcher wanted to know the association of the physical activity to the prevention of social isolation in the geriatric population.

METHODS

This is a cross-sectional study among elderly people who came to Posyandu lansia (community-based integrated service center

for older adults) in Ardirejo and Panggungrejo villages, Kepanjen District, Malang Regency.

Measurement

The research instrument used was the physical activity questionnaire from IPAQ (International Physical Activity Questionnaire), which categorized physical activity into two levels: light and moderate to vigorous physical activity. IPAQ questionnaires have been validated in 14 centers in 12 countries that have been internationally standardized with more than adequate level of validity ($r=0.40$) and reliability ($0.70-0.87$).¹⁴ Result from Indonesian version of the IPAQ questionnaires had small but significant correlation with physical activity recall ($r=0.28$).¹⁵ Social isolation questionnaire was taken from the Handbook of Geriatric Assessment 5th Edition. The questionnaire consists of 10 questions, with the answer "YES" or "NO" to each question. If the answer "YES" ≥ 5 , then the participant is declared positive to experiencing social isolation.¹⁶ The author examined the validity and reliability for social isolation questionnaire. Validity and reliability were measured using the product moment technique. The criteria for selecting items are based on the total item correlation value, generally using a total item coefficient 0.02 because the number of respondents is 50 ($r=0.2$). In the social isolation measurement questionnaire, the validity coefficient moves from 0.258 to 0.0727, except for item no. 7 which has a validity coefficient of -0.053 and a Cornbach's alpha value of 0.775. Item no. 7 will still be used for data collection by researchers, because it is considered not to affect other items. The Standardized protocols for data collection, including validity and reliability, can minimize inter-observer variability.

Ethics Approval and Consent to Participate

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was reviewed and approved by the research Ethics Universitas Brawijaya Malang No.100/EC/KEPK/04/2020.

Statistical Analysis

Data analysis includes descriptive analysis and hypothesis testing. In the descriptive analysis, categorical scale data, such as the level of physical activity (light and moderate to vigorous), were expressed as a frequency distribution. Hypothesis testing in data analysis uses an association test to determine the relationship between the independent and dependent variables. The association test used is *Fisher's exact* test. The confidence interval states the magnitude of the independent variable's influence on the dependent variable, and the p-value is considered significant if the p-value is <0.05. Data analysis was performed using SPSS 25.

RESULTS

Based on **Table 1**, it is known that from 181 respondents, the most respondents were elderly aged 60-70 years, which was 126 elderly (69.61%). Proportion of males and females in the elderly respondents were 21.54% (n=39) and 78.46% (n=142), respectively. The characteristics of respondents based on occupation were mostly as housewives, 93 elderly (51.4%). The highest level of education was primary school, with 75 elderly (41.4%).

According to **Table 2**, it can be seen that most of the elderly have a moderate level of physical

activity, which was 93 elderly (51.38%). In **Table 3**, it is known that social isolation occurred in 34 elderly (18.78%).

Table 4 shows the results of the *Fisher's exact* test are obtained with significance or *p value* = 0.000. So that if the *p value* <0.05, there is a significant correlation between physical activity and social isolation in the elderly.

Regarding to the calculations obtained from **Table 5**, it is known that the *odds ratio* between the level of light and moderate physical activity on the social isolation in the elderly is 23.407 (OR = 23.407; 95% CI = 3.117-175.800). It showed that the elderly with light physical activity levels are 23 times more likely to experience social isolation than the elderly who have moderate and vigorous physical activity levels.

DISCUSSION

In this study, it was found the most respondents who did physical activity was elderly aged 60-70 years old and the least was the elderly aged 91-100 years. According to data from Badan Pusat Statistik (BPS), the percentage of elderly in Indonesia is dominated by young elderly (aged 60-69 years) 63.82%, the rest are middle elderly and the older elderly people.¹⁴ According to Sharkey (2011) a person at the age of 60 and has retired, has more time to increase activity, although it can decrease with age.¹⁵ The

