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Body Mass Index and Physical Fitness of Dayak Paramasan Elders

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ABSTRACT

Physical fitness in the elderly, particularly among the Dayak Paramasan tribe, plays a crucial role in enhancing overall quality of life and health. This study aims to examine the relationship between Body Mass Index (BMI) and physical fitness levels in elderly individuals from the Dayak Paramasan tribe using the Six-Minute Walk Test (6MWT) as an indicator of cardiorespiratory fitness. The research employs a quantitative cross-sectional design with a purposive sample of 30 elderly participants. Data were collected through questionnaires for demographic and health information, and 6MWT to assess physical endurance. Descriptive analysis was conducted to identify BMI characteristics and 6MWT results, and correlation analysis to understand the relationship between BMI and physical fitness. The results indicate that elderly individuals with normal BMI and higher 6MWT scores tend to have better physical fitness. Conversely, high BMI is associated with decreased physical fitness. The study concludes that increasing physical activity and maintaining a healthy diet are crucial for improving fitness and quality of life in the elderly, particularly within indigenous communities such as the Dayak Paramasan tribe.

INTRODUCTION

Physical fitness, defined as an individual's ability to perform daily activities without excessive fatigue, has an important role in various aspects of life, including learning achievement and long-term health (Huwaida et al., 2022; Putri, 2022) . Physical fitness measurement can be done through various tests, such as running, hanging, and long-distance running (Sinuraya & Barus, 2020) , as well as by using modern technology (Yudhistira, 2023) . Despite this, research shows that the level of physical fitness in children still needs to be improved (Suhartoyo et al., 2019) . Physical fitness is influenced by various factors, including physical activity, diet, and sleep quality (Rosario et al., 2019; Safaringga & Herpandika, 2018) . Thus, improving physical fitness requires a comprehensive approach that involves various aspects of life, from schools to communities.

The aging process is a natural stage experienced by every individual, but the quality of life in old age can still be maintained (Suryadi et al., 2024) .To carry out daily activities without fatigue, a person needs to have a good level of body fitness (Dirgantoro & Fauzan, 2021a) . The higher the level of physical fitness, the greater the physical ability a person has (Dirgantoro & Fauzan, 2021b) . Physical fitness can also be used as an indicator of a person's healthy condition (Bahari et al., 2020) . This shows

that physical fitness is not just a physical ability, but also a reflection of a person's overall health condition.

Physical activity, especially exercise, is very important in improving health and fitness, especially if done regularly and in moderation (Hayati et al., 2023; Rizaldi et al., 2023) . In addition, environmental factors, such as place of residence, also affect a person's level of physical fitness (Fadli et al., 2020) . Physical activity aims to keep the body in top shape, and optimal fitness can only be achieved through consistent exercise (Fahrurrazi et al., 2022; Hafidzah et al., 2022) . The development of the world of sports, both in the fields of recreation, education, and achievement, is increasingly visible through the increasing number of fitness centers and sports communities throughout Indonesia (Hadi et al., 2021) .

Physical fitness in the elderly, especially the Dayak Paramasan tribe, plays an important role in maintaining quality of life and overall health. The aging process is often accompanied by a significant decline in physical function, which impacts the mobility and independence of the elderly. Research shows that regular physical activity can slow the decline in physical function as well as improve overall physical fitness (Cahyana, 2023; Nur'amalia, Rabia, et al., 2022; Nuraeni et al., 2019) . For example, elderly exercise has been shown to be effective in improving cardiorespiratory endurance (Nuraeni et al., 2019; Suyamto, 2022) . In addition, regular physical activity also provides psychological benefits by reducing the risk of depression and anxiety (Noor & Merijanti, 2020; Septiani et al., 2021) .

Regular physical activity also plays a role in preventing common health problems in the elderly, such as metabolic syndrome and decreased cognitive function (Noor & Merijanti, 2020; Sudibjo et al., 2021) . Further research shows that physical activity can improve cognitive function as well as slow the mental decline that often occurs in the elderly (Lidyana et al., 2020; Noor & Merijanti, 2020) . Therefore, it is important for physical fitness programs to consider both physical and mental health aspects of the elderly to achieve optimal results.

