



Relationship between Sex, Age, Body Mass Index, and Physical Fitness with Elderly Participation

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Abstract

The purpose of this study was to reveal the relationship between sex, age, body mass index and physical fitness with the level of active participation of the elderly in development. The research method used is descriptive correlational. Samples were taken from the sports association of the elderly who live in the Pasir Layung Village of Bandung City as many as 30 people. The results showed that there was a sex relationship to TPA with a percentage of 58.5% for male and 41.5% for female, the relationship between age and TPA with a Sig. 0.000 <Sig. α with $r = -0.637$, the relationship between BMI and TPA is the Sig. 0,000 <Sig. α with a value of $r = -0.826$, and the relationship between physical fitness and TPA with the Sig. 0,000 <Sig. α with a value of $r = 0.857$. The conclusion of this study is that there is a relationship between sex, age, body mass index and physical fitness with the level of active participation of the elderly in development.

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INTRODUCTION

Elderly is someone who experiences increasing age accompanied by a decrease in physical function characterized by a decrease in muscle mass and strength, a decrease in maximum heart rate, an increase in body fat and a decrease in brain function (Azizah, 2011). Meanwhile, according to the Government Regulation of the Republic of Indonesia Number 43 of 2004, an older adult has reached 60 (sixty) years and over. When a person enters old age, his body will no longer elevate.

Based on the population census in 2014, the number of older adults in Indonesia is 18.78 million. In 2050, the number of older adults is estimated to be 21.4% and will become 41% of the total population in 2100 (Indonesian Ministry of Health, 2014). This requires serious handling from various parties, especially families, central government, local governments, and community institutions. The elderly must be empowered to live independently, namely independence in the bio-psycho-sociological life cycle (Giriwijoyo, 2004).

The old-age dependency ratio or old dependency ratio is a number that shows the level of dependence of the elderly population on the productive population. This figure compares the number of elderly people / 60 years and over with the productive population aged 15-59 years (Odekon, 2015; OECD, 2015; United Nations, 2002). This figure is reflected in the enormous economic burden that the productive population must bear to finance the elderly population. The data on the problem of the dependency ratio of the elderly population can at least be used as an illustration for all of us so that in the future, this number can be reduced by empowering the elderly for bio-psycho-sociological independence, as stated above.

According to (Berkman et al., 2013), doing a structured physical activity program will positively impact depression symptoms and life quality in the elderly. Therefore, by doing sports activities, the elderly will maintain their physical fitness to carry out various daily activities (Chodsko-Zajko et al., 2009). Efforts that can be made through regular and measured physical activity or health exercise aim to maintain the decline in moving slowly and not decrease drastically and reduce depression in the elderly (Salguero, Martínez-García, Molinero, & Márquez, 2011).

Physical fitness is the body's ability to carry out activities without experiencing significant fatigue (Kyröläinen, Santtila, Nindl, & Vasankari, 2010). A person will get the right fitness level if

he routinely performs physical activities or sports (Rauner et al., 2013). Physical activities carried out by humans are closely related to the quality of life, health, and well-being (Chen, Hui, Lang, & Tao, 2016). Conversely, suppose humans do not carry out physical activity according to their needs. In that case, likely, they will easily contract diseases due to lack of movement (hypokinetic), such as type 2 diabetes (Gram, Dahl, & Dela, 2014). According to (Ogilvie et al. 2011), lack of physical activity can put you at risk for obesity and many other chronic diseases, including coronary heart disease, diabetes, and colon cancer. However, it cannot be avoided that a general decrease in physical activity will occur in old age, along with decreased muscle capacity, the appearance of stiffness, and pain in joints (Buckwalter & Dinubile, 1997).

An active lifestyle must be carried out throughout life to support human life, without exception for the elderly. The results showed many benefits from participation in physical activity training for the elderly (Rousseau, 1989), including improving cardiovascular function, lowering blood pressure, and increasing work capacity. It is enough to do two and a half hours of physical activity per week to significantly reduce chronic disease risk (Ogilvie et al., 2011). However, other studies have shown that about 100 minutes of exercise per day is even better (Van Den Brink et al., 2005). Exercise programs for the elderly include cardiovascular exercise, muscle strength, flexibility, and coordination with a frequency of 3 to 6 times per week, a duration of 50 to 60 minutes per training session with low intensity between 60% - 70% of the maximum pulse (Emerson, 1991, 1989). In addition to maintain the health and fitness of the elderly, a structured physical activity training program can also be used as a therapeutic tool (Short & Leonardelli, 1987). An exercise program for the elderly carried outdoor can raise a much more positive mood than people who do not exercise and positively affect their participation in this program directly (Matsouka, Bebetos, Trigonis, & Simakis, 2010).

With certain physical activities, the elderly can positively affect strength, balance, and quality of life (Simmonds & Wideman, 2010). A decrease in these older adults' quality and physical abilities makes them less likely to be motivated to do something they are capable of doing. Older people can do light to moderate activities according to their abilities, such as gardening, walking around the house, and so on. This means that they must be educated about the importance of physical activity and sports training for the elderly (Lohne-Seiler & Torstveit, 2012).