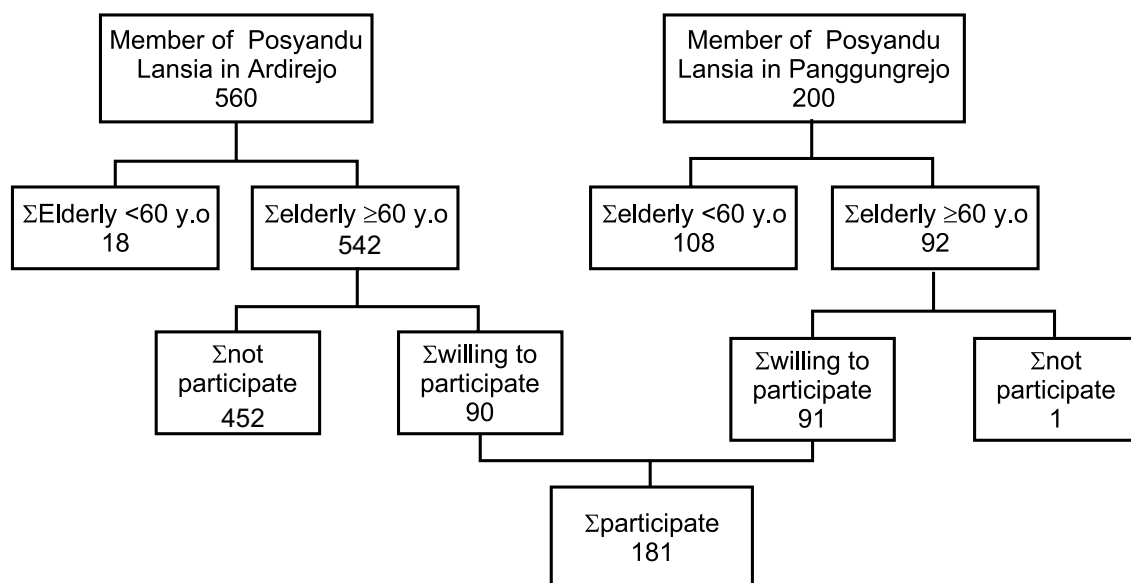


Figure 1. Flowchart participant recruitment

Table 1. Distribution of respondents' frequency characteristics (N=181).

Respondents' Characteristics	Frequency [f]	Percentages [%]
Age		
- 60-70	126	69.61%
- 71-80	48	26.52%
- 81-90	6	3.32%
- 91-100	1	0.55%
Gender		
- Male	39	21,54%
- Female	142	78,46%
Occupation		
- Housewife	93	51,4%
- Retired employee	36	19,9%
- Private employee	9	5%
- Entrepreneur	14	7,7%
- Driver/Taxibiker/ Pedicab driver	6	3,3%
- Labor	5	2,8%
- Farmer	8	4,4%
- Stockbreeder	1	0,5%
- Freelancer	4	2,2%
- Unemployed	5	2,8%
Level of Education		
- Unschoolers	4	2,2%
- Had not finished primary education	14	7,8%
- Elementary School	75	41,4%
- Junior High School	33	18,3%
- Senior High School	37	20,4%
- Bachelor	18	9,9%

(Source: Primary Data, 2020)

Table 2. Distribution of elderly physical activity frequency.

No.	Level of Physical Activity	Frequency [f]	Percentage [%]
1	Light	26	14.37%
2	Moderate to vigorous	155	85.63%
Total		181	100%

(Source: Primary Data, 2020)

Table 3. Distribution of elderly social isolation frequency

No.	Incidence of Social Isolation	Frequency [f]	Percentage [%]
1	Social Isolation	34	18.78
2	Normal	147	81.22
Total		181	100

(Source: Primary Data, 2020)

older they get, the lower the physical activity will be performed, this is due to a decrease in the strength level caused by comorbidities suffered by the elderly, thus it prevented the elderly to

Table 4. Cross tab between light and moderate to vigorous physical activity levels on the incidence of social isolation in the elderly

Physical Activity	Social Isolation	
	Normal	Social Isolation
Light	61	1
Moderate - Vigorous	87	32
Total	148	33

Table 5. Fisher's exact test, prevalence ratio calculation between light, moderate to vigorous physical activity levels on social isolation in the elderly.

