

## Fitness Levels of Elementary School Students Based on Gender and Race in Indonesia: Are There Differences?

### Niveles de forma física de los alumnos de primaria en función del sexo y la raza en Indonesia, ¿Existen diferencias?

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**Abstract.** This research aimed to determine differences in physical fitness levels based on Race and Gender in Indonesia. It used a comparative quantitative approach. The samples in this research were elementary school students in three provinces: Sumsel, DIY, and NTT. They were selected using cluster random sampling and yielded 254 people. Then, the samples were clustered to equalize numbers based on students' gender and regional race (South Sumatra, DIY, & NTT). After this process, the remaining 132 people were taken. Students' physical fitness data were collected using the Indonesian Physical Fitness Test (TKJI). The data were then analyzed using the parametric Two-Way ANOVA statistics. The results of the Two-Way ANOVA test showed that the race factor variable had a value of Sig.  $0.00 < 0.05$ . This value indicates a significant difference in the TKJI test scores between races in the three provinces: South Sumatra, DIY, and NTT. In the gender factor variable, the Sig.  $0.001 < 0.05$ , meaning a significant difference was also found in the TKJI test scores between male and female students. Furthermore, for the combined race and gender factor variables, the Sig  $0.485 > 0.05$ . Since the Sig value was greater, there is no influence or interaction between the race and gender factors in the three provinces in determining the results of the students' TKJI scores. Differences in physical fitness in terms of race can be caused by differences in physical activity, socioeconomic status, and social factors, such as racial discrimination and interpersonal racial discrimination. These differences can manifest as emotional stress due to increased psychological stress and increased risk of unhealthy behavior, including activities. In addition, the difference in physical fitness was also found between genders. The results show that men have a better level of physical fitness than women. One of the reasons is possibly due to increased fat mass associated with growth and puberty in girls. In addition, boys are often more active than girls.

**Keywords:** Physical fitness, Student, Race, Gender

**Resumen.** El objetivo de esta investigación es determinar las diferencias en los niveles de forma física en función de la raza y el sexo en Indonesia. Este método de investigación utiliza un enfoque cuantitativo comparativo cuyo objetivo es determinar el alcance de las diferencias en los resultados de los niveles de condición física de los alumnos de primaria en función del género (masculino y femenino) y de la raza en tres provincias (Sumsel, DIY y NTT). En esta investigación participaron alumnos de primaria de tres provincias (Sumsel, DIY y NTT). Las muestras se tomaron mediante muestreo aleatorio por conglomerados para alumnos y alumnas, con un total de 254 personas, pero luego se agruparon las muestras en números iguales en función del sexo y la raza regional (Sumatra Meridional, DIY y NTT), de modo que se tomaron las 132 personas restantes. La técnica de recopilación de datos de aptitud física utiliza el instrumento Indonesian Physical Fitness Test (TKJI). La técnica de análisis de datos utiliza la estadística paramétrica Two-Way Anova. Basándose en los resultados de la prueba Anova de dos vías de los datos de puntuación de la prueba TKJI de 132 estudiantes, muestra que la variable del factor Raza tiene un valor de Sig.  $0,00 < 0,05$  significa que existe una diferencia significativa en los resultados de las pruebas TKJI en función de la raza en las tres provincias de Sumatra del Sur, DIY y NTT. En la variable del factor género, el valor Sig.  $0,001 < 0,05$  significa que existe una diferencia significativa en los resultados de la prueba TKJI en función del sexo masculino y femenino. Además, en las variables factor Raza y género, el valor Sig.  $0,485 > 0,05$  significa que no existe influencia o interacción entre los factores Raza en las tres provincias y género en la determinación de los resultados de las puntuaciones de los alumnos en el TKJI. La conclusión es que las diferencias en la forma física en función de la Raza pueden deberse a diferencias en la actividad física, a un estatus socioeconómico diferente y a factores sociales como la discriminación racial y la discriminación racial interpersonal, que pueden manifestarse como estrés emocional debido al aumento del estrés psicológico y al aumento del riesgo de comportamientos poco saludables, incluidas las actividades físicas. Aparte de eso, la diferencia en la forma física en términos de género es que los hombres tienen un mejor nivel de forma física que las mujeres. Esto se debe al aumento de la masa grasa asociado al crecimiento y la pubertad en las chicas, y a que los chicos suelen ser más activos que las chicas.

