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AEROBIC ENDURANCE CAPACITY (VO_2Max) USING BLEEP TEST ON STUDENTS OF PJKR STUDY PROGRAMME

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Abstract
The aerobic endurance capacity of PJKR progdi students must be above the average of the aerobic endurance capacity of other students. Observing this phenomenon, this study aims to determine the capacity of aerobic endurance (VO_2Max) using the Bleep Test in first semester students of the PJKR study programme. The method in this study is quantitative non-experimental with a quantitative descriptive approach. The population used in this study were first semester students of the PJKR study programme, the number of samples was 70 people. The research was carried out at the PJKR study programme. Data analysis using statistical analysis includes preparation, tabulation and data application. Based on the results of research and discussion, it is concluded that the level of physical fitness of Physical Education study programme students is categorised as very less (95.51%) and 4.28% of students are categorised as less. It can be said that more than 95% of physical education study programme students have a very poor level of physical fitness. Students need to manage their diet, rest and exercise activities regularly. The study programme is recommended to monitor and improve physical fitness for students through training and evaluation programmes.

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INTRODUCTION

A person's lifestyle can cause a decrease in one of the components of physical fitness, namely, cardiorespiratory fitness or what is often called the level of maximum oxygen volume. Physical education, sports and health as a forum or place to channel or explore sports skills. In practice, it is important so that it is outlined in Law Number 3 of 2005 article 4 concerning the National Sports System, namely "National Sports aims to maintain and improve health and fitness, achievement, human quality, instill moral values and noble character,

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sportsmanship, discipline, strengthen and foster national unity and integrity, strengthen national resilience, and elevate the dignity and honour of the nation."

From the explanation of the law above, it can be concluded that the main purpose of exercise is to increase a person's activity so that their health and fitness can be maintained. Aerobic endurance is known as maximal volumetric oxygen capacity (VO_2Max). (Satria & Masrun, 2020), VO_2Max is the volume of oxygen that can be used by muscles in the synthetic process of aerobic energy storage with units of millilitres of oxygen per kilogram of body weight in one minute. Aerobic endurance capacity (VO_2Max) is influenced by several factors, namely (1) gender, (2) age, (3) heredity, (4) altitude, (5) exercise, and (6) nutritional adequacy (Candra, 2021).

Maximum oxygen consumption or VO2Max is often used as an indicator of aerobic capacity or cardiovascular endurance. Vo2Max is the maximum volume of oxygen a person can consume in a minute and is generally related to body mass (Pratama et al., 2024). Therefore, the unit of measurement of Vo2Max is ml/kg/minute (Fitrianto, 2016). Physiological factors that affect Vo2Max are the quality of the cardiovascular system in supplying the necessary oxygen to the muscles and the ability of the muscles to extract and utilise the oxygen that has been provided, Aerobic conditions involve low-intensity activities for long periods of time, The aerobic system involves energy metabolism processes that use oxygen as the main fuel (Allsabah, 2021).

It can be said that in everyday life physical fitness greatly affects a person in carrying out physical or non-physical activities, this is less likely to provide the ability to live a productive life (Afrengty, Eldawaty, & Putra, 2020) (Arisman & Agun Guntara, 2021). The implementation of learning in the PJKR study programme focuses on physical activity and sports, so that each student is required to be able to carry out the learning process with a fit body condition. Learning activities both practical and theoretical for first semester students are adjusted to the schedule issued by the study programme starting from 06.00 to 17.00 WIB. Therefore, the aerobic endurance capacity of PJKR progdi students

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must be above the average of the aerobic endurance capacity of other students. Especially for PJKR students in the early semesters (semesters 1-4) will get more practical lecture portions so that their aerobic endurance capacity must be in a good category, in order to carry out learning activities properly. This aims to avoid fatigue that can result in unwanted things such as illness or injury. In accordance with the background description above, the research topic to be studied is Aerobic Endurance Capacity (VO_2Max) Using the Bleep Test in PJKR Study Programme Students.

