

The Effect of 17 KM Longmarch Training on Physical Fitness Learning Outcomes at SMK Negeri Jateng Semarang

Syahnata Deningtyas Putri^a, Ranu Baskora Aji Putra^b

^{ab}Universitas Negeri Semarang, Indonesia

Correspondence: tyasputri640@students.unnes.ac.id

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Abstract

Physical education plays an important role in developing students' physical fitness and learning outcomes. However, physical fitness learning outcomes in vocational high schools are often not optimal, especially in endurance components, due to limited learning variations and low student engagement. Therefore, innovative and structured physical activity programs are needed to improve students' fitness and learning achievement. This study aimed to examine the effect of a 17 km longmarch training program on students' physical fitness learning outcomes at SMK Negeri Jateng Semarang. The study used a quantitative pre-experimental design with a one-group pretest-posttest model. The sample consisted of 25 tenth-grade students selected from a population of 125 students. Data were collected through pretest and posttest long-distance walking tests and analyzed using descriptive statistics, paired sample t-test, and normalized gain (N-Gain). The results showed a significant improvement, with mean scores increasing from 74.96 to 85.08 and an N-Gain value of 0.406 (moderate category).

Keywords: longmarch training; physical fitness; learning outcomes; endurance training; physical education

1. Introduction

Physical Education, Sports, and Health (PJOK) is a important part of the education system, developing students holistically through physical activity (Annisa, 2022). PJOK not only improves motor skills but also instills the values of sportsmanship, teamwork, discipline, and a healthy lifestyle (Raharjo et al., 2023). Furthermore, PJOK simultaneously integrates cognitive, affective, and psychomotor aspects to support character development and improve students' quality of life (Ma'rifa, 2024).

Physical fitness is one of the main objectives in learning Physical Education, Sports, and Health (PJOK) (Fahmi, 2025). Physical fitness is defined as a person's ability to carry out daily activities without experiencing excessive fatigue and still having energy reserves to carry out other activities (Qadrianti et al., 2025).

In the context of education, students physical fitness levels are an important indicator in supporting the success of the learning process, especially those related to physical activity (Anggraaini, 2023). Students with a good level of physical fitness tend to have more optimal learning concentration, stronger endurance, and better psychomotor abilities compared to students with a low level of fitness (Pratiwi et al., 2023). Efforts to improve physical fitness through structured training programs are very important in supporting the achievement of overall educational goals.

In the context of vocational high schools (SMK), the role of PJOK becomes increasingly important due to the characteristics of students who are in adolescence and face high physical and practical demands (Agusta et al., 2024). PJOK in vocational education aims to maintain and improve students' physical fitness to support both academic learning and vocational practice activities (Sarosa & Nurhayati, 2022). However, several issues persist, including low levels of physical fitness particularly in endurance components and suboptimal learning outcomes across cognitive, affective, and psychomotor domains. These conditions are influenced by limited variation in learning activities, low student motivation, and the lack of structured and sustainable training programs (Aryatama, 2022).

Physical fitness is a crucial indicator in supporting the success of PJOK learning. Students with higher levels of physical fitness tend to demonstrate better concentration, stronger endurance, and improved psychomotor performance (Riyadhoh et al., 2022). One effective approach to enhancing physical fitness is endurance training, such as longmarch activities. Longmarch, defined as long-distance walking, has been shown to improve cardiorespiratory capacity, muscular strength, and mental resilience (Rahmadani et al., 2025). Furthermore, such activities can increase student engagement due to their challenging and experiential nature (Murjani & Mashud, 2025).

Although physical exercise programs have significant potential to improve student fitness and learning outcomes, research on the implementation of long march training in formal educational settings, particularly in Vocational High Schools (SMK), remains limited. Most previous studies have focused on general fitness training such as circuit training, shuttle runs, and physical fitness exercises without specifically examining the effect of structured long march training on student learning outcomes in Physical Education (PJOK).

This situation indicates a research gap that still needs to be developed, particularly regarding the implementation of endurance-based training programs in vocational high schools. Furthermore, actual conditions in the field indicate that the physical fitness level of vocational high school students remains a concern. Previous research found that students' VO_2 Max capacity is in the suboptimal category due to low physical activity and a lack of programmed endurance training, which can impact students' physical readiness to participate in learning activities and prepare to enter the workforce, which requires prime physical condition (Nathasya, 2024).