Body Mass Index (BMI) is an important indicator of physical fitness in the elderly. Research found a relationship between BMI and physical fitness in the elderly, emphasizing the need for BMI monitoring as part of a health program for the elderly (Oktriani et al., 2020) . An unbalanced BMI can increase the risk of degenerative diseases and worsen the physical condition of the elderly. In this case, the 6-Minute Walk Test (6MWT) is a measurement tool that is often used to assess physical fitness. Several studies have shown that gymnastics and other physical activity interventions can improve the physical capacity of the elderly, as measured through the 6MWT (Nuraeni et al., 2019; Waluyo et al., 2021) . Overall, previous studies have shown that the physical fitness of older adults, as measured through physical activity, BMI, and 6MWT, has a significant impact on their health and quality of life. Programs that increase physical activity and pay attention to health factors such as BMI are important to implement, especially among indigenous communities.

For the Dayak Paramasan tribe, an approach that considers local culture and habits in physical fitness programs is very important. Education about the importance of physical activity tailored to the conditions of the elderly can increase their participation in fitness programs (Ainiyah et al., 2021; Nur'amalia, Rabia, et al., 2022) . Research shows that physical activities that are accessible and appropriate to physical abilities can increase older people's motivation and engagement in the program (A.P., 2023; Wahyuni et al., 2022) . For example, gymnastics specifically designed for older people can be done in a comfortable and familiar environment, which helps to increase self-confidence and independence (Asmunandar et al., 2021; Suyamto, 2022) . The health conditions of indigenous people, including the elderly from minority groups such as the Dayak Paramasan Tribe, also need to be considered in the context of physical fitness. Research shows that participation in physical activity contributes to improving the quality of life of older people in their cultural and social context (Dewi, 2018; Suyamto, 2022) .

Based on the explanation of the research background, the authors conducted a study that aims to determine the Body Mass Index (BMI) and the level of physical fitness in the elderly Dayak Paramasan Tribe, using the 6 Minute Walk Test (6MWT) as an indicator of cardiorespiratory fitness.

METHODS

Research methods include systematic approaches used to collect, analyze, and interpret data, forming the backbone of scientific inquiry across a wide range of disciplines (Kothari, 2004) . The research method that will be used in this study is descriptive quantitative. Quantitative descriptive research method is a systematic approach that utilizes numerical data to describe population characteristics or phenomena without manipulating variables (Barella et al., 2024) . The focus of this research is on Body Mass Index (BMI) and 6 *Minutes Walk Test* (6MWT) on the health of Dayak Paramasan elderly.

Type of Research

This study is a quantitative study with a *cross-sectional* design. This design was chosen because it allows researchers to collect data at a single point in time to analyze the relationship between BMI variables and 6MWT outcomes in the elderly (Nur'amalia, Abdullah, et al., 2022) . This study will also involve direct measurement of relevant physical variables, such as BMI and physical performance through the 6MWT, which has been shown to be effective in assessing the functional capacity of older adults (Palilati et al., 2021; Waluyo et al., 2021) .

Research Subject

The research subjects were elderly Dayak Paramasan aged 60-69 years. The population in this study was 56 people (Documentation of Paramasan Health Center, 2024). Based on this population, the researcher took a research sample of 30 people consisting of 15 men and 15 women, with inclusion

criteria which included elderly people who did not have chronic diseases that interfered with their physical activity. Subject selection was carried out by *purposive sampling* to ensure that all participants met the specified criteria, namely the inclusion criteria, namely the elderly aged between 60-69 years according to the Indonesian Ministry of Health in 2009, domiciled in Paramasan District. Elderly, according to the Ministry of Health of the Republic of Indonesia, is defined as individuals aged 60 years and over. This definition reflects recognition of the natural aging process and the health challenges faced by this age group. Aging is not only related to physical aspects, but also includes psychological and social dimensions that are important to consider in planning and implementing health programs (Febriana et al., 2023; Wahyuni et al., 2022) .

Data Collection Instruments

Data collection will be conducted using two main instruments:

1. Body Mass Index (BMI) Test Sheet: Body Mass Index (BMI) is a commonly used tool to assess a person's weight status based on height and weight. BMI is calculated by the formula weight (in kilograms) divided by the square of height (in meters). This measurement is important because BMI can provide an early indication of the health risks associated with obesity or underweight. Research shows that a high BMI correlates with various health problems, including diabetes, hypertension, and other metabolic disorders (Fikha, 2023; Vuong et al., 2015) .
2. 6 Minutes Walk Test (6MWT): This test will be used to measure the physical endurance and cardiorespiratory capacity of the elderly. The 6MWT procedure will be carried out in accordance with established guidelines, where participants are asked to walk as far as possible within six minutes (Waluyo et al., 2021) .

