



## Use of Physical Test Measurements for Hockey Sports Using the Physical Education Sports and Health Application for Extracurricular Students of Senior High School Muhammadiyah 6 Palembang

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Physical Test Result Measurement; Physical Education Sports and Health Application; Indoor Hockey

### Abstract

The study entitled The Use of Physical Test Result Measurement in Hockey Sports Branch Using PE Application on Extracurricular Students of Muhammadiyah 6 High School Palembang. This study aims to determine the physical condition of hockey sports students using the help of PE application on extracurricular students of Muhammadiyah 6 High School Palembang. The research method used in this study is quantitative descriptive method. The results of the study were to produce data on the physical condition of extracurricular students of Muhammadiyah 6 High School Palembang with a very good category of 16.64%, a good category of 13.58%, a sufficient category of 92.9%, a less category of 89.2% and a very less category of 29.98%. The implications of the results of this study are the growing awareness for students to continue to improve and maintain their physical condition wherever and whenever, so that they can improve the physical condition of students in the sufficient, less and very less categories so that they become better.

### How to Cite

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## INTRODUCTION

According to (Agnes Sopiya Maliza et al., 2023) the opinion regarding extracurricular activities is an event to develop interests and talents aimed at achieving goals optimally, both in education and achievement, this level of self-confidence is very necessary because students can be more interested in participating in extracurricular activities. Extracurricular activities are educational activities for students outside of class hours. Extracurricular activities in the school environment must prepare several student training needs and everything so that students are more motivated to do physical activities, activities that can be a place to accommodate students' desires in being active (H. , & K. N. W. Hartati, 2018).

Extracurricular sports activities carried out in schools aim to develop students' potential and talents in the field of sports, especially sports achievements at the student level. The purpose of holding extracurricular sports activities is expected to have an influence on the interests, talents and potential of students. Extracurricular sports activities carried out in schools have two types of sports, namely team sports and individual sports. Extracurricular activities that are almost carried out in every school, especially High Schools because by participating in these extracurricular activities, students can develop their interests, talents, achievements and foster self-confidence. Self-confidence is the belief in one's own abilities and being able to use them appropriately. Self-confidence is needed by students to be able to carry out extracurricular programs properly, so that they can support the achievement of achievements in sports. The results of previous studies show that in order to achieve high achievements, athletes must have self-confidence in themselves (Kamnuron, 2020).

Testing is one of the processes that is very necessary in seeing the development of athletes. (H. , S. S. , & V. A. R. Hartati et al., 2022) A test is a tool or instrument used to obtain information about a person or object. A test, also known as a test, is a written assessment tool to record or observe student achievement in accordance with targets).

(H. Hartati et al., 2022) Sport is a series of regular, planned exercises that people do intentionally to improve their functional capacity. Field hockey is a two-team game in which each team consists of 11 players, each player using a stick to play the ball.

According to Primadi Tabrani in his

research (Akbar, 2018) Hockey is a game played by two teams or squads where each team holds a stick which aims to move, control, dribble and hit the ball. Hockey is a sport played by two teams. Each team plays using a stick, or a bent stick, to set the ball into the opponent's goal (Yulianus, 2023). Hockey can be played by men and women, and the team consists of eleven people. Which team scores the most goals can determine the winner. Sport is a physical activity with rules. Because it has various benefits for health and physical fitness and easy to do so it does not require complicated preparation, sports are common activities carried out by the outside community.

According to (Arif et al., 2019) Hockey is a type of game played with a small ball. Each team plays with each player holding a bent stick called a stick to move the ball. In hockey, players do not come into direct contact with their bodies because of the stick, while the goalkeeper uses full body protection to avoid being hit directly. The role of physical condition in supporting athlete performance is the main requirement. Athletes who have good physical condition will get an increase in the circulatory system and heart function, strength, flexibility, endurance, speed, and other physical components. More effective and efficient movement during training and competition, as well as rapid recovery. Good physical condition components will affect the athlete's maximum performance, including in hockey. Hockey is a sport of achievement consisting of two numbers, namely: outdoor hockey and indoor hockey. Hockey games require optimal physical condition because hockey games in matches consist of two periods of 20 minutes.

Currently, hockey is starting to be known and loved by the community, especially in high schools in the city of Palembang. Hockey sports have been included in the High School environment in the form of extracurricular activities. Schools that make hockey an extracurricular activity are Muhammadiyah 6 High School Palembang. The development of indoor hockey for students in Indonesia is quite rapid. The popularity of the hockey sport in the student environment has also spread widely among students in the city of Palembang, namely Muhammadiyah 6 High School Palembang. Hockey sports for students in the city of Palembang often conduct trials every month, so there is good communication and socialization from each school.

According to (Pradana Saputro et al., 2021) based on the research results that have been presented in the results and discussion chapter, it can be concluded that the sports application

(AORA). Processing physical test results using the application is also stated to be more efficient when compared to manual processing. based on the study, the application for measuring the physical condition of hockey players to measure the abilities and biomotor of hockey players. The implementation of this application makes it easier for coaches to find out the history of the physical condition of hockey layer, whether there has been an increase or decline, with this application it can speed up the process of monitoring the physical condition of hockey players.