Physical activity that is routinely carried out, even though it is mild in shape, will still affect the health of the elderly compared to just being silent. Regular physical activity is essential for healthy aging ... even in older adults with existing functional limitations, scientific evidence indicates that regular physical activity is safe and helps to improve functional ability (Services, 2008).

From some of the statements above, the authors can interpret that there are many benefits from the participation of older men and women in carrying out physical activities or sports, such as improving cardiovascular function, reducing hypertension, increasing work capacity, and many other physical benefits fitness. Also, the nutritional status of the elderly as measured by the body mass index / BMI scale is used as an indicator of elderly health. The authors are interested in researching the relationship between gender, age, and body mass index (BMI) with the physical fitness of the elderly.

METHODS

The research method used is descriptive correlational. The independent variables are X1: sex, X2: age, X3: body mass index, and X4: physical fitness; The dependent variable Y: Level of Active Participation in Development, which is divided into five categories, namely very active, active, moderately active, less active, and inactive; Some of the fields of participation in development are: participation in the field of education and training, social, sports, recreation, arts, work, and religion. The sample or research subject used were the elderly who live in Bandung as many as 30 people, including the pre-elderly and elderly groups; the sample was taken randomly. The design used in this descriptive correlational study is a pattern, as described below **Figure 1**.

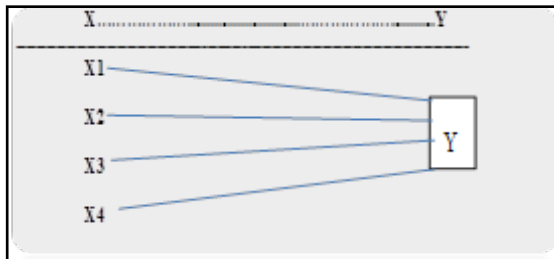


Figure 1. Research Design

The design description is as follows: X: The variable that affects / the independent variable / independent variable consists of 4 variables, namely: X1: Sex consists of 2 types, male and female; X2: Age, consisting of 2 groups, pre-

elderly and early elderly; X3: Body Mass Index, consists of 3 categories, thin, normal, and obese; X4: Physical Fitness, Y: The variable affected / dependent variable / dependent variable, namely the level of active participation in development, which consists of 5 categories, namely: very active, active, moderately active, less active, inactive.

The instrument used to measure the level of active participation in development is an adaptation of the test instrument used in the study entitled "The Effect of Elderly Social Participation Levels on the Healthy Aging Process" (Kusmaedi, 2008). The data obtained were analyzed using SPSS version 22 software. The prerequisite analysis test used the normality test and the linearity test. The statistical data analysis technique used Pearson Correlation with a significance level of P <0.05.

RESULTS AND DISCUSSION

Table 1. Description of Research Data

	Variable	Statistic
Sex	Male	15
	Female	15
Age	Mean	65,1
	Median	66
	SD	7,14
	Min	51
	Max	78
	Range	27
	Mean	27,25
BMI	Median	26,95
	SD	2,43
	Min	22,1
	Max	31,7
	Range	9,6
	Mean	91,3
	Median	91,5
Physical fitness	SD	6,06
	Min	81
	Max	101
	Range	20
	Mean	7,4
	Median	7,5
	SD	2,37
TPA	Min	4
	Max	14
	Range	10

Table 1 presents the description of the research data. The number of samples in this study consisted of 30 samples with a distribution of 15 male and 15 of female elderly. The average age was 65.1 ± 7.14 , the average BMI value was 27.25 ± 2.43 , the average physical fitness value was 91.3 ± 6.06 , and the average TPA value was $7, 4 \pm 2.37$.

Normality test

Table 2 showed that all data are normally distributed, so it is feasible for the next testing phase.

Table 2. Normality Test Results

Variable	Kolmogorov-Smirnov		Shapiro-Wilk	
	Sig.	Category	Sig.	Category
Age	0,2	Normal	0,45	Normal
BMI	0,2	Normal	0.82	Normal
Physical Fitness	0,09	Normal	0,07	Normal
TPA	0,2	Normal	0.91	Normal

Relationship between Sex and the Level of Active Participation of the Elderly in Development

Table 3. Relationship between sex and TPA

Sex	N	TPA				Percentage
		Min	Mean	SD	Max	
Male	15	5	8,67	2,22	14	58,5%
Female	15	4	6,13	1,8	9	41,5%

Based on **Table 3**, it can be seen that the average TPA value for male is 8.67 ± 2.22 , and the average TPA value for female is 6.13 ± 1.8 . The average TPA value for male was higher than the average TPA value for female, with a percentage of 58.5% and 41.5%. So, it can be concluded that the male can PRODUCE a greater level of active participation.

Relationship between Age, BMI, and Physical Fitness to the Level of Active Participation of the Elderly in Development

Based on the **Table 4** the average age is 65.1 ± 7.14 with $r -0.637$ and Sig. 0,000. Sig. Count <Sig. $\alpha(0.000 <0.05)$ means that there is a relationship between age and the level of active participation of the elderly in development.