Data Analysis

The data collected will be analyzed descriptively to describe the demographic characteristics and fitness level of the subjects (Febriana et al., 2023; Nugraha et al., 2021; Nur'amalia, Abdullah, et al., 2022) . Physical fitness categories based on the 6MWT mileage test can be seen in Table 1.

Table 1. Elderly Physical Fitness Categories Based on the 6MWT Mileage Test

No.	Mileage 6 MWT	Category
1.	< 300 meters	Bad
2.	300-400 meters	Medium
3.	> 400 meters	Good

Source: (Nugraha et al., 2021)

RESULTS AND DISCUSSION

The results of the study showing data on body mass index (BMI) and 6MWT test results in elderly Dayak Paramasan can be seen in Table 2.

Table 2. Summary of BMI Data and 6MWT Test Results in Dayak Paramasan Elders

Participant Initials	***Age (years)***	***Height (cm)***	***Body weight (kg)***	***IMT***	***6MWT Distance (m)***	***Fitness Level***
US	67	141	39	19,6	350	Medium
RU	63	145	41	19,5	400	Good
US	60	149	45	20,3	400	Good
KU	60	147	53	24,5	450	Good
UM	69	157	45	18,5	440	Good
TI	60	146	40	18,8	400	Good
IP	60	145	46	21,9	400	Good
UL	61	150	54	24	400	Good
LI	60	151	45	19,7	420	Good
UD	61	157	50	20,3	420	Good
US	60	154	47	19,8	400	Good
IN	60	159	51	20,2	400	Good
MA	63	149	50	22,5	450	Good
AT	60	152	53	22,9	400	Good
DU	62	158	57	22,8	450	Good
AB	60	160	53	20,7	400	Good
UMB	69	130	33	19,5	300	Medium
UT	62	160	52,8	20,3	325	Medium
RI	60	156	47,2	19,3	320	Medium
SI	65	151	55,5	24,1	350	Medium
SU	60	145	41,5	19,5	400	Good
KA	60	140	40	20,4	450	Good
SA	61	176	57,6	18,7	370	Medium
SAU	60	151	55	24,1	330	Medium
HA	68	179	59	18,4	330	Medium
RA	63	143	45	22	330	Medium
MA	68	156	40	16,4	330	Medium
AB	62	161	46	17,7	350	Medium
AM	67	138	34	17,9	320	Medium
HE	60	155	60	25	310	Medium
Average				23,67	379,83	Medium

The data presented in table 2 includes several variables such as age, height, weight, Body Mass Index (BMI), *6-Minute Walk Test* (6MWT) mileage, and fitness category. This study aims to determine the physical condition of Dayak Paramasan elderly based on these indicators.

Average BMI: The mean BMI value in this elderly group was 23.67. Based on the WHO classification, this value generally indicates normal weight. Variations: There was significant variation in BMI values, ranging from underweight to obese. This shows the diversity of physical conditions in

the elderly group studied. 6MWT Distance Traveled. Average Distance: The average distance covered by the 6MWT was 379.83 meters. This value can be used as an indicator of aerobic capacity and cardiovascular endurance. Fitness Category: Most of the elderly fitness in this study was categorized as "moderate" based on the 6MWT results.

Although the average BMI showed normal values, the 6MWT results indicated problems with physical function. This suggests that BMI alone is not always an accurate indicator to assess the physical condition of the elderly, especially in terms of cardiovascular function. Other influencing factors such as age, gender, underlying health conditions, and level of physical activity can also affect 6MWT results.

Results of Body Mass Index (IMT) of Elderly Dayak Paramasan Tribe

The relationship between Body Mass Index (BMI) and physical fitness in the elderly Dayak Paramasan tribe can be seen in Figure 1.