METHOD

This research is a non-experimental quantitative research using a descriptive quantitative approach. Quantitative research involves itself in calculations or numbers or quantities. This descriptive research is to measure the high and low aerobic endurance capacity (VO_2Max) of PJKR students who are studied using the Bleep Test, so that they can determine the aerobic endurance capacity (VO_2Max) of PJKR students.

The samples selected in this study were samples that met the inclusion criteria and exclusion criteria that had been determined as research subjects. The number of samples was 70 male students of PJKR semester I. In this study, the sampling technique used was non-random / non-probabilty sampling technique (purposive sampling), which is a sampling technique using certain considerations. The selection of subjects in this study is based on the inclusion criteria set by the researcher, so all subjects diagnosed as meeting the selection criteria will be included in the study (Sugyono, 2018). The total population of this study was 225 students. This study was conducted in the PJKR study programme, using research instruments The test instrument used in this study was the Multistage Fitness Test (MFT) or bleep test (Fenanlampir & Faruq, 2015), The implementation of the Bleep Test is carried out in a way, running back and forth or shuttle run between lines that have been measured using a meter and limited by cones that are 20 metres apart, as long as there is a "beep" sound on the sound that already has a bleep test tone instrument, the student must run from the initial cone to the second

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cone, if the sound "beep" is heard again the student runs from the second cone to the initial cone, and is done repeatedly until the student stops at a certain level and return, if before the student arrives at the cone and the sound "beep" has been heard then it is considered a failure. This test is a reliable test and is considered valid to do.

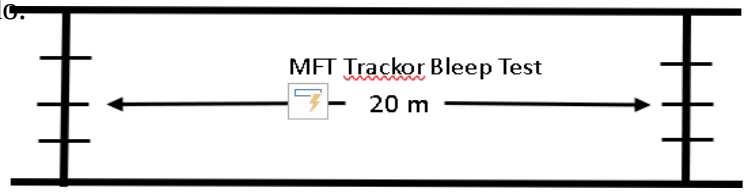

Figure 1. Drawing of MFT Trajectory

The tools and materials required in performing the MFT test are:
1. Field
2. Tape recorder or loudspeaker
3. MFT test audio
4. Stationery
5. MFT test table/form
6. Cones

Steps to measure the aerobic endurance capacity (Vo2Max) of PJKR students, as follows:

1. Calculation of Vo2Max using the level and feedback achieved by the participants studied.
2. After getting the level and feedback results on the test carried out,
3. Then the Vo2Max category can be found in the following table:

Table 1. Vo2Max Categories Based on 13-19 Years of Age

Status	Men	Princess
very less	<35,0	<25,0
less	35,0-38,3	25,0 - 30,9
Simply	38,4 - 45,1	31,0 - 34,9
Good	45,2 - 50,9	35,0 - 38,9
Outstanding	51,0 - 55,9	39,0 - 41,9
Superior	>55,9	>41,9

Data analysis uses statistical analysis, which includes data preparation, tabulation and application. The data obtained were then processed and analysed

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through the following stages: (1). Univariate analysis in this study was used to determine the characteristics of respondents based on age, gender, body weight, height, (2). Bivariate analysis used in this study is to determine the capacity of aerobic endurance (VO_2Max) using the bleep test on PJKR study programme students by referring to the category of aerobic endurance ability (Vo2max) of players with categories: excellent, good, moderate, less, very less, then the 5 categories are percented, this percentage aims at how big the category is in each category. Percentage rate (Arikunto, 2016), calculate the percentage with the formula:

Percentage yield (%):

$$P = \frac{f}{n} X\ 100\%$$

Description:
p : percentage
f : frequency
n : number of respondents

RESULT AND DISCUSSION

This research was conducted on students of PJKR FKIP UKAW Kupang. Data collection was carried out on 10 November to 15 November 2023. The population in the study amounted to 225 and the sample amounted to 70 PJKR students in the first semester of the 2023/2024 class year.

