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# Effectiveness of Health-Based Physical Fitness Training in High School Students

Mazirawati Zakaria[1], Nur Shakila Mazalan[1], Muhammad Naeimuddin Zakaria[1], Wan Hafizi W. Kamaluddin[1]

[1]Faculty of Education, Universiti Kebangsaan Malaysia, 43600, Selangor, Malaysia

Corresponding Authors Email: p121883@siswa.ukm.edu.my

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**Abstract**

The involvement of students during the physical activity of the Physical Education subjects affects the level of physical fitness of students. This study aimed to test the effectiveness of health-based physical fitness exercises based on cardiovascular endurance through a 3-minute bench-up test with a metronome. 18 Kasawari students at the Sekolah Menengah Kebangsaan Convent Jalan Peel located in Kuala Lumpur were selected as samples. The Standard Physical Fitness Examination Form for High School Students (SEGAK) has been used as a measurement tool in collecting information guided by standard procedures harmonized by the Ministry of Education of Malaysia. (KPM). The data was analysed using SPSS Version 29. Through pre- and post-stage tests, the study findings showed descriptive data showing that the min of post-stand test was found to be higher than the min before the stand test. The study findings obtained were significant ($t = -1.446$, $p<.001$). Test-t results show a significant difference between the pre-test upstairs and post-test downstairs in looking at the effectiveness of health-based physical fitness exercises. Therefore, this study can have an impact on various parties such as ministries, departments, schools in addition to the emphasis being given to students to do fitness activities to improve stamina and sports performance and help reduce the problem of obesity among students who are increasing.

**Keywords**: Physical Fitness, Physical Activity, Cardiovascular Endurance

## Introduction

The movement of skeletal muscles as a result of physical movement that surpasses the energy consumption of the resting level, such as walking, sweeping the garbage, lifting things, walking to work, riding a bicycle going to school and doing outdoor activities such as playing roller skates, rowing, gardening, warm-up activities and so on are known as physical activities (WHO, 2020). While the Ministry of Health Malaysia suggests the best amount of physical activity that has an impact on the body is 150 minutes of moderate intensity activity per week or 75 minutes of high intensity activity per week (National Strategic Plan for Non-Communicable Disease NSP-NCD 2016-2025). One needs to divide the exercise period into several days, i.e. for 4 to 5 days a week, or every day. They need to ensure that sitting or lying activities are reduced and changed to activities that involve movement such as standing and walking. Thus,

the study can have an impact on various parties such as ministries, departments, schools as well as emphasis given to students to do fitness activities to improve stamina and athletic performance and help reduce the incidence of fatigue.

**Preview**

Structural muscle movements resulting from a physical movement that overcomes the use of energy at the appropriate resting level such as walking, garbage washing, picking up things, walking to work, riding a bike to school, and doing outdoor activities such as playing wheel shoes, swinging, planting, body heating and so on are known as physical activity. (WHO, 2020). While the Malaysian Ministry of Health recommends that the best amount of physical activity and effect on the body is 150 minutes of moderate-intensity activity per week or 75 minutes of high-intensity activities per week. (National Strategic Plan for Non-Communicable Disease NSP-NCD 2016-2025). One needs to divide the period of exercise into several days, that is, four to five days a week, or every day. They need to ensure that sitting or lying activity is reduced and converted to acts involving movement such as standing and walking. According to the recommendations of the World Health Organization through the Global Recommendations on Physical Activity for Health, the frequency of physical activity can be classified into three age groups ranging from the age of 5 to about 17 years. Whereas an individual who reaches the age of 18 will be in the same category until age 65. Next, when the age of the individual has reached 65 years of age and above, they will be grouped in the same category. In order to maintain a good level of fitness, an individual who is in an environment aged 5 to 17 years is advised to perform a fitness activity within 60 minutes. They are encouraged to perform daily activities at a moderate or high level in order to a good level of health standards.