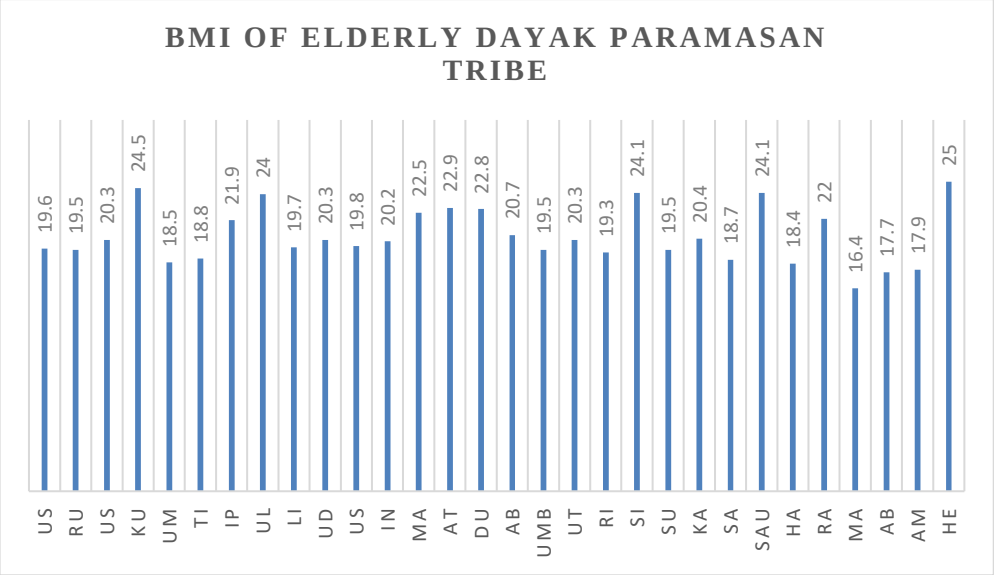

Figure 1. IMT of Elderly Dayak Paramasan Tribe (Source: Data Analysis Results)

Figure 1 shows that most participants had a BMI status in the normal category, with some individuals being overweight and obese. Previous studies have shown that higher BMI is often associated with decreased physical fitness, especially in the elderly population (Concha-Cisternas et al., 2020; Higieny, 2023; Oktriani et al., 2020) .

Physical fitness in the elderly is strongly influenced by physical activity that is carried out regularly. Research by confirms that physical fitness in the elderly is closely related to physical activity carried out, where regular activity can improve physical fitness (Oktriani et al., 2020) . This is in line with findings showing that higher levels of physical activity contribute to better health and well-being in the elderly (Bae et al., 2017) . Therefore, individuals with normal BMI tend to have better physical fitness compared to those with higher BMI, as seen in some participants in this study who showed

overweight or obesity (Higieny, 2023) .

The results also showed that individuals with normal BMI, such as AS, RU, and US, had better physical fitness compared to those in the overweight category, such as KU and UL. Research supports this finding by showing that low levels of physical activity are associated with lower functional capacity in older people (Buckinx et al., 2021) . In addition, other studies have shown that older women with higher BMI tend to have lower physical fitness (Kaczorowska et al., 2022) .

It is important to note that while BMI is a useful indicator, other factors such as gender, age, and physical activity patterns also contribute to the physical fitness of older adults. The results of research show that community-based exercise programs can improve physical fitness among the elderly, which suggests that appropriate interventions can help improve fitness despite risk factors such as high BMI (Seguin et al., 2012) . Individuals with normal BMI tend to have better physical fitness, while those with overweight or obesity show a decline in physical fitness. Therefore, it is important to encourage regular physical activity and a healthy diet to improve health and fitness among the elderly population.

The relationship between the results of the 6 Minute Walking Test (MWT) and Physical Fitness in the Elderly Dayak Paramasan Tribe

The relationship between the results of the 6 *Minute Walking Test* (MWT) and Physical Fitness in the Elderly Dayak Paramasan Tribe can be seen in Figure 2.