A negative r value (-0.637) shows the opposite direction, meaning that the TPA will be smaller if the age is getting bigger.

Table 4. Statistical Test Results Relationship between Age, BMI, and Physical Fitness to TPA

Variable	N	Mean	SD	Pearson Correlation (r)	Sig.
Age	30	65,1	7,14	-0,637	0,000
BMI	30	27,25	2,43	-0,826	0,000
Physical Fitness	30	91,3	6,06	0,857	0,000

The average BMI value was 27.25 ± 2.43 , with a value of $r -0.826$ and Sig. 0,000. Sig. Count <Sig. $\alpha(0.000 <0.05)$ means a relationship between BMI and the level of participation of the elderly in development. A negative r value (-0.826) indicates the opposite direction, which means that the greater the BMI, the smaller the TPA.

The average value of physical fitness is 91.3 ± 6.06 , with r value 0.857 and Sig. 0,000. Sig. Count <Sig. $\alpha(0.000 <0.05)$, which means a relationship between physical fitness and the level of active participation of the elderly in development. The positive value of $r =0.857$ indicates a positive direction, which means that the greater the value of physical fitness, the greater the TPA.

Relationship Between Sex and The Level of Active Elderly Participation in Development

Based on the research results, it shows that the first hypothesis is accepted, namely sex is related to the level of active participation of the elderly in development. Gender refers to the biological differences between male and female. Based on the results of the study, the male elderly produced a greater level of participation in terms of development compared to the female elderly. This is because the male is more likely to enter all sectors in society.

Meanwhile for the female, there are still limitations where not all aspects of development can be followed. The gender factor determines the level of participation and productivity of a person at work (Putri, 2016). The level of active participation in development is one form of productivity that is done by humans, both when they are young and when they are elderly. In this study, it was specifically found that gender is related to the level of active participation of the elderly in community development.

Relationship Between Age and The Level of Active Elderly Participation in Development

Based on the results of the study, it shows that the second hypothesis is accepted, namely that age variable is related to the level of active participation of the elderly in development. For both male and female elderly, the age factor greatly influences the level of their active participation in development. As you get older, the level of active participation in its development decreases. This is evidenced by the correlation value which is marked negative, which means that it has an inverse relationship.

As the elderly get older, they are often faced with declining health factors. Illness susceptibility, and decreased physical fitness are some of the factors that will hinder the participation of the elderly in actively participating in development. Age is related to the level of work productivity (Mahendra, 2014). Young people are considered to have greater physical strength than the elderly. This factor is what ultimately affects the level of active participation of the elderly in development. Given the importance of these physical conditions, the elderly was encouraged to exercise in order to maintain their physical condition in good condition so as to produce high productivity in the field of community participation.

Relationship Between BMI and The Level of Active Elderly Participation in Development

The results showed that the third hypothesis was accepted, namely that the Body Mass Index (BMI) related to the level of active participation of the elderly in development. The Body Mass Index (BMI) can be used as a reference scale for measuring the condition of a person's nutritional status, including the elderly. Nutritional status is closely related to a person's health status, in this case including the elderly. A normal BMI value indicates a good level of nutritional status, and also good health status.

Body Mass Index (BMI) is one of the factors that affect to productivity (Widiastuti, 2011). The standard BMI value makes it more possible for someone to do multitasking activities because there are no obstacles to doing work. A normal BMI also makes the body feel lighter, less tired, and more fit. The correlation value (r), which is irrelevant, indicates the opposite relationship between BMI and the level of active participation of the elderly in development. As with the age variable, the higher the BMI value, the lower the

level of active participation of the elderly in development. A high BMI value means overweight will prevent a person from carrying out their daily activity.

Relationship Between Physical fitness and The Level of Active Elderly Participation in Development

The results showed that the fourth hypothesis was also accepted, namely that physical fitness was related to the level of active participation of the elderly. The correlation value (r), which shows a positive value, indicates a linear relationship. The higher the level of physical fitness, the grander the level of active participation in development will be. The elderly who have good physical fitness will carry out various activities without experiencing significant fatigue. This is a supporting factor for an older adult to play an active role in community development.

Physical fitness affects work productivity; the higher the physical fitness, the more productive a person can be (Utami, 2016). The level of active participation in development is one form of one's productivity, in this case, including the elderly. Good physical fitness can be obtained through physical activity or regular exercise with the right dose. Exercise makes human organs more active so that it can be a medium to slow down aging. The elderly who routinely do sports are proven to have an adequate level of physical fitness to affect productivity, including the level of active participation.

CONCLUSION

There was a relationship between sex and elderly development. The male can produce a more significant than the female level of active participation. There was also a relationship between age and the level of elderly social participation in development. As the elderly get older, their participation level tends to decrease due to their decreased physical ability to record. Body mass index (BMI) correlates to the level of social participation in the elderly in development. A healthier body provides a better chance of daily activities. A body that is too fat or too thin can provide obstacles to optimal participation in development. Also, there was a relationship between physical fitness and the level of social participation of the elderly in development. Better physical fitness provides a better opportunity to increase skills development than those with deficient physical fitness levels.

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