The involvement of students in physical activity during physical education is essential to achieving a good level of health. Although physical activity has an excellent effect on the body, studies have found that about one-third (31.1%) of the world's population is classified as physically inactive. (Guthold, Stevens, Riley & Bull, 2018). In Malaysia, the 2019 National Health and Morbidity Survey (NHMS) conducted under the agency of the Malaysian Ministry of Health has identified that the latest population health survey that 25.1% of Malaysians are physically inactive. In 1996, the percentage of obesity among Malaysians was 4.4%. There was an enormous percentage change in the number of people with obesity in 2006 as it reached 14% and subsequently increased by 1.1% by 2011. Next, there is a 2.6% surge by 2015 and a steady rise to 19.7% by 2019. In addition, this inactive lifestyle is responsible for 16.4% of national deaths caused by sedentary lifestyles (NHMS,2019). In order to ensure that the student's physical fitness level is at a good level, fitness training should be given because the components of physical activity are based on their health.

Several recent studies have explored the consequences of a lack of physical activity that can be exposed to a variety of dangerous diseases and fat additions in the body. Based on the study by Bouchard and Shephard (1994), through the Physical Activity Relationship Model, Based Health & Health explains how changes in the level of physical fitness will occur through physical activity performed by an individual. When an individual's fitness level increases, it automatically makes the individual active and energetic. In addition, the World Health Organization (WHO, 2017) found that overweight among children was a serious health problem which in 2015 estimated 42 million Asian children under the age of 5 were categorized as overweights. Besides, Model Kurt Lewin who is an American social psychologist

will be used. According to the Kurt Lewin Model, there are four stages that have been identified. The first stage is the planning stage to conduct the study and then through the action process. Then the process of observation must be carried out and ended with reflection. The problem or issue is the main point of an action study to solve the problem. The action to be taken to address the problem is to prepare an action plan (Lewin, 1946).

Although there are studies of health-based physical fitness activities among pupils, the effectiveness of cardiovascular-based fitness is still under-discussed. A study conducted by Phareez et al. (2021), explains that high physical activity levels affect the individual's health. Researchers study the level of involvement of inactive physical activity that leads to high health risks. Therefore, there is a need to implement health-based physical fitness training so that the number of students suffering from obesity can be reduced through the effectiveness of the program.

In Malaysia, a fitness test device on a pupil is applied through a physical fitness test. (SEGAK). Before this test standard was launched, the student's fitness test was through the Basic Endurance Test (UDTA). The filling of the contents of the elementary and secondary school subjects covers the components contained in the SIGAK test. Starting in 2008, all students who have reached the age of 10 to 17 years will take the SIGAK test. In conclusion, students who are in Year 4 up to Level 5 will be required to conduct this test and the findings of the test will be recorded in the System of Testing of Sports Physical Activities and Cocurricular (PAJSK). By March, the first phase of the SEGAK test will begin to be carried out on students, and the next phase will be conducted in August according to the procedures approved by the ministry. The school will always be reminded from time to time of important dates. However, when the world is hit by the Covid-19 epidemic, the test performance dates and Body Size Index for the data collection of Malaysian schoolchildren include those who are five to nine years of age (preschool and Year 1 to Year 3) for the 2023/2024 session will be carried out from May to November. (KPM, 2023). The results of the SEGAK data reporting will help students determine their fitness level. For both teachers and administrators, the data can help them identify the student's current health level in the school to provide guidance or intervention to the student in question in order to the appropriate level of fitness. Meanwhile, the report is very meaningful to be shared with parents so that they are sensitive to their child's health. Even interested parties can get the data for the purpose of finding new talents in the sporting arena (BPK, 2016). The study aims to look at the effectiveness and assess the health-based levels of physical fitness that lead to cardiovascular endurance as well as a long-term plan to reduce the number of students with obesity.

In the context of this study, this study involves a female pupil from 1st grade Kasawari has been selected as a sample study. The study sample will undergo a three-minute pre-rise-down bench test and a recorded flow rate reading calculation. One of the instruments used is to test the cardiovascular endurance. The data collection instrument for testing the endurance of the pupils is through a three-minute Up and Down Test and then the data is recorded in the up and down test scores form. The pre- and post-examination data carried out by the students of the class will be recorded. The scores or scores according to a specified scale are quantitative data that are always used in some data analysis. The next action by the examiner when the sample is completed performing the test before climbing down the bench for 3 minutes, the information and data scores of the student's achievement scores will be used as

a measure to the study sample to improve the test score of cardiovascular endurance in the post-climbing test session next bench. Exceptions to the students lack the effort to not pass this test because this data finding is typical for individuals who are healthy bodies (BPK, 2016). At the end of this article, the overall formulation of the findings of the study will explain the implications for students about their fitness level as well as suggestions for further studies that can be carried out.