Research conducted by Hartati, et al. (2023) Produced a Product in the form of a PE Application. The application used is a product of a physical test result measurement application. This measurement application can be accessed via smartphones and computers connected to the internet in order to carry out the measurement process from physical test result data, for the effectiveness of using the application it is highly recommended to use a laptop or computer.

Technology develops along with the progress of culture, because technology is an advanced cultural development, the era of globalization like today, media development is increasingly rapid. Technology has entered human life and coexists directly or indirectly, as well as in the field of sports which has placed technology as the most important part of every sporting activity, one of which is application-based hockey (Abdurahman et al., 2020).

Physical condition is the most basic preparation that someone does if they want to do a sporting activity, therefore it is necessary to do dominant preparation in order to get the desired physical condition (Bafirman HB. Asep Sajuna Wahyuri, 2020). The components of physical condition are biometrics where the components of physical fitness are divided into two large groups. Basic techniques are important in a sport game, including hockey. Players must really master the basic techniques in hockey. because it will be the basis of all movements and strategies to achieve a victory. In hockey. there are several basic techniques that need to be mastered properly by athletes including dribbling, passing, and shooting (Nurrochmah et al., 2023).

According to (S. Aryanti et al., 2019) The definition of technique is a path, tool, or media used by teachers to direct student activities towards the desired goals, learning techniques are the methods used by educators in implementing a media or method.

According to Purwanto (2019: 41), the physical conditions required in hockey include:

(1) strength, (2) agility, (3) speed, (4) flexibility, and (5) endurance. Good endurance is essential for every hockey player to face a match. If a player has good endurance, then the player will not experience significant fatigue when undergoing training or matches. (Syamsidar, 2019).

Based on the results of field observations and previous research, it was found that there are similarities in the use of applications that will later make it easier for everyone who does sports to classify their physical fitness levels.

The application for processing hockey physical test results which is stated to be effective and efficient compared to calculating physical test results manually, and makes it easier for coaches to find out the condition of students, whether they have increased or decreased, with this application it can speed up the process of monitoring students' physical conditions.

The update in this study is the use of an application that will make it easier for everyone who does sports to classify their physical fitness level, a hockey physical test result processing application that is stated to be effective and efficient compared to calculating physical test results manually, and makes it easier for coaches to find out the condition of students, whether they have increased or decreased, with this application can speed up the process of monitoring students' physical conditions. In previous studies, coaches still used manual calculations to calculate students' physical test results so that it took a long time.

Based on the problem limitations above, the formulation of this study is. How is the physical condition of the hockey sport branch using the assistance of physical education, sports and health applications for extracurricular students at Muhammadiyah 6 Senior High School, Palembang.

Based on the formulation of the problem above, this study aims to determine the physical condition of the sport of hockey by using the assistance of the Physical Education, Sports and Health Application for extracurricular students at Muhammadiyah 6 Senior High School, Palembang.

## METHOD

This study uses a quantitative descriptive research method. Where quantitative descriptive research is describing, researching, and explaining something that is studied as it is, and drawing conclusions from phenomena that can be observed using numbers. This study uses data

collection techniques through questionnaires, observations and interviews.

According to (Ardyanto & Firdausy Putra Islamy, 2023) the physical conditions required in hockey include: (1) strength, (2) agility, (3) speed, (4) flexibility, and (5) endurance. The following is the standardization of physical test assessments for the sport of hockey which is a data collection technique, namely:

### **Tes Push – Up ( Strength )**

Test participants perform a perfect Push-Up Movement counted as a test result for 60 seconds.

Purpose of Pust – Up:

Purpose: To measure the strength of the student's arm muscles.

How to do Pust – Up:

Start in a prone position with your body straight.

- Place your palms on the floor parallel to your shoulders.
- Make sure your back is straight and your weight is evenly distributed.
- Position your legs straight with your fingertips touching the floor.
- Start lifting your body until your arms are straight. Do the up and down movement by bending your elbows to 90 degrees.

**Table 1.** Push up test for age group 15-18 years Assessment norms.

Man	Criteria	Woman
>38	Very well	>21
20 – 28	Good	16 – 20
20 – 28	Enough	10 – 15
12 – 19	Low	5 – 9
4 – 11	Very Low	1 – 4

Source: (Pasaribu, 2020)

### **30 Meter Run (Speed)**

The test is performed twice, with runners performing the next test after a gap of at least one runner. The best running speed will be calculated.

30 Meter Run Goals:

Objective: to increase muscle mass and measure student speed.

How to do a 30 Meter Run:

- The athlete is ready to stand behind the starting line
- With the command "ready", the athlete is ready to run with a standing start.
- With the command "yes", the athlete runs as fast as possible covering a distance of 30

meters until crossing the finish line.