**Palabras clave:** Aptitud física, Estudiante, Raza, Género

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### Introduction

Indonesia is the largest archipelagic country in the world, with a total of 17,001 islands and a population of 275,773.8 million people (Statistics Indonesia, 2023). With so many islands in Indonesia, the country has a wide

diversity of cultures, languages, customs, ethnicity, and race. According to data from Statistics Indonesia (BPS), Indonesia has more than 300 ethnic groups, more precisely 1,340 ethnic groups. The Javanese are the largest group, reaching 41% of the total population, while Kalimantan and Papua only have small populations. The large number of

races and tribes in Indonesia certainly needs attention, especially regarding health issues.

Health is one measure of the level of welfare of a nation. If the health level is, the level of welfare of the nation is also higher. The importance of health is stated in the strategic plan of the Ministry of Health (Renstra Kemenkes) for 2020-2024 and the Presidential Regulation Number 18 of 2020 on RPJMN for 2020-2024. The regulations mandate nine national development missions, one of which is improving the quality of Indonesian people. To realize this mission, every Indonesian citizen needs to improve their quality of life by maintaining their health.

One way to assess an individual's physical health is through physical fitness. According to the United States Department of Health and Human Services (USDHHS), physical fitness can be defined as a person's ability to perform daily tasks with enthusiasm and alertness, without feeling significant fatigue, with sufficient energy to enjoy free time and being able to meet unexpected emergencies (Saunders et al., 2020). This means that if someone can maintain their physical fitness well, they are expected to be able to complete their daily responsibilities well. On the other hand, someone's poor physical fitness can hinder their activities. Apart from that, lifestyle plays a very important role in health. In sociology, lifestyle is defined as a person's life (Kumar, 2017). It is a long-term choice. There are various efforts to implement a healthy lifestyle, such as maintaining healthy food intake patterns with diet and nutrition, exercising regularly, choosing the right supporting nutrition, and joining the community to get support from the same people. By making these various efforts and attitudes, a healthy quality of life can be achieved, and a positive environment can be created (Tiara & Lasnawati, 2022).

A good quality of life will be obtained by doing regular physical activity and maintaining good cardiorespiratory fitness. It is also associated with a lower risk of cardiovascular disease (Pandey et al., 2016). Differences in cardiorespiratory fitness may contribute to a higher risk of cardiovascular disease and may even lead to mortality. This tendency occurs more often in black people than in white (Swift et al., 2013). Previous studies have explained that differences in lifestyle in an ethnic group will have an impact on their physical fitness. For example, a study found that South Asian people had a lower level of physical fitness than white Europeans and black African-Caribbean in the UK. (Nightingale et al., 2016). Other research found that higher levels of insulin resistance were more prevalent among South Asian people with a low level of physical fitness compared to white Europeans (Nightingale et al., 2018). In

addition, a study reported that race/ethnic differences in cardiovascular function would lead to differences in cardiovascular fitness (Pandey et al., 2016). The diversity of races and ethnic groups in Indonesia needs special attention, especially the issue of physical fitness. Physical fitness is required by an individual to allow them to carry out their activities well.

Although physical fitness has been widely investigated and is often associated with differences in age, gender, obesity, and physical activity, the explanation of physical fitness related to race and ethnicity is still poorly understood (Pandey et al., 2016), especially in Indonesia. Some research investigating physical fitness include Loureiro et al. (2022), Martins et al. (2023), Mashud et al. (2024), and Saputra et al. (2024). However, no research has discussed the differences in physical fitness levels of elementary school students based on age and race. Therefore, the present research aims to explore this topic.

## Methods and materials

This research used a comparative quantitative approach. The research involved a population of elementary school students in Indonesia. Meanwhile, the samples in this research were elementary school students in three Indonesian provinces: South Sumatra, the Special Region of Yogyakarta (DIY), and East Nusa Tenggara (NTT). They were selected using cluster random sampling and yielded 254 people. Then, the samples were clustered again to equalize the numbers based on gender and regional race (South Sumatra, DIY, & NTT). Consequently, the remaining 132 people were taken.