According to Clarke (1976), and Davis (1991), physical fitness is the ability of an individual to perform daily activities more effectively without feeling tired. While scholar Wildor Hollman (1991) defines physical fitness as a condition that involves the external and internal of a person and has the ability to do something like others. In addition to physical and mental strength, the strength of human internal organs plays an important role in affecting the fitness level of the individual body. The power of organs such as the heart, blood vessels and muscles to function efficiently can be inferred as fitness according to the results of the study of Sheikh Kamaruddin (1987). However, in the study Corbin and Lindsey (1988) divided into two elements namely physical fitness feeling health and motor-based fitness as the definition of physical fitness. An individual can be categorized as one who is in the extreme stage when it succeeds in achieving at least a simple stage of each component of cardiovascular endurance in which the strength of the heart muscle is tested and the body muscle endurance component. In addition, the components of flexibility and muscle strength are involved in analyzing an individual's fitness level. However, work activities such as physical activity such as hiking, lifting heavy goods, sporting activities (walking and gardening). There are three types of activity that are known as light-intensity physical activity (LIA), moderate-intensive physical activities (MIA) and vigarious-intent physical activity. (Ainworth et al, 2000: U.S Department of Health and Human Services, 2018)

In addition, according to Son's researcher (2019), students' physical fitness is applied through the subjects of physical education with emphasis on health education, physical fitness, recreation and improvement of the quality of human life. In order to improve the level of fitness of pupils, in elementary schools, the discipline of physical education usually consists of physical exercise and posture, exercises, games, field events, gymnastics and dancing. Whereas in secondary schools physical exercise or fitness exercise, exercise, racing and field, swimming activities and anxiety aid are emphasized in addition to dancing for female students. (Pahliwandari, 2019). According to the 2016 SEGAK Examination Guide Book, the National Physical Fitness Standard for Malaysian School Students (SEGAK Test) is a standard physical fitness test battery to measure the level of physical fitness of students based on health (KPM, 2016). Students of the fourth and fifth levels are required to undergo this SIKAK test which is carried out on the first quarter of March and second quarter in August to reduce the population suffering from chronic disease and obesity as well as to give knowledge and awareness about the importance of practicing physical fitness activities. (Kementerian Kesihatan Malaysia, 2016). Through research into students of Sports Science in Kedah, it was found that physical fitness was a motivation not only for athletes but also to be given priority to all, including students who are growing adult (Gunthevan et al., 2019). At the same time opened the minds and minds of the public about the importance of fitness following there are more than four million people said to have died because they did not take care of their health so they became obese (WHO,2020). Overall, the data show an increase in the number of overweight and obese people where the prevalence rate was 4 percent in 1975 and has seen

a major change when it increased to 18 percent by 2016 involving only young people and children. (WHO, 2021).

Cardiovascular endurance is defined as the efficiency of the heart or cardiorespiratory system capable of transporting oxygen-containing blood throughout the body smoothly. According to Yulinar et al (2018), cardiovascular endurance is the core of a person's physical fitness. An individual can work continuously when they have a good level of heart efficiency over a long period of time. They can perform activities at low or moderate intensity rates without feeling uncomfortable. Blood containing oxygen will be delivered throughout the body will cause an individual to work for a long time. Individuals will begin to feel uneasy if they have weak levels of cardiovascular endurance. While less energetic students are often unable to respond positively to what the teacher teaches at school. Less energetic pupils are often not fully focused and concentrated, sleepy and unables to absorb the input that the teacher shares in the learning process in school. (Pauline dan Tajul, 2020). Furthermore, aerobic fitness can be defined as the supply of energy to humans through the ability of the heart muscles, lungs and blood vessels to supply oxygen to 58 muscle groups. Aerobic capacity functions can be assessed through the implementation of aerobics exercise tests in which the oxyge production capacity produced during physical activity is defined by V02max. (American College of Sports Medicine, 2000). According to Corbin, (2011) cardiovascular endurance is a key component in a physical fitness test to study improved athlete performance. Based on a study conducted by Hasif and Norliah (2018), researchers have used a metronome tool to harmonize jumps during a rope jumping exercise exam as an intervention to increase the rate of cardiovascular endurance in fifth-year students.

