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Application of The MFT Method in The Evaluation of The Fitness Level of Menanggal 601 Surabaya Elementary School

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ABSTRACT (9 pt)

The purpose of this study is to use the Multistage Fitness Test (MFT) technique to assess the fitness level of elementary school pupils. The study used secondary data from 20 students (10 males and 10 females) in a descriptive quantitative manner. Based on MFT findings, VO_2max values were computed and examined using Jamovi software. The results showed that both male and female students had moderate to good levels of aerobic fitness, with male students' average VO_2max at 22.2 ml/kg/min and female students at 22.1 ml/kg/min. Male students' VO_2max distribution was more concentrated at higher levels, whereas female students' range was more varied, with some falling into lower categories. These findings bolster the MFT method's usefulness as a trustworthy instrument for assessing students' levels of fitness. The significance of physical fitness in schools is emphasized by this study, which also calls for bigger and more diverse sample sizes in future research to support more general findings on education and health.

INTRODUCTION

Thereduction in children's levels of physical fitness is becoming a bigger issue. Many reasons contribute to this, such as their growing reliance on technology and lack of physical exercise in their daily routine (Ma'arif et al., 2023; Sunarwan et al., 2022). Research indicates that students' academic performance and mental health are strongly correlated with their degree of physical fitness, in addition to their physical health (Bass et al., 2013; "R ESEARCH A RTICLE A Longitudinal Examination of the Link," 2011). In order to evaluate the level of physical fitness of primary school pupils, it is crucial to find suitable assessment techniques, such as the Multi Fitness Test (MFT) approach.

Prior research has demonstrated that children who are physically fit have better academic performance and social awareness (Thompson et al., 2024; Wills et al., 2019). But physical fitness is generally measured using traditional approaches that ignore different components of fitness (Yustanti et al., 2024). In order to assess primary school pupils' level of fitness and create more effective intervention programs, this study will use the MFT approach, which may give a thorough picture of their physical health.

Additionally, in order to increase the validity of the measuring, instruments employed, this study aimed to assess physical fitness as well as compare the outcomes of the MFT with those of earlier assessment techniques (Vaskov, 2022; Yustanti et al., 2024). According to (Thompson et al., 2024; Yustanti et al., 2024), the findings of this study should serve as a strong basis for the creation of more successful physical education programs and support educational policies that struggle to improve students' physical health. It is anticipated that the use of MFT will help pinpoint areas where school sports programs need to be improved and encourage children to have active, healthy lives (Yustanti et al., 2024)

The primary hypothesis of this study is that, in comparison to other conventional assessment techniques, the use of the MFT approach can yield more accurate and comprehensive findings when assessing students' physical fitness. We intend to show the reciprocal link between academic performance and physical fitness by creating and putting into practice a strong research approach. This is especially crucial in the context of education in the current digital era.

RESEARCH METHOD

This study is a descriptive quantitative investigation that uses the Multistage Fitness Test (MFT)

technique to assess elementary school pupils' level of fitness. Given that the data being evaluated are numerical data that has undergone statistical processing, this study employs a quantitative methodology.

The secondary data utilized in this study were gathered by earlier researchers. The data includes the outcomes of physical fitness assessments given to Menanggal 601 Surabaya Elementary School children using the MFT technique.

The Multistage Fitness Test (MFT) approach, commonly referred to as the beep test, was the tool utilized in this investigation. One physical fitness test used to gauge an individual's aerobic capacity or cardiorespiratory endurance is the MFT. Its application involves participants running 20 meters back and forth at a progressively faster pace in response to a signal (beep).

The statistical program Jamovi is used to examine the collected data. Data description (mean, standard deviation, minimum and maximum values), processing of the MFT data into an estimated VO2max value using the standard formula, and classification of student fitness levels based on VO2max into categories (very good, good, moderate, less, and very less) in compliance with applicable standards are all included in the analysis. To make comprehension easier, all analytical findings are displayed as tables and graphs.

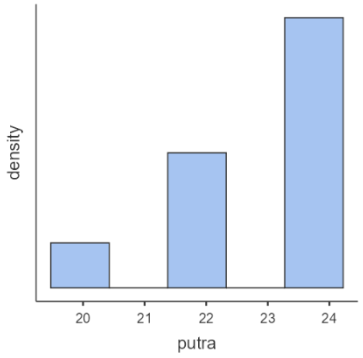
RESULTS AND DISCUSSION

Table 1. Deskriptive

	Male	Female
N	10	10
Mean	22.2	22.1
Std. Deviation	1.35	1.40
Min	20.0	18.9
Max	23.8	23.8

Based on the results of descriptive analysis of VO2max data obtained from the Multistage Fitness Test (MFT) test results, it is known that the number of research subjects for each gender is 10 people. For the male group, the average VO2max value (mean) was 22.2 ml / kg / min with a standard deviation of 1.35, indicating a relatively homogeneous distribution of data. The minimum value of VO2max in this group was 20.0, while the maximum value was 23.8. Meanwhile, for the female group, the mean value of VO2max was 22.1 ml/kg/min with a standard deviation of 1.40. The minimum value in this group was recorded at 18.9, and the maximum value was the same as the male group, which was 23.8. In general, there was no significant difference between the mean VO2max values of males and females in this sample, although males showed a slightly higher mean.