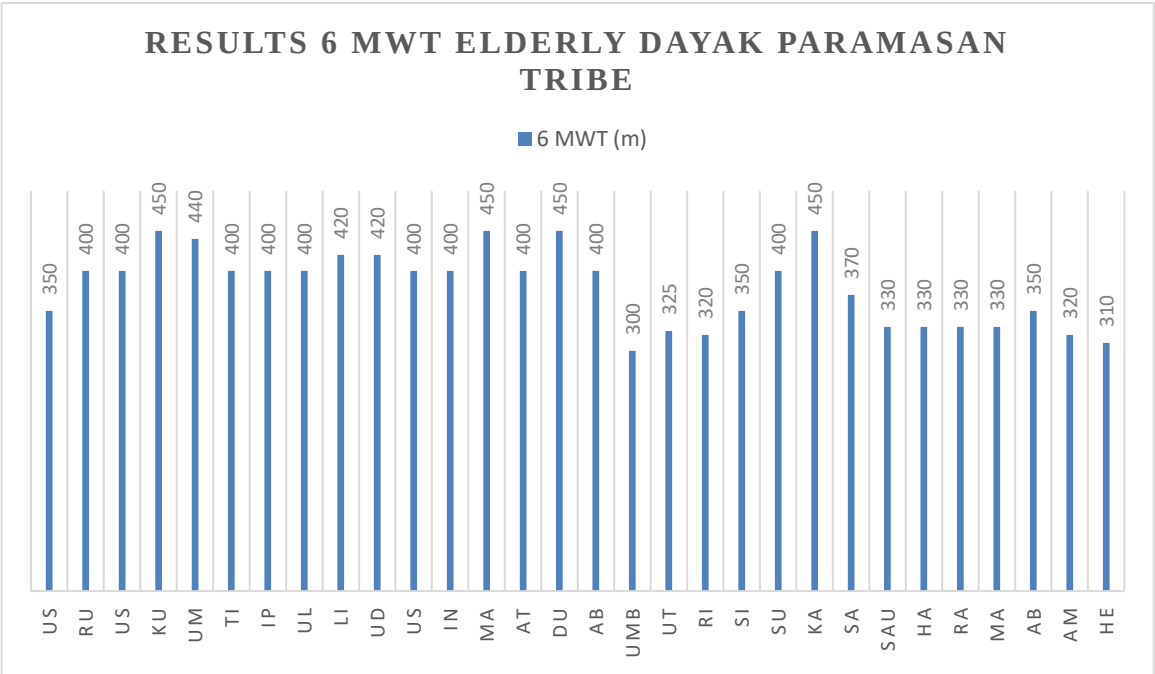

Figure 2. Results of 6 MWT Elderly Dayak Paramasan Tribe (Source: Data Analysis Results)

Figure 2 shows the relationship between the results of the *Six-Minute Walk Test* (6MWT) and physical fitness in the elderly Dayak Paramasan tribe showing significant variations in the distance

traveled by participants. The data obtained shows that participants with higher 6MWT results tend to have better physical fitness levels. For example, participants such as KU and MA who recorded 450 meters showed better performance compared to other participants such as UMB who only reached 300 meters. This is in line with research showing that the 6MWT is a valid indicator for measuring functional capacity and physical fitness in the elderly population (Pérez-Gómez et al., 2020; Serra et al., 2015) .

Previous research has also shown that better performance in the 6MWT is associated with higher quality of life, especially in the physical and social domains (Hasan & Pane, 2022) . In this context, the 6MWT results in Paramasan Dayak elderly can be interpreted as a reflection of their physical fitness, which in turn may affect their quality of life. Research by confirms that there is a positive relationship between 6MWT performance and better physical functioning (Serra et al., 2015) . Therefore, improving physical fitness through regular physical activity may contribute to better results in the 6MWT.

Furthermore, the varying 6MWT results among participants may also be influenced by factors such as previous physical activity levels and general health conditions. Research shows that individuals who engage in regular physical activity perform better on the 6MWT compared to those who are less active (Neta et al., 2018) . In this regard, it is important to consider interventions that can improve the physical fitness of older adults, such as resistance training programs that have been shown to increase the distance covered in the 6MWT (Lai, 2023) .

CONCLUSION

Based on data analysis, this study reveals the Body Mass Index (BMI) and 6-Minute Walk Test (6MWT) results in elderly Dayak Paramasan. Although the average BMI of participants was within the normal range, considerable variation indicated significant differences in body composition. The 6MWT results showed variable functional capacity, with most participants obtaining lower than expected results, despite their normal BMI. These findings suggest that other factors such as muscle strength, cardiorespiratory fitness and overall health condition have an important role in determining the functional capacity of the elderly. Therefore, IMT should be complemented with functional assessments such as the 6MWT to provide a more comprehensive picture of an individual's health status, as well as highlight the need for tailored interventions to improve the physical function and well-being of Paramasan Dayak elderly. Further research is needed to explore the impact of lifestyle interventions in improving the quality of life of this population.

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