**Physical Exercise**

Physical exercise is described as a process of heating the body repeatedly and slowly embracing the learning and adaptation elements of the body. An important focus of an individual doing physical exercise is to improve recovering and raising the elements in fitness and can avoid the body from getting an accident. When an individual has a well-connected nerve muscle, a strong muscular system and a stable body balance, the body will not feel tired and tired quickly. Regular and effective physical exercises help raise an individual's performance. Diseases such as heart, diabetes and obesity can be avoided or prevented as well as boost the body's immune system through the practice of systematic and continuous physical exercise.

According to the National Institutes of Health, the National Heart, Lung, and Blood Institute (2006), physical exercise is generally divided into three parts that affect all members of the human body. Aerobics is a physical activity that uses a bunch of major muscles and results in the body using more oxygen than that, resting and aiming to increase heart endurance. Examples of aerobic exercises include cycling, swimming, fast walking, jumping ropes, windsurfing, climbing, playing tennis, and some distance workouts. While anaerobic exercises include strength and resistance training, boosting bone strength and balance. Some examples of appropriate anaerobe exercising are practiced including heavy exercise, pause training and strike running.

## Methodology

*Study Methods*

Study design is an important aspect of some research because it describes the procedures and systematic procedures for the processing of some study carried out. According to Cresswell & Plano Clark (2011), the design of a study helps a researcher to determine the appropriate method used when conducting a study. There are four procedures to be followed: collecting, analyzing, interpreting and reporting data during the conduct of the study. In carrying out this study, the researchers have applied the design of an on-shot case study. Experiments are done only once, treatment to a group of experiments is done in a short time. Do not allow the researcher to diversify the statistical report due to only once the data is quoted and analyzed. The design is as follows:

One treatment group only

| | | |
|---|---|---|
| O1 | X | O2 |
| Pre-treatment | test | post-examination |

## Population,Location and Samples

According to Wallace & Van Fleet (2012), all cases or subjects that are of interest to researchers are known as populations. Populations are also defined as groups that attract the attention of researchers so that it is easier for a researcher to draw conclusions from the data obtained. (Noraini, 2013). The sample of this health-based physical exercise efficacy study consisted of 18 Kasawari girls at the Sekolah Menengah Kebangsaan Convent Jalan Peel in Kuala Lumpur. The Standard Physical Fitness Examination Form for High School Students (SEGAK) has been used as a measuring tool in the collection of information. Researchers have selected 1 Kasawari students to conduct a health-based fitness test to measure cardiovascular endurance. Students were asked to fill in the name and class details as the background of the respondents. The test carried out on the sample was a three-minute stand-down test according to the guidelines set out in the National Physical Fitness Standard Guide (SEGAK) 2016.

Table 1

*Norma SEGAK 13-year-old girl (Panduan SEGAK BPK KPM, 2016)*

| SCORE/ TEST | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| Get up and down the bench for three minutes (Pulses in minute) | 82 and below | 83-106 | 107-130 | 131-154 | 155 and above |
| Push up (Repeat) | 22 and above | 18-21 | 13-17 | 9-12 | 8 and below |
| Ringkuk separa (Repeat) | 19 and above | 16-18 | 11-15 | 8-10 | 7 and below |
| Sit and Reach (cm) | 39 and above | 33-38 | 26-32 | 20-25 | 19 and below |

Between data analysis performed descriptively based on standard min frequencies and fractions using the Statistical Package for the Social Sciences (SPSS) Software Version 29.0.

**Result and Discussion**

*Study Access*

The test analysis results of the up and down bench are given in the form of mins and standard fractions as in the table below.