The data for physical fitness levels were collected using the Indonesian Physical Fitness Test (TKJI). The data were grouped into two categories (men and women) with three factors, namely physical fitness level score results in the race for the South Sumatra region, Yogyakarta Special Region, and East Nusa Tenggara. The distribution of these variable factors is shown in Table 1. The data were then analyzed using the Two-Way ANOVA parametric statistics. It is a two-way or two-category classification analysis based on observing certain factors that cause variation. Data prerequisite tests were carried out using the Kolmogorov-Smirnov test to measure normality test and Levene's test of homogeneity of variance to calculate the data homogeneity. Kolmogorov-Smirnov normality test resulted in Asymp Sig. (2-tailed)  $0.200 > 0.05$ , which means the data is normally distributed. Meanwhile, the homogeneity test result was Sig.  $0.866 > 0.05$ . Thus, the data is homogeneous.

Table 1.

Results of TKJI between male and female students in the Race regions of South Sumatra, DIY, and NTT

No	Man		Value Score	No	Woman		Value Score
	Student's name	Label/Race			Student's name	Label/Race	
1	AEM	South Sumatra	18	1	AAD	South Sumatra	10
2	AMR	South Sumatra	14	2	E.R	South Sumatra	9
3	AT	South Sumatra	14	3	GIFs	South Sumatra	13
4	BTW	South Sumatra	20	4	KJG	South Sumatra	14
5	DS	South Sumatra	16	5	MAMG	South Sumatra	17
6	FAN	South Sumatra	13	6	PEFM	South Sumatra	16

7	FML	South Sumatra	16	7	RAYB	South Sumatra	18
8	FAT	South Sumatra	14	8	SS	South Sumatra	16
9	JAL	South Sumatra	17	9	AMWK	South Sumatra	17
10	JASF	South Sumatra	19	10	EMP	South Sumatra	12
11	MPRN	South Sumatra	15	11	TAFT	South Sumatra	15
12	MAJS	South Sumatra	18	12	CMF	South Sumatra	12
13	MSA	South Sumatra	19	13	IGL	South Sumatra	16
14	NHS	South Sumatra	17	14	IMN	South Sumatra	17
15	OCDP	South Sumatra	15	15	IAAS	South Sumatra	15
16	RAM	South Sumatra	17	16	BODYL	South Sumatra	15
17	RJCT	South Sumatra	19	17	DAT	South Sumatra	16
18	AFK	South Sumatra	14	18	GNSL	South Sumatra	10
19	ARBK	South Sumatra	18	19	JMS	South Sumatra	15
20	AMB	South Sumatra	16	20	LWM	South Sumatra	17
21	AFN	South Sumatra	17	21	LCK	South Sumatra	16
22	AN	South Sumatra	18	22	FOLDER	South Sumatra	12
23	AMNI	DIY	19	23	A A	DIY	16
24	ARR	DIY	21	24	ARH	DIY	15
25	AGK	DIY	19	25	CFN	DIY	19
26	US	DIY	21	26	ERA	DIY	21
27	BJBS	DIY	18	27	M.S	DIY	19
28	DAWK	DIY	19	28	MNK	DIY	17
29	FRH	DIY	17	29	SNH	DIY	21
30	GP	DIY	22	30	SAC	DIY	19
31	KAW	DIY	15	31	WPH	DIY	20
32	KRP	DIY	19	32	ANA	DIY	17
33	MAWY	DIY	15	33	D.N	DIY	18
34	MNES	DIY	16	34	FL	DIY	15
35	MAAW	DIY	16	35	IR	DIY	10
36	RPA	DIY	21	36	MNH	DIY	20
37	WNO	DIY	19	37	MDOH	DIY	17
38	YES	DIY	20	38	NNA	DIY	17
39	AFJSB	DIY	20	39	NNA	DIY	15
40	DNNB	DIY	23	40	RNF	DIY	15
41	ASSA	DIY	15	41	RPR	DIY	21
42	AK	DIY	18	42	ZTI	DIY	18
43	AKO	DIY	16	43	AN	DIY	20
44	AAPP	DIY	17	44	A.M	DIY	16
45	AEM	NTT	18	45	AAD	NTT	10
46	AMR	NTT	14	46	E.R	NTT	9
47	AT	NTT	14	47	KJG	NTT	14
48	BTW	NTT	20	48	MAMG	NTT	17
49	DS	NTT	16	49	NHS	NTT	17
50	FAN	NTT	13	50	PEFM	NTT	16
51	FML	NTT	16	51	RAYB	NTT	18
52	FAT	NTT	14	52	RAM	NTT	17
53	GIFs	NTT	13	53	AMWK	NTT	17
54	JAL	NTT	17	54	EMP	NTT	12
55	JASF	NTT	19	55	FPKB	NTT	15
56	MPRN	NTT	15	56	MNDFX	NTT	14
57	MAJ	NTT	18	57	TAFT	NTT	15
58	NSA	NTT	19	58	CMF	NTT	12
59	OCDP	NTT	15	59	FNDEM	NTT	16
60	RJC	NTT	19	60	FAN	NTT	20
61	SS	NTT	16	61	IMN	NTT	17
62	AFK	NTT	14	62	SUIT	NTT	15
63	ARBK	NTT	18	63	AIYW	NTT	14
64	AMB	NTT	16	64	BODYL	NTT	15
65	AFN	NTT	17	65	DAT	NTT	16
66	AN	NTT	18	66	FKP	NTT	17
Number of Men = 66				Number of Women = 66			