Table 2. Histogram of male student



The histogram above shows the frequency distribution of VO_2max values of male students based on the Multistage Fitness Test (MFT) results. From the graph, it can be seen that most students have

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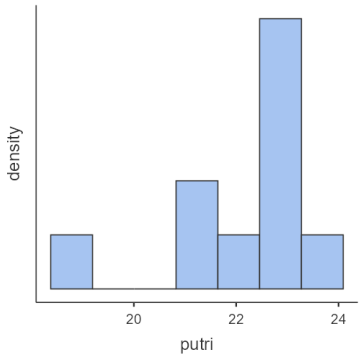
VO_2max values in the range of 23-24 ml/kg/min, which is indicated by the most dominant bar height. Meanwhile, there were also some students in the 20-22 ml/kg/min range, but the number was relatively less than the group in the highest range. This suggests that the distribution of VO_2max of male students tends towards higher values, indicating a fairly good level of aerobic fitness in this group.

Table 3. Histogram of female student



The histogram in the figure shows the distribution of VO_2max values of female students based on the Multistage Fitness Test (MFT) results. The distribution of values looks more varied than male students, with the peak frequency being in the range of 22-23 ml/kg/min, which is the group with the largest number of participants. In addition, there were also students who had lower VO_2max, in the range of 18-20 ml/kg/min, although the number was smaller. This indicates that most female students have a fitness level that is classified as moderate to good, but there are also a small number who are in the lower category.

In the descriptive analysis conducted on VO2max data through the Multiple Stage Fitness Test (MFT), information was obtained regarding the average value of VO2max in the male and female student groups. The average VO2max of male students was 22.2 ml/kg/min with a standard deviation of 1.35, while the average VO2max of female students was 22.1 ml/kg/min with a standard deviation of 1.40. Although the mean VO2max of male students was slightly higher, the difference between the two groups was not statistically significant, indicating that the data distribution of the two groups was quite homogeneous (Tongwu & Chuanwei, 2025)

Physiologically, this difference can be caused by several natural factors such as lung capacity and proportion of muscle mass, which indeed tend to differ between men and women. This is in line with research which states that genetic factors and body structure can affect VO2max capacity in individuals (Mustafina et al., 2014). The average VO2max obtained can also be related to the fitness standards set by WHO. In this regard, based on WHO criteria, VO2max values above 20 ml/kg/min for adolescents are expected to be in the good or moderate category (Weston et al., 2014). Therefore, the majority of students in this study appear to fall into the good fitness category, with some possibly falling into the moderate category.

When looking at the distribution of the data displayed in the histogram, it can be seen that most students have values close to the average, although there are a few students who have lower values. If the distribution of VO2max shows a normal shape, this would indicate that the majority of students have an aerobic capacity close to the average, with few outliers at either end of the distribution. However, if the distribution is skewed to the left or right, this could indicate that there are factors affecting fitness density that differ between students (Bassett, David R.; Howley, 2000; Mendoza et al., 2024)

When it comes to students' physical activity, it is important to consider their daily exercise and activity habits. In this context, research shows that low physical activity in children can contribute to low VO2max values (Harfika & Hidayat, 2022). In research on children's fitness, it was found that lack of physical activity and regular exercise can negatively impact cardiovascular health and aerobic capacity

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(Harfika & Hidayat, 2022; Setty et al., 2013)
Comparison with previous studies showed that the VO2max value of students in this study was lower than that found by (Ahmad, 2022) which was 23.5 ml/kg/min. This reflects the varying trends in students' physical fitness across different educational contexts (Harfika & Hidayat, 2022). Some factors that can affect the results of this MFT include the health condition of the participants at the time of the test, the technique of implementation, as well as the environment when the test is held (Danek et al., 2019).
However, there are limitations to this study, including the small sample size and the scale of the study being limited to only one school, which may not be representative of the wider population (Danek et al., 2019). Therefore, in order to obtain more representative and more satisfactory results, it is recommended that a follow-up study be conducted with a larger number of participants and more diverse backgrounds with the aim of obtaining more varied and detailed data. Schools are also encouraged to be more active in organizing consistent fitness programs to improve students' overall physical health.

CONCLUSION

The average VO_2max values of male and female primary school pupils were found to be quite equal, with boys having slightly higher values (22.2 ml/kg/min) than girls (22.1 ml/kg/min), according to the findings of data analysis using the Multistage Fitness Test (MFT). This suggests that the aerobic fitness levels of both groups are moderate to good. According to the data distribution, female students had more variable scores, with a small percentage falling into lower fitness categories, whereas male students were more likely to concentrate within the higher VO_2max range (23–24 ml/kg/min).
These results imply that primary school pupils' levels of physical fitness may be evaluated using the MFT approach. This study has drawbacks, such as a limited sample size and dependence on secondary data from a single school, despite its efficacy. Therefore, in order to improve the findings' generalizability, future research is urged to employ larger and more varied populations.
The findings emphasize the value of regular physical exercise in schools from a pedagogical standpoint. It is advised that educational institutions put in place regular, structured fitness programs that can help students develop healthy habits and improve their physical and intellectual health.

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