Table 2
*Data Output Up Dan Down Bench (N=18)*

| | Mean | Std. Dev |
|---|---|---|
| Pre-up and down bench | 97.11 | 35.148 |
| Post -up and down bench | 109.22 | 11.228 |

Table 3
*Test-T Min Score Comparison for Pre and Post Up and Down Bench*

| | | Mean | Std. Dev | t-value | df | Significant Two-Sided p |
|---|---|---|---|---|---|---|
| Pair 1 | Pre-up and down bench- Post-up and down bench | -12.111 | 35.541 | -1.446 | 17 | 0.166 |

level significant p<.001

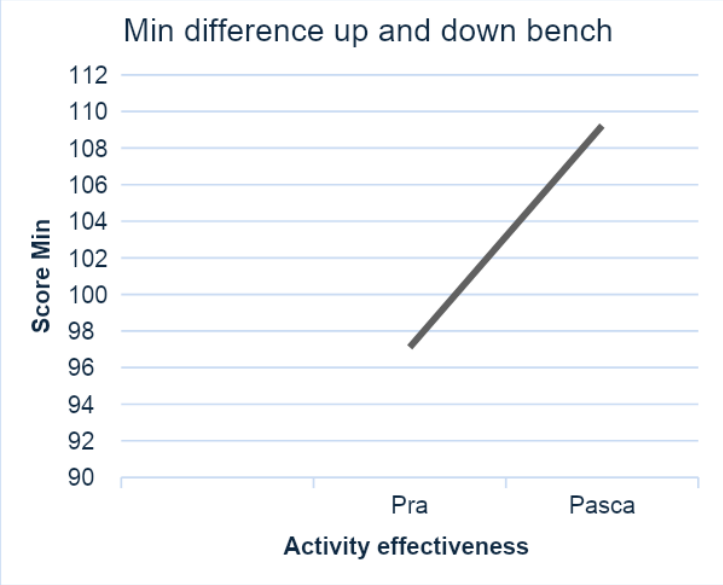


Diagram 1: The graph shows min activity effectiveness comparison

The descriptive data in table 2 show the minutes before the bench climbs down (min = 97.11, the standard fraction = 35.148) and the post-stage fraction (min=109.22, the standard

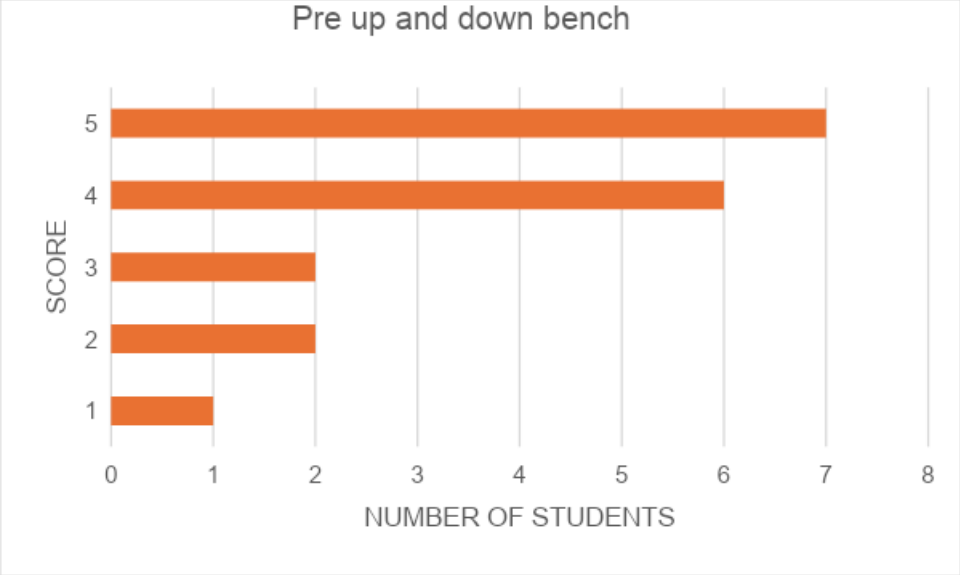


Diagram 2: Pre-score up and down bench

Fraction = 11.228) of the test carried out by the students of Level 1 Kasawari. The difference in min scores between the pre-stage and post-staging test is 12.11. The study findings obtained were significant (t = -1.446, p<.001). This suggests that there is an increase in the level of fitness based on the cardiovascular endurance of the bench-up test performed affecting the effectiveness of the activities of the pupils of 1 Kasawari during Physical Education as well as the activities that have been organized by the school. Figure 1 shows a graph of mins after the up and down bench is found to be higher than mins before the ups and down of the bench.