Based on the results of data analysis and processing, the following are some of the findings in the study to answer the research questions that have been formulated. After analysing and processing the data, the findings in this study are the description of the results of research on physical fitness of Semester I PJKR FKIP UKAW Kupang students presented in the following table:

Table 2. Descriptive Statistics of Physical Fitness

Statistics	
N	70
Mean	24.50
Median	24
Std. Deviation	3.66
Minimum	19.60
Maximum	37.50

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Based on descriptive statistical analysis, the level of physical fitness of Semester I students of 2023/2023 PJKR FKIP UKAW Kupang with a total sample of 70 people, shows a mean value of 24.50, Median 24, standard deviation 3.66, minimum value 19.60 and maximum value 37.50.

The level of physical fitness of Physical Education study programme students that has been calculated using the descriptive percentage analysis formula is shown in the following table:

Table 3. Frequency Distribution of Physical Fitness

No	Category	Interval	Frequency	Percentage
1	Very Less	<35,0	67	95.71
2	Less	35,0-38,3	3	4.28
3	Simply	38,4 - 45,1	0	0
4	Good	45,2 - 50,9	0	0
5	Outstanding	51,0 - 55,9	0	0
6	Superior	>55,9	0	0
Jumlah			70	100

From the table above, it is known that the level of physical fitness of students is in the very poor category as many as 67 people (95.71%), in the poor category as many as 3 people (4.28%), in the sufficient category as many as 0 people (0.0%), in the good category as many as 0 people (0.0%), in the extraordinary category as many as 0 students (0.0%) and in the superior category as many as 0 people (0.0%). So it can be concluded that the level of physical fitness of Semester I Batch 2023/2024 students is in the very poor category of 95.71%.

DISCUSSION

Sample Test

The results obtained from this study with a total sample of 70 people, showed that the level of physical fitness of students was in the very poor category as many as 67 people (95.71%), in the poor category as many as 3 people (4.28%), in the sufficient category as many as 0 people (0.0%), in the good category as many as 0 people (0.0%), in the extraordinary category as many as 0 students (0.0%) and in the superior category as many as 0 people (0.0%). So it can

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be concluded that the level of physical fitness of Semester I Batch 2023/2024 students is in the very poor category of 95.71%. This test is basically direct, the implementation is carried out by running back and forth in the specified direction, taking into account the development of the musical sound symbols used. This test is carried out by running for 20 metres, starting with a slow rhythmic run but continuing as the level increases, causing students to be unable to keep up with the increase in rhythmic speed to reach the maximum limit. This fact can lead to an indicator that shows that Physical Education study programme students are less active and less optimal in doing sports training both independently and in a structured manner.

Factors that affect physical fitness become a reference in improving physical fitness. Students need to manage their diet, rest and physical activity regularly. Physical activity includes endurance training and walking which can improve cognitive function (Muzamil, 2014). The greater the lung volume, the easier it is for the blood supply (Hb) to bind to oxygen and remove carbon dioxide or waste into the lungs. The surface area of oxygen bubbles/alveoli in the internal lung volume determines gas exchange (diffusion). The concentration of haemoglobin has the function of binding with oxygen. Haemoglobin then circulates through tissues throughout the body and binds to red blood cells in red blood cells. When levels exceed the maximum threshold, this affects the number of red blood cells that are above the maximum threshold, causing the blood to thicken. This makes distribution through the tissues more difficult and the work of the heart more difficult, as a result, the performance of the heart decreases (Syaifullah, 2021).

Physical fitness is the degree of quality of a person to be able to move optimally without experiencing health problems and excessive fatigue in accordance with their respective tasks or professions. Physical fitness is an important aspect and must be owned by Physical Education study programme students. This is due to the large number of practical learning of various sports carried out by students in the physical education study programme. Students who

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have good physical fitness have the ability to capture and follow learning more optimally. In research (Isnanta, 2023) explains that optimal physical fitness has significant benefits for maintaining heart health, including increasing heart rate, reducing the risk of coronary heart disease, improving blood flow, and maintaining blood vessel elasticity. Regular physical activity reduces the risk of premature death, improves sleep quality, improves cognitive and mental performance, and reduces the risk of depression.