A similar issue is also evident in research on the impact of eliminating physical education (PJOK) subjects in several vocational high schools, which showed a decline in students' physical fitness levels (Dani Wiradhika Putra et al., 2024). This indicates that structured physical activity is essential for maintaining the fitness of vocational high school students. However, to date, the implementation of endurance-based training programs such as long marches has rarely been implemented or scientifically researched in the context of PJOK learning in schools.

Based on the above considerations, this study aims to analyze the effect of 17 km longmarch training physical fitness learning outcomes at SMK Negeri Jateng Semarang. Additionally, this study seeks to measure students' physical fitness levels and evaluate the effectiveness of the longmarch program as an alternative instructional strategy in PJOK. The findings are expected to contribute both theoretically and practically to the development of more innovative, effective, and comprehensive physical education learning models that enhance students' physical fitness and overall learning outcomes.

2. Method

This study employs a quantitative approach aimed at empirically examining the effect of 17 km longmarch training on physical fitness learning outcomes at SMK Negeri Jateng Semarang. The research adopts a descriptive pre-experimental method using a one-group pretest–posttest design, involving a single group without a control group. Participants were given a pretest to determine their initial condition in cognitive, affective, and psychomotor domains, followed by a structured treatment consisting of a longmarch training program conducted over 15 sessions, and concluded with a posttest to measure changes in learning outcomes. The study was conducted at SMK Negeri Jateng Semarang, involving a sample of 25 tenth-grade students selected from a population of 125 students across five classes. The sample was chosen to ensure homogeneity, feasibility, and effective control of the treatment process.

The variables in this study consisted of an independent variable, namely a 17 km long-distance walking training program, and a dependent variable, namely student learning outcomes, which included cognitive (understanding of physical fitness concepts), affective (discipline, responsibility, and mental resilience), and psychomotor (physical performance and motor skills) aspects (Hamid et al., 2022). Data were collected using testing and measurement techniques through pretest and posttest instruments. The pretest and posttest involved a 12 km long-distance moderate-intensity walk to assess baseline physical fitness and to evaluate improvements after the training program. The training intervention combined endurance-based methods, including continuous training, interval training, hill training, and strength endurance training, which were implemented systematically to improve aerobic capacity, muscular endurance, and overall physical performance (Junaidi et al., 2024). Throughout the intervention, participant progress was monitored using structured observations, training logs, and periodic evaluations.

Data analysis in this study was conducted in stages to determine the effect of the long march training program on student learning outcomes. The initial stage began with the collection of pretest data before students participated in the training program and posttest after the training program was completed. The data obtained were then analyzed using inferential statistics to determine any differences in learning outcomes before and after the treatment. Before hypothesis testing was carried out, prerequisite analysis tests were first conducted, including a normality test to determine whether the data were normally distributed and a homogeneity test to ensure equality of research data variance. After the analysis requirements were met, hypothesis testing was conducted to determine whether the long march training program had a significant effect on student learning outcomes. In addition, this study also analyzed the level of improvement in learning outcomes using the N-Gain calculation by comparing the results of the students' pretest and posttest (Mar'ussifa Rizki et al., 2024). Through these analysis stages, the study can provide a more comprehensive picture of the effectiveness of the long march training program in improving physical fitness and student learning outcomes.

3. Result

The data analysis techniques in the effect of 17 km longmarch training on physical fitness learning outcomes at SMK Negeri Jateng Semarang used normality tests, homogeneity tests, paired sample t-tests, and n-gain tests. The following are the test statistics.

Table 1. Statistical descriptive analysis

Variable	N	Minimum	Maximum	Mean	Std. Dev
PreTest	25	71	79	74.96	2.245
PostTest	25	81	89	85.08	2.235

Based on Table 1, the descriptive analysis shows that the mean pretest score was 74.96 with a standard deviation of 2.245, a minimum score of 71, and a maximum score of 79. After the treatment, the mean posttest score increased to 85.08 with a standard deviation of 2.235, a minimum score of 81, and a maximum score of 89. Overall, the data indicate an improvement of 10.12 points, suggesting a positive trend in students' performance following the longmarch training program.