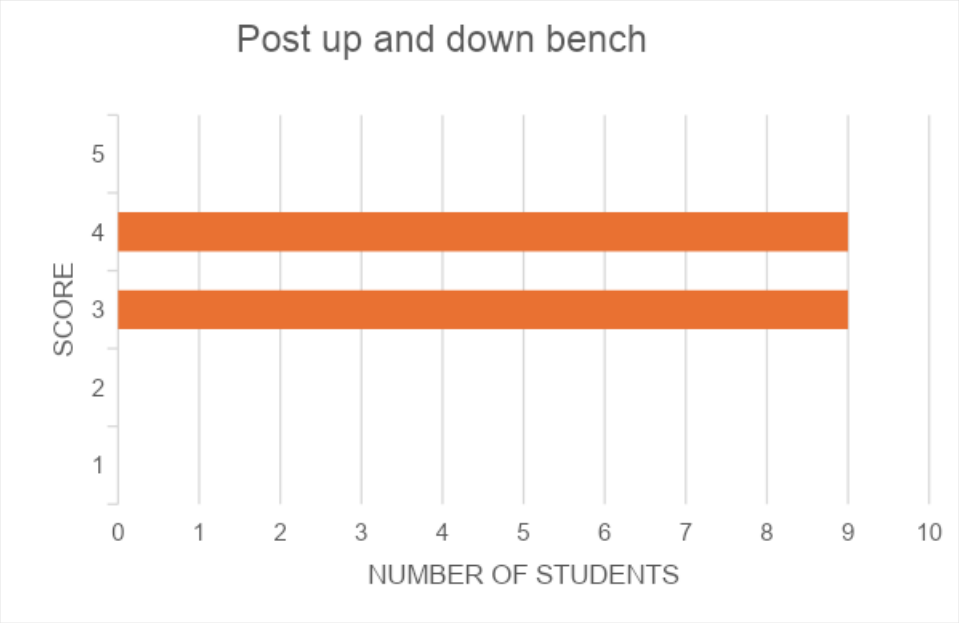


Diagram 3: Post-score up and down bench

A pre-test is conducted to test the student's physical fitness level before a physical fitness exercise is performed on the student. The students were tested by taking a three-minute stand-down test using a metronome. Data analysis showed students are less confident

to undertake activities that involve fitness activities while teachers are teaching in Physical Education. Figure 2 shows how many of the 7 students scored 5 and less than one student scored 4. While the results of scores 3 and 2 showed that only 2 students were recorded for the two scores. However, there was one student who scored 1 in the pre-test.

Based on Diagram 3 of the post-stage test, the data showed an increase in the number of scores of 3, which is nine students. Whereas for the number of scores 4 also recorded the same number it was nine students. Data from this Figure 3 can be compared to data in Figure 2, no students a score of 5 on this post-test.

Table 4
*Student Fitness Level Categories*

| Level | Pre-test (%) | Post-test (%) |
|---|---|---|
| Very High Fitness | 38.8 | 0 |
| High Fitness | 33.3 | 50.0 |
| Strong | 11.1 | 50.0 |
| Less Strong | 11.1 | 0 |
| Not Strong | 5.5 | 0 |

As shown in Table 4, the pre-test and post-exam fitness level category was run by 1 Kasawari students. Out of these, 38.8 percent achieved a very high level of fitness in the post exams and 33.3 percent were in the high fitness category. For the high and low fitness category, however, each recorded 11.1 percent. Only 5.5 percent were recorded for the non-high category in this pre-test. On the other hand, after 1 Kasawari students underwent a physical fitness intervention, there was a change where only the high-level and low-health fitness category was recorded by them at 50.0 percent.

