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Relationship Between Gender, Age, and BMI with Body Flexibility at MAN 2, Sleman, Yogyakarta

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A B S T R A C T

Flexibility is important for general health and fitness, athletic performance, injury prevention and rehabilitation. Sedentary behavior in students causes a decrease in physical fitness levels which affects flexibility. There is little research on flexibility in relation to BMI. The purpose of this study was to determine the relationship between gender, age, BMI with body flexibility. The method used was descriptive analytic of secondary data with a cross section approach and analyzed with univariate using frequency distribution and bivariate analysis using chi square. The results of the study were 81 respondents. Women are more than male respondents, namely 71.6% or as many as 58 respondents. While the most age is teenage age (<25 years) of 67.9% or as many as 55% and most respondents have normal BMI, namely 61.7% or as many as 50 respondents. While the cross tabulation of age with flexibility shows a P-value> 0.05, namely 0.73, while the cross tabulation of gender and body flexibility shows a p-value> 0.05, namely 0.296, and for cross tabulation of the relationship between BMI and body flexibility is p-value> 0.05, namely 0.458. Conclusion There is no relationship between age, gender, BMI and flexibility

INTRODUCTION

Background

Flexibility is important for general health and fitness, athletic performance, injury prevention and rehabilitation. Sedentary behavior is one that causes a decrease in physical fitness levels which affects flexibility. The relationship between BMI and Flexibility has not been widely studied to date.. (Ashwini, Neha and Lata, 2021)

Lack of stretching, especially when combined with activity can lead to fatigue-induced shortening of soft tissues over time.

Many variables influence the loss of normal joint flexibility including injury, inactivity or lack of stretching. Range of motion will be affected by the mobility of the soft tissues surrounding the joint. These soft tissues include: muscles, ligaments, tendons, joint capsule and skin. (https://health.ucdavis.edu/sports-medicine/resources/flexibility)

LITERATURE REVIEW

Flexibility is the most important component of physical fitness and performance which includes joint range of motion. Good flexibility contributes to work and sports activities. Flexibility training is essential for maintaining flexibility that can be reduced. Flexibility is also the most important component in determining physical fitness and performance. Good flexibility contributes to work and sports activities (Kosuke and Masatoshi, 2020).

Santos dkk (2020) also states that flexibility is related to age, gender, body weight, skin thickness, and body surface area. Body size affects the accumulation of body fat in the abdomen and muscle fibers, affecting the measurement of muscle flexibility. In addition, Santos also stated that flexibility is a very important skill to prevent muscle damage, and continuously needs to be improved so that the benefits can be felt throughout life.

Flexibility refers to the physiological range of motion of the joints, which is very important for completing movements in daily activities. Flexibility is joint-specific and changes depending on the muscles involved, therefore total body flexibility cannot be determined by a single test. In both. In children and adults, poor hamstring flexibility is related to difficulty performing and maintaining daily motor activities, as well as chronic musculoskeletal injuries, postural posture and gait disorders (Sreejisha and Umme, 2022).

According to Santos et al (2020) High BMI levels are more likely to have a limited range of motion than normal BMI. Individuals with a higher body mass index (BMI) have lower levels of flexibility than those with normal or less weight. Flexibility measurement using the method used by Wlodek and Gonzales (2003)

Table 1. Value of Flexibility (Sit and Reach Test)

Category	Score
Very Good	>15
Good	13.1-15
Mild	11.1-13
Less	8.5-11
Verry Less	<8.5

Body Mass Index (BMI) is a widely used indicator to assess nutritional status in adults. An increase in BMI increases the risk of obesity-related diseases. (Rebecca RL, & Erwin PS, 2022). In measuring BMI, a standard is needed to determine BMI. BMI according to Jeong et al., (2017) is

Table 2. Body Mass Index

Category	Score
Underweight	<18.5
Normal	18.5-22.9
Overweight	23-24.9
Obesity I	25-29.9
Obesity II	>30

Sources : Jeong et al., (2017

A person's level of obesity can be determined using the BMI score. Obesity and overweight among young people have increased in both developed and developing countries. Many countries have examined the relationship between weight status and physical fitness. Governments in East and West Asia have consistently determined that obesity and overweight have a strong negative relationship with physical fitness (Ya-Tzu Kung, et al, 2020).

The age factor affects BMI values. As people age, they tend to experience a decrease in muscle mass and facilitate the accumulation of body fat. The metabolic rate will also decrease, causing the caloric requirement to be low; ideal height and weight will support the players' performance. Therefore, one's body composition affects one's movement. The problem of the size of the posture and body parts possessed by each player is one of the factors that affect sports performance. In addition, increased adiposity in the adolescent age group caused by decreased physical activity and an accelerated growth and development phase can have an effect that can interfere with flexibility in the muscles (Alvina, Sinduja, Susan, 2021)

METHODOLOGY

This study was conducted using an analytical description research design using secondary data. The data used was total sampling. With a cross-sectional approach. The dependent variable in this study is the age and BMI of the respondent and the independent variable is body flexibility..