Table 2. Normality and homogeneity test

	Variable	Statistic	df	Sig.	Description
Normality Test (Shapiro-Wilk)	PreTest	.964	25	.495	Normal
	PostTest	.966	25	.536	Normal
Homogeneity Test (Levene's Test)	Based on Mean	.006	1	.938	Normal

Based on Table 2, the significance values for the pretest (0.495) and posttest (0.536) are both greater than 0.05, indicating that the data are normally distributed. Thus, the dataset meets the normality assumption and is suitable for parametric testing. And the significance value (0.938) is greater than 0.05, indicating that the data are homogeneous.

Table 3. Paired sample t-test

Comparison	Mean	Std. Deviation	Std. Error Mean	t	df	Sig.
Pretest-Posttest	-10.120	1.310	.260	-38.885	24	< .001

The results show a significance value of < .001, which is lower than 0.05. This indicates that the alternative hypothesis (H_1) is accepted and the null hypothesis (H_0) is rejected. This finding confirms that there is a statistically significant difference between pretest and posttest results, meaning that the longmarch training program had a significant effect on students' learning outcomes.

Table 4. N-gain test

	N	Minimum	Maximum	Mean	Std. Deviation
N-Gain	25	.30	.52	.4060	.05448

Based on the N-Gain analysis, the average score is 0.4060 or 40.6%. According to Hake's classification, this value falls into the moderate category ($0.30 \leq \text{N-Gain} < 0.70$). In terms of effectiveness, a score of 40.6% indicates that the longmarch training program is moderately effective in improving students' learning outcomes. Therefore, it can be concluded that the treatment provided has a meaningful and positive impact on the learning process.

4. Discussion

The results of this study indicate that the 17 km longmarch training program has a positive effect on improving students' learning outcomes in physical fitness learning at SMK Negeri Jateng Semarang. Descriptive analysis shows a clear improvement in students' performance after participating in the training program. Prior to the intervention, students' learning outcomes were relatively lower, but they increased significantly after the implementation of the program (Hassan & Nurharsono, 2023). This finding suggests that learning activities involving direct physical engagement can enhance both understanding and mastery of physical fitness concepts.

A 17 km longmarch can improve students' physical fitness through interrelated biological and psychological mechanisms. Biologically, long marches are considered endurance or aerobic endurance training performed over a relatively long duration at moderate intensity (Irwan & Kamarudin, 2021). In addition to improving cardiorespiratory endurance, long marches also help increase muscle strength and endurance, especially in the legs and core, because the continuous long-distance walking activity increases energy metabolism, calorie burning, and muscle efficiency. This programmed exercise has been shown to be positively associated with improved physical fitness in students. Psychologically, long marches can increase motivation, discipline, mental resilience, and self-confidence through the release of endorphins and serotonin, which help improve mood, reduce stress, and decrease mental fatigue. This improved psychological condition also supports students to be more focused, active, and ready to participate in the learning process, as well as improving their quality of life and social skills.

Overall, this study demonstrates that longmarch training has strong potential as an effective instructional method in physical education. Through experiential learning, students not only gain theoretical knowledge but also develop practical skills and internalize physical fitness values in their daily lives. This finding highlights the importance of integrating physical activity into learning processes to achieve comprehensive educational outcomes, particularly in physical education contexts.

5. Conclusion and Recommendation

Based on the research results, it can be concluded that the 17 km long march training program has a positive influence on improving student learning outcomes in physical fitness learning at SMK Negeri Jateng, Semarang. This improvement is evident from the development of student abilities after participating in a structured training program, both in psychomotor, cognitive, and affective aspects, so that the learning process becomes more comprehensive and meaningful. The results also show that the long march program is quite effective in improving physical fitness and student learning readiness through planned endurance-based physical activities.

This finding strengthens studies in the field of Physical Education, Sports, and Health (PJOK), especially in the context of vocational education, that endurance training such as long marches not only plays a role in improving physical condition, but also supports the formation of discipline, mental resilience, and student involvement in the learning process. Thus, the long march training program can be considered as an alternative strategy for PJOK learning in vocational high schools through the implementation of structured, varied physical activities that are appropriate to student characteristics. This research also opens up opportunities for further development of studies related to the implementation of endurance-based training in vocational education.

Therefore, further researchers are advised to use a stronger experimental design involving a control group so that the effectiveness of the program can be tested in more depth, as well as adding measurements of physiological variables such as VO₂Max, heart rate, or cardiorespiratory endurance to obtain a more objective picture of the effect of long march training on physical fitness and student learning outcomes.

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