Fitness is an important component of life. With this conclusion obtained, assumptions to the initial hypothesis and subsequently tested whether acceptable or rejected, the results of the study data in detail have accepted the preliminary hypotheses submitted by the researcher. Overall, the researcher can formulate that cardiovascular endurance is at a high level due to various external and internal factors plus the support and also student psychological conditions that play an important role and affect the actual level of student ability.

**Discussion**

The aim of this study is to test the effectiveness of health-based physical fitness exercises among 1 student Kasawari at the Sekolah Menengah Kebangsaan Convent Jalan Peel, Kuala Lumpur. Following this study, it is expected to provide guidance and information to all parties involved in the world of education between pupils and teachers and the school sports development program such as feedback to the school administrators, teachers, and coaches, to help the teacher and coach design exercises that are appropriate to the level of the pupils. The involvement of students in the activities of the co-curriculum can shape the personality and make a good impression on the students through the systematic and orderly management of the curriculum (Sheila Michael & Abdul Said, 2019). Based on a study by AJ and Norlena (2023), proved that the level of effectiveness of school coaches influenced the stage of

execution of athlete management in the Song district primary school, Sarawak. In addition, it is possible to know the real achievement of the student for the component of cardiovascular endurance and also as a source of reference to the examiner will come in particular through the aspects of cardio-vascular endurance. It can help reduce obesity among students who are on the rise. According to Faliza et. al. (2023) progress on this issue is worrying since obesity is the leading cause of diseases such as diabetes and heart disease. The results of this study, the results of the study are significant ($t = -1.446$, $p<.001$). Through the results of the test, there is a significant difference between the pre and post-test for the bench climbing test in view of the effectiveness of health-based physical fitness exercises. The test is a battery test component of the physical fitness level test carried out to measure the level of cardiovascular endurance of students according to the Standard of Procedure (SOP) of the National Physical Fitness Standard Guide Book for students of Malaysian Schools of the Ministry of Education of Malaysia.

Based on the findings of the study showed that most students have a high level of physical fitness based on health due to a variety of factors that affect the actual level and ability of students. The frequency of an individual in performing physical activity actively affects the level of fitness of the individual that will determine that the individual is not easily pale, sluggish and more capable and has an excess of energy when doing something. (Radzani, 2020). The location factor also affects fitness. According to Akid and Radzani (2020), stated the results of their study on pupils in Felda, their lifestyle is healthier and compared to the pupils of the city in the country of Terengganu at the same time helping in improving the level of physical fitness and indirectly they are also not involved with many negative things because the position of their residence is somewhat far from the city and they are still becoming routine giving help and help to parents perform daily tasks such as making the work of the village and improve the standard of life of their own family. In conducting this study, the researcher faced a problem in which he did not know the level of students' involvement in doing fitness activities beyond the time of Physical Education and Health Education. A study by Tarmizi and Radzani (2019), stated that the level of physical fitness of students in vigorous-intensity, moderate-intentity and low intensity activities at a certain rate of time is dependent on the involvement of the student. There are also other external factors that interfere with the conduct of the study. Based on studies by Nursuhaila and Arifin (2022), found that there are four contributing factors that are the main obstacle, namely the state of health of a person who does not allow him to carry out activities, parents, too focused on the examination and environmental conditions. Moreover, according to Cristina et al (2019), stated interests, peers and convenience of the practice are conducive to the involvement of students in the implementation of activities. The results of this study are expected so that the researchers will be able to make changes and innovations with the experts in this field more systematically to help students improve the effectiveness of the implementation of interventions carried out. In addition, researchers also need to make more references to literature studies related to the study of the efficacy of physical activity based on cardiovascular endurance to help this study.

**Conclusion**

The conclusion, based on past studies that underpinned this study, has helped researchers to help students improve the effectiveness of a health-feeling physical fitness intervention that focuses on the cardiovascular endurance of a bench-up test. Next through this study, a little bit of help to all stakeholders to monitor students' fitness levels.

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