No.	Incidence of Social Isolation	Frequency [f]	Percentage [%]
1	Social Isolation	34	18.78%
2	Normal	147	81.22%
Total		181	100%

(Source: Primary Data, 2020)

perform physical activity.¹⁶

The gender of respondents was dominated by women, which was 142 (78.46%) elderly, and the largest proportion had an occupation of being a housewife with 93 (51.4%) elderly. Demographically, women have a higher life expectancy²⁰ and women who are mother figures for their children and have maternal innate responsibilities where they are fully responsible for their family's condition and themselves, especially in the health aspect (housewives).¹⁸

In addition, the other respondents' occupations involves vigorous physical activity, such as 5 labourers, 8 farmers, 6 drivers, and 1 stockbreeder. Only 5 out of 181 respondents are jobless. This is in line with research conducted by Noni EJW and Katrin R (2008) which states that having job as farmers/laborers, tea pickers, and factory workers require vigorous physical activity.¹⁹ Workers who use skills over physical strength tend to involve lower levels of physical activity.²⁰ The heavier the activity, the more energy required to carry out these activities.²¹ In this study, the elderly who work as housewives generally have moderate to vigorous physical activity levels. This is in accordance with the previous theory which states that in general women have the responsibility to cook, clean

the house, doing errands, and do all activities that require a lot of walking, bending, standing, and lifting, thus when accumulated, the activity level of housewives are included in the category of moderate to vigorous physical activity levels. Since housewives do not accrue occupational physical activity or work-related commuting activity, housewives does engage in domestic activities, and may have additional child care or home care activity compared to employed women.²² By engaging in light to vigorous intensity physical activity for many hours during the day, housewives may achieve the same volume of activity as employed woman who engage in more short-term moderate to vigorous physical activity, but also spend more time sedentary.^{23,24}

Based on educational background, it can be seen that the majority of the elderly in Ardirejo and Panggungrejo village have a fairly low level of education, which is elementary school education. This was shown by 75 (41.4%) of 181 respondents only completed having their primary education. From these data, it was found that the physical activity of the elderly in Panggungrejo and Ardirejo villages had more moderate to vigorous physical activities than light physical activities. The results of this data are in accordance with research conducted by Cheah YK and Poh BK (2014) which states that the higher a person's education level, the lower the level of their physical activity.²³

Physical Activities of the Elderly in Ardirejo and Panggungrejo Villages, Kepanjen District, Malang Regency

According to the level of physical activity, 155 (88.05%) elderly had moderate to vigorous physical activity levels and 26 (14.37%) elderly had low activity levels. A *systematic review* of research articles on physical activity in elderly population around the world in 2000-2012 showed that physical activity is consistently associated with functional capacity, overall quality of life, autonomy, past, present, and future activities, death, relationship intimacy, mental health, vitality, and psychological conditions.²⁴ A high level of physical activity reduces the risk of mortality in the elderly. The elderly who were physically active at a moderate level of

150 minutes per week experienced a mortality reduction by 30% compared to those who were less active. The greatest benefit from physical activity is obtained by those aged 60 years and above.²⁵ Previous studies have shown that subjects with moderate to vigorous levels of physical activity are associated with good quality of life and good mental health.³⁰⁻³²

Social Isolation of the Elderly in Ardirejo and Panggungrejo Villages, Kepanjen District, Malang Regency

In this study, it was found that social isolation only occurred in 34 (18.78%) of the elderly in Panggungrejo and Ardirejo villages. Social isolation is defined as the termination of real relationship with society, groups and communities. In fact, it is defined as the weakness of social relationship and friendship, as well as correlation with formal and informal groups.²⁶ In Tehran of Iran, the proportion of elderly people in the population was 7.5% and it is known that 62% of the elderly of that proportion experienced social isolation. It shows the expansion of extensive social isolation in Tehran.²⁷

If it is reviewed with frequency distribution of physical activity data, it can be seen that the physical activity of the elderly in the two villages has moderate to vigorous activity levels. In accordance with the research hypothesis that the higher the physical activity performed by a person, the higher the reduction of the occurrence of social isolation. This is also in line with research conducted by Robins (2016) which explains group physical activity is known to reduce the occurrence of social isolation in adults.⁸ Elderly who live in a supportive environment for physical activity has lower risk of social isolation.²⁸

The Effect of Physical Activity on Social Isolation in the Elderly

In this study, it was found that the elderly in Ardirejo and Panggungrejo villages had a fairly high level of activity. It can be seen from the data that there are more elderly who have moderate to vigorous physical activity than light physical activity. Physical activity level was related to the level of social isolation that occurs in the two villages. The percentage of elderly with social isolation was only 18.78%

in the two villages. It could be due to the high level of physical activity of the elderly in the two villages. After doing the *fisher's exact test*, there was a significant correlation (p value <0.05) with the p value between the level of physical activity and social isolation in the elderly being 0.000 (PR = 23.407; 95% CI = 3.117-175.800). The results of this study is in line with research conducted by Robins that physical activity was significantly associated with social isolation with an odds ratio of 1.03 (CI 1.01-1.04, p -value 0.002).⁹ Intervals that are very wide (3.117-175.800) indicate that we have little knowledge about the result, and that further information is needed.