Research time

This research was conducted in May 2024 at MAN 2, Sleman DIY.

Data collection technique

After obtaining permission to collect data, the data is inputted. The data used in this study are data obtained during community service at MAN 2 Sleman, DIY.

Statistical Analysis

This study used total sampling. Data analysis in this study used frequency distribution for data on respondent characteristics such as age, gender and BMI while bivariate analysis for the relationship between age, BMI and flexibility using chi-square.

RESULTS

Outcome

Data obtained with a total of 81 respondents. The results of the respondents consisted of gender, age, BMI and its relationship with flexibility. The results obtained for the frequency distribution of gender and age can be seen in table 1 below.

Table 3. Frequency Distribution of Gender and Age

Frequency Distribution

Gender	f	%
Male	23	28,4
Female	58	71,6
total	81	100
Age (years)		
<25	55	67,9
25-59	25	30,9
≥ 60	1	1,2
total	81	100

Table 3. shows that female respondents are more than male respondents, namely 71.6% or 58 respondents. While the highest age is adolescence (<25 years) at 67.9% or as many as 55%.

While the results of the BMI frequency distribution can be seen in table 4 below

Table 4. BMI Measurement Results

BMI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Obeis	7	8.6	8.6	8.6
	Overweight	14	17.3	17.3	25.9
	normal	50	61.7	61.7	87.7
	underweight	10	12.3	12.3	100.0
	Total	81	100.0	100.0	

Table 4. shows that most respondents have normal BMI, namely 61.7% or 50 respondents.

The results of the cross-tabulation between age, gender and BMI in relation to flexibility are shown in Table 5. Below

a. For the cross tabulation of Age with flexibility is

Table 6 Cross Tabulation of Age and Flexibility

Crosstab

Count

		Age			
		Elderley: =>60	Adult: 25-59 years	Teenager: <25 years	Total
Flexibility	Mild : 11,1-13	0	2	7	9
	Good:13,1-15	0	0	9	9
	Very Good:>15	1	23	39	63
Total		1	25	55	81

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.760[a]	4	.218
Likelihood Ratio	8.571	4	.073
Linear-by-Linear Association	2.778	1	.096
N of Valid Cases	81		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .11.

Table 6. shows that the results of the cross tabulation of Age and Body Flexibility show a P-value> 0.05, namely 0.73, in other words, there is no relationship between Age and Body Flexibility.

b. For the cross tabulation of gender with body flexibility is

Table 7. Cross-Tabulation of Gender and Body Flexibility

Crosstab

Count

		Gender		
		Male	Female	Total
Flexibility	Mild : 11,1-13	2	7	9
	Good:13,1-15	1	8	9
	Very Good:>15	21	42	63
Total		24	57	81

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.132[a]	2	.344
Likelihood Ratio	2.432	2	.296
Linear-by-Linear Association	1.184	1	.277
N of Valid Cases	81		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.67.

Table 7. shows the p value is greater than 0.05 which is 0.296 so the results show there is no relationship between gender and body flexibility.

c. For the cross tabulation of BMI with body flexibility is

Table 8. Cross Tabulation of BMI and Body Flexibility

Crosstab

Count

		BMI				
		Obeis	Overweight	normal	underweight	Total
Flexibility	Mild : 11,1-13	0	1	7	1	9
	Good:13,1-15	1	1	4	3	9
	Very Good:>15	6	12	39	6	63
Total		7	14	50	10	81

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.848[a]	6	.440
Likelihood Ratio	5.698	6	.458
Linear-by-Linear Association	1.667	1	.197
N of Valid Cases	81		

a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is .78.

Table 8 shows that the p value is more than 0.05, namely 0.458, which indicates or in other words there is no relationship between BMI and flexibility. Since the results of age, gender and BMI show no relationship with flexibility and the p-value is more than 0.25, the multivariate analysis cannot be continued.

DISCUSSION

The results showed that there was no relationship between gender, age and BMI with one's body flexibility. This is in line with Nawan's research (2022) which states that there is no relationship between BMI and body flexibility.

This study is not in line with the research of Gopi et al (2014) which states that a person's body flexibility is influenced by age. With increasing age, body flexibility decreases.

This research is not in line with what Santos et al (2018) also stated that a higher body mass index (BMI) has a lower level of flexibility than those who have normal or less weight.

In addition, this study is also not in line with the research of Gopi et al (2014) which states that there are differences in size between men and women. While this study shows there is no difference between gender and flexibility.

CONCLUSIONS AND RECOMMENDATIONS

In this study the results obtained showed no relationship between age, gender and BMI with a person's body flexibility. Our recommendation is for future researchers to continue this research with different methods and samples. This is because research on flexibility associated with age, gender and BMI is still very rarely done.

FURTHER STUDY

This research will be continued by conducting flexibility tests on the elderly who have specifically been actively performing directed movements.

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