Total = 132

## Results

### Descriptive

The following is a detailed description of differences in physical fitness test results based on gender and race for the South Sumatra, DIY, and NTT regions. As provided in Table 2, the number of data (N) for factors resulting from the physical fitness test is 132, with 44 data from the South Sumatra TKJI race test, 44 from DI Yogyakarta's TKJI Race DI test, and 44 from East Nusa Tenggara test result.

Further, the number of data (N) for the gender factor is also 132, with 66 of them male and 66 others female.

Table 2.  
Results between Subjects Factors Test

		Between-Subjects Factors	
		Value Labels	N
Race of three provinces in Indonesia	1	South Sumatra	44
	2	DI Yogyakarta	44
	3	East Nusa Tenggara	44
Gender	1	Men	66
	2	Women	66

Table 3 below provides the results of the descriptive test. This research showed that the student's male TKJI test score result in the South Sumatra race was 16.55 with an SD of 1.993. Meanwhile, the mean TKJI test score for women in the South Sumatra race was lower, by 14.45, with an SD of 2.595. In DIY, male students' test score was 18.45 with SD 2.365, making it the highest across regions. Meanwhile, the mean TKJI test score for female students DI. Yogyakarta race was 17.55 with SD 2.665. For male students, the mean TKJI test score in the East Nusa Tenggara race was 16.32, with an SD of 2.124. Meanwhile, the mean TKJI test score for female students in the East Nusa Tenggara race was lower, by 15.14 with SD 2.606. Based on the results of this analysis, it can be concluded that the TKJI test scores for male students in the DI. Yogyakarta race is the highest. Meanwhile, the TKJI test scores for female students in the South Sumatra race are the lowest.

Table 3.  
Results Descriptive Statistics Test

Descriptive Statistics				
Dependent Variable: Physical Fitness Test Results				
Race of Three Provinces in Indonesia	Gender	Mean	Std. Deviation	N
South Sumatra	Man	16.55	1.993	22
	Woman	14.45	2.595	22
	Total	15.50	2.520	44
DI Yogyakarta	Man	18.45	2.365	22
	Woman	17.55	2.668	22
	Total	18.00	2.533	44
East Nusa Tenggara	Man	16.32	2.124	22
	Woman	15.14	2.606	22
	Total	15.73	2.424	44
Total	Man	17.11	2.341	66
	Woman	15.71	2.908	66
	Total	16.41	2.721	132

Table 4.  
Results Tests of Between-Subjects Effects

Tests of Between-Subjects Effects					
Dependent Variable: Physical Fitness Test Results					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	240.727a	5	48.145	8.319	.000
Intercept	35542.091	1	35542.091	6141.546	.000
Race	168.182	2	84.091	14.531	.000
Sex	64.121	1	64.121	11.080	.001
Race * Gender	8.424	2	4.212	.728	.485
Error	729.182	126	5.787		
Total	36512.000	132			
Corrected Total	969.909	131			

a. R Squared = .248 (Adjusted R Squared = .218)

### Two-Way ANOVA

After calculating the descriptive data, the Two-Way Anova analysis was conducted to analyze the 132 students' TKJI test score data. The analysis showed that the race factor variable had a value of Sig.  $0.00 < 0.05$ , which means a significant difference was found in the results of the TKJI test scores based on race in three provinces: South Sumatra, DI. Yogyakarta, and East Nusa Tenggara. In the gender factor variable, the Sig. value  $0.001 < 0.05$ . It indicates that the research found a significant difference in the results of TKJI test scores based on their genders. Furthermore, for the combined race and gender factor variables, the Sig.  $0.485 > 0.05$  was drop. This decrease indicates no influence

or interaction was found between the race factors in the three provinces and gender in determining the results of students' TKJI scores, as shown in (Table 4) below:

### Discussion

The research results above reported differences in physical fitness among elementary school students based on gender and race. In terms of race, the difference in physical fitness had a significant difference with a value of  $0.000 < 0.05$ . Physical fitness is the body's ability to carry out physical activities without causing significant fatigue (Wulandari et al., 2022). It is a need that a person must fulfill to carry out their daily activities well, efficiently, and effectively. Besides, physical fitness can also be a benchmark for whether a person's physical condition is good or not. (Najib et al., 2021). For some reasons, it can be associated with health, such as cardiorespiratory endurance and muscle strength. It is also related to skills such as speed and strength (Fühner et al., 2021). For this reason, every elementary school student needs to have good physical fitness.

The Oxford Dictionary defines race as a group of people connected by common ancestry or origin, usually defined in terms of different physical forms (Flanagin et al., 2021). There are several race groups, namely the race groups of White, Hispanic/Latino (Latin), Black/African American (black), Asian, American Indian (Indian), and Hawaiian. White people are considered the majority racial group because it is based on the population size of a country (Purnama et al., 2018). Race, physical activity, and exercise intensity are important to explain differences in cardiorespiratory fitness (CRF) (Ceaser et al., 2013). Cardiorespiratory fitness (CRF) and high physical activity are associated with a lower risk of disease (Newman et al., 2006).

Using a cross-sectional study, previous research involved 1,625 children aged 9-10 years from South Asia, African-Caribbean blacks, and European-origin whites in England studied between 2006 and 2007. The study explained that South Asian children have lower levels of physical fitness than white Europeans and black African-Caribbean people in the UK. These ethnic differences in physical fitness are at least partially explained by ethnic differences in physical activity. (Nightingale et al., 2016). Apart from that, other research shows that black participants have the lowest cardiorespiratory fitness. However, the association between race/ethnicity was weakened for blacks and was not significant for Hispanics after additional adjustment for BMI, lifestyle factors, socioeconomic status, and cardiovascular disease risk factors. (Pandey et al., 2016). Differences in socioeconomic status and race can be a cause of a lack of physical activity (Van Dyke et al., 2018). Lower socioeconomic status and racial/ethnic minority students are more often concentrated with fewer funds and resources (Van Dyke et al., 2018).

Another study identifies that differences in race/ethnicity can be a factor that influences participation in physical activity (Kelly et al., 2010). They also find that social

support from friends is a factor associated with physical activity in black and white girls. Pate et al. (2009) examined the decline in physical activity from sixth to eighth grade and found that Black girls decreased more than White or Hispanic girls (Pate et al., 2009). These racial/ethnic disparities may be rooted in social factors, such as racial discrimination and interpersonal racial discrimination, which can manifest as emotional distress due to increased psychological stress and increased risk of unhealthy behaviors, including physical activity (McNeill et al., 2006). Another study also explains that race/ethnicity has a relationship with physical activity (Barr-Anderson et al., 2017).

Furthermore, this research found that the physical fitness variable in terms of gender had a significant difference in value between the fitness of men and women. The results of this study are strengthened by a study that explains that boys have better fitness than girls at the age of 10-15 years (Guessogo et al., 2020). This is due to an increase in fat mass, which is related to growth and puberty in girls (Armstrong & Welsman, 2006). Apart from that, it was also explained in previous research that men (19%) were more likely to be involved in vigorous activities than women (10%) (Cohen et al., 2007). Similarly, other research explains that men have 8-18% better VO<sub>2</sub> max than women (Dencker et al., 2007).

## Conclusion

Based on the discussion above, it can be concluded that differences in physical fitness levels based on race and gender were found among elementary school students in Indonesia. Differences in physical fitness in terms of race can be caused by differences in physical activity, different socioeconomic status, and social factors, such as racial discrimination and interpersonal racial discrimination. These factors can manifest as emotional stress due to increased psychological stress and increased risk of unhealthy behavior, including activities. Apart from that, the difference in physical fitness in terms of gender is that men have a better level of physical fitness than women. This is due to increased fat mass associated with growth and puberty in girls, and boys are often more active than girls.

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