It shows that there is an effect of physical activity on the occurrence of social isolation in the elderly where the higher the level of physical activity, the lower the incidence of social isolation. This is in line with one of previous studies which states that social isolation is associated with sedentary behaviour, mild, and moderate levels of physical activity. These findings are consistent with the possible role of physical activity in health risks toward social isolation. Although not large, there still seem to be difference in physical activity between the daily life of more isolated individuals and those who are not. These differences will accumulate as the time goes by and contribute to an increased likelihood of chronic disease and disability in the elderly.²⁹

Physical activity is one of the most effective ways to improve health in populations and psychosocial health.³⁰ Old elderly can avoid the occurrence of health problems associated with social isolation by participating in social interactions that are held regularly by communities or institutions.³¹ Voluntary activities such as social service performed by older adults provide better mental health and physical function also reduce the risk of death.³²⁻³⁴ Regular exercise can improve cardiovascular, metabolic, endocrine, and psychological health. Support from others is an effective way to reduce the negative effects of loneliness for the elderly to stay active.¹³ Currently, there are various physical exercise programs and sports for the elderly with the aim of reducing social isolation and its various consequences.⁹ These programs include; daily active life program, physical

fitness improvement, strengthening exercises, and walking activities.¹⁰

In line with the research explored by,³⁵ compared to other forms of treatment therapy of social isolation (e.g mindfulness therapy, art, and craft therapy), physical activity intervention, especially in small groups (up to eight to nine people), can assist in building friendly and trusting relationships between participants. Some intervention consist of aerobic exercise training in small group, that allow the participants to interact each other.³⁵

Mechanism of physical activity can affect social isolation through loneliness reduction models, stress reduction and increased social support during activities. Physical activities can increase peripheral social networking during friendly conversation between participants.³⁶ Beside that, enjoyable forms of physical activities generate happiness and bring positive emotions, which in turn could be related to loneliness reduction as shown in longitudinal study by Newall.³⁷ In the group, elderlies can share interest and goals, which in turn strengthening the social interaction and promote well-being.³⁸

Confounding Factors Affecting Association Between Social Isolation and Physical Activity

Firstly, poor physical health, limits capacity for physical activity and is associated with social isolation and loneliness (Coyle and Dugan, 2012). Second, problem with modality and impairment in activities of daily living (ADLs) may restrict social interaction and associated with depression in elderlies.³⁹ Socioeconomic status partly explains links between social isolation/loneliness, disease risk, and mortality.^{40,41} An association between social isolation and physical activity could be secondary to any of these factors.

The relation between physical activity and social isolation is a vicious cycle. Poor physical activity will reduce physical fitness and limit social interaction. In the other side, lack of social interaction can pomote loneliness and induce depression, which interferes with motivation to be physically active.

There are limitations of this study. In this research the willingness elderly to participate was low. This study has not performed multivariate analysis, because the data did not fulfill the basic requirements for independent variables of at least having 0.05 the principle of factor analysis is the correlation between variables. This may lead future research to evaluate deeply.

In addition, the better way to estimate the level of physical activity is with qualitative measures, such as accelerometer-based measurements rather than self-reported results.²⁹ Changes in norms with age and disability of what constitutes vigorous activity, cognitive and recall problem can limit the accuracy of self-reports in older age.

Future research may need to address the limitations above for better elucidation of the association.

Implications for the Field of Medicine

This research is expected to be an alternative method to prevent and reduce the occurrence of social isolation in the elderly through increased physical activity, especially physical activity in groups or in a community. We also hope that this research can give insight into the effect of physical activity on the management of loneliness, physical health and psychological health improvement in the elderly.

CONCLUSION

There is a significant correlation between physical activity and social isolation in the elderly. The vigorous the physical activity, the lower the occurrence of social isolation in the elderly.

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