Physical fitness is strongly influenced by physical activity and exercise. The more exercise and training a person does, the higher the level of physical fitness. This is because physical activity and exercise will increase the body's ability to fully utilise oxygen (Hardiansyah & Syampurma, 2017:26). In more detail, Sharkey (2003:30) states that to obtain a good degree of physical fitness, a person must implement a healthy lifestyle (quality of life), the quality of life is translated into three aspects that must be fulfilled, namely regulating food, regulating rest and doing activity (exercise).

Exercise is an effort to improve the functional quality of the body's organs as well as the psychology of the perpetrator (Chan, 2012). Aerobic exercise is a form of exercise that can improve physical fitness. With regular aerobic exercise training, blood flow becomes smooth and accelerates the disposal of metabolic waste substances so that recovery takes place quickly, and a person will not experience fatigue in carrying out tasks, and can still carry out other activities. Physiologically, aerobic exercise has many benefits for the heart, lungs, and muscle elasticity. During exercise there is an increase in oxygen demand so that the heart volume becomes larger and the elasticity of the lungs to expand and deflate increases. Blood vessels become elastic so that the blood which is the medium for delivering food and oxygen needed by body tissues can carry out its functions properly. With a good cardiovascular system, the biological needs of the body at work will be smooth (Nugroho, 2007) Students need to do regular and structured sports training. Structured training means that the training performed must be in accordance with the principles of training. The principles of training

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include the systematic principle, the principle of continuity (continue) and the principle of overload (overload). The systematic principle means that the exercise must be done coherently, starting from warm-up, core, and finally cooling down. The principle of continuity means that training must be carried out in a sustainable or continuous manner while maintaining a regular frequency. The principle of overload means that training must experience additional load at each level of training, starting from the lightest load to the heaviest load.

Regular exercise is training in accordance with the concept of FITT delivered by Irianto (2004: 17), namely Frequency, Intensity and Time (Duration) Type. Frequency of training states the number of training repetitions performed within a period of time per week. The ideal training frequency is 3-5 times per week, based on the principle that there are heavy training days and light training days. Intensity is indicated by how hard a person trains during the training period. The size of the intensity of the exercise is adjusted to the purpose and type of exercise. Intensity for fitness training usually ranges from 60% to 90% DJM (Maximum Heart Rate). Time (duration) is the length of exercise which is inversely proportional to the intensity of exercise. The heavier the intensity of the exercise, the shorter the time required. It takes about 20 to 60 minutes of exercise to improve physical fitness and weight loss programmes.

Managing diet is closely related to efforts to maintain physical fitness because food is a source of energy needed by the body to carry out daily activities. The food intake consumed must also be healthy and fulfil the body's nutritional needs so that the growth and development process can run optimally. Nutritional adequacy strongly supports the availability of sufficient energy for one's body.

The human body is composed of cells, tissues and organs that have work capabilities that cannot be forced to work continuously. Organising rest is necessary for humans so that the body has the opportunity to recover from all the body's faunal activities, so that the body can return to work and carry out daily activities properly. Rest is needed by the body to restore energy when fatigue

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occurs. The time for rest that a person needs in a day and night is approximately 7 to 8 hours.

The application of a regular diet, adequate rest and sports activities carried out according to the principles of exercise and dosage can have a major effect on improving the physical fitness of students. Students in the field of sports must have better knowledge and application of the concept of physical fitness so that they can get a good level of physical fitness. In the end, every student in the field of sports, especially the Physical Education study programme, must have good physical fitness to support high physical activity in the field of sports.

CONCLUSION

Based on the results of research and discussion, it is concluded that the level of physical fitness of Physical Education study programme students is very poor (95.51%) and 4.28% of students are categorised as less. It can be said that more than 95% of physical education study programme students have a very poor level of physical fitness. Students need to manage their diet, rest and exercise activities regularly. The study programme is recommended to monitor and improve physical fitness for students through training and evaluation programmes.Conclusions describe the answers to the hypothesis and / or research objectives or scientific findings obtained.

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