- Running speed is calculated from the time the command "yes".
- Time recording is done up to tenths of a second (0.1 seconds), if possible recorded up to hundredths of a second (0.01 seconds)
- The test is done twice, the runner does the next test after a gap of at least one runner. The best running speed will be calculated.
- The athlete is declared to have failed if he passes or crosses another lane.

**Table 2.** 30 Meter Running Test for the 15-18 year age group Assessment Norms.

Man	Criteria	Woman
3.58 – 3.91	Very well	4.06 – 4.50
3.92 – 4.34	Good	4.51 – 4.96
4.35 – 4.72	Enough	4.97 – 5.40
4.73 – 5.11	Low	5.41 – 5.86
5.12 – 5.50	Very Low	5.86 – 6.30

Source : (Guidebook for Implementing Tests and Measurements for Athletes, 2019)

### **T test (Agility)**

Test participants performed the T-test during one trial.

Purpose of T test:

The purpose of the test is to measure student agility.

How to do a T test:

- Place the cones in a T-shaped position, 5 yards (4.57 m) or 10 yards (9.14 m) apart
- To start, Testi is on cone A
- Pay attention to the cue to start.
- Testi sprints to cone B and touches cone B with the right hand.
- Then turn left with a sideways movement and touch cone C with the left hand.
- Continue moving sideways towards cone D and touch it using the right hand.
- Continue moving sideways towards cone B and touch it using the left hand.
- After that, run backwards towards cone A.

**Table 3.** T-test for the age group 15-18 years Assessment Norms.

Man	Criteria	Woman
<9,5	Very well	<10,5
9,5 – 10,5	Good	10,5 – 11,5
10,5 – 11,5	Currently	11,5 – 12,5
> 11,5	Very Low	>12,5

Source: (Guidebook for Implementing Tests and Measurements for Athletes, 2019)

**V Sit and Reach Test (Flexibility)**

Test participants perform the V sit and reach movement and record the results of the furthest reach from 3 attempts.

V Sit and Reach Objectives:

Purpose: to measure the flexibility of the lower back and hamstring muscles.

How to do a V Sit and Reach:

- Students sit on the mat with their legs straight and shoulder-width apart, the soles of their feet perpendicular to the mat. The position of the heels does not exceed the outer tape line.
- The left palm is placed on the back of the right hand with the fingers parallel.
- Bend and push the body far forward with both ends of the hands and knees straight.
- The knees should not be bent during the test.
- The soles of the feet are kept perpendicular to the mat.
- Maintain this position for 3 seconds.

**Table 4.** V Sit And Reach for the age group 15 -18 years Assessment Norms.

Man	Criteria	Woman
>14	Very well	>18
10 – 14	Good	14 – 18
5 – 9,9	Enough	10 – 13,9
0 - 4,9	Low	5 – 9,9
<0	Very Low	<5

Source: (Kemenpora, 2022)

**12 Minute Run (Endurance)**

Test participants run for 12 minutes.

12 Minute Run Goals:

The goal of the 12-minute run is to improve students' endurance.

How to do the 12 Minute Run:

- Face your gaze forward.
- Keep your chest up and your body relaxed.
- Keep your hips in position.
- Pay attention to your knee position.
- Use the middle of your foot to step.

**Table 5.** 12 Minute Running Test for the 15-18 year age group Assessment Norms.

Man	Criteria	Woman
>3000M	Very well	>2600M
2400M – 3000M	Good	2000M – 2600M
2200M – 2400M	Enough	1800M – 2000M
2300M – 2000M	Low	1700M – 1600M
<2000M	Very Low	<1500M

Source: (Runner.case, 2023)

Quantitative research is defined as a systematic investigation of phenomena by collecting measurable data using statistical, mathematical or computational techniques. The data analysis technique in this study is quantitative descriptive analysis with percentage data used to test the variables in this study. The formula used is in accordance with the formula of Anas Sudijono (2017) as follows:

$$P = N/F \times 100\%$$

Source: (Sutiana, 2020)

Description:

P = Percentage

f = Frequency

N = Number of Cases (Total frequency / number of individuals).

The normality test is a part of the research that functions to test all variables in the research, the formula norm used in the normality test in this research uses the Shapiro-wilk formula with the Spss 23 program. Data is said to be normal if the significant value is greater than 0.05 at ( $p > 0.05$ ) conversely if the significant value is less than 0.05 at ( $p < 0.05$ ) then the data is said to be abnormal.

**RESULTS AND DISCUSSION**

This research was conducted at Muhammadiyah 6 High School Palembang on August 29, 2024, located on St. Jendral Sudirman Komp, Muhammadiyah Balayudha KM. 4.5, Kemuning District, Palembang City, South Sumatra Postal Code 30128. has an "A" accreditation where the PE teacher is a member of the Subject Teachers' Conference PE Palembang City. The collection of Physical Test Data for the Hockey sport was carried out together with the PE teacher of Muhammadiyah 6 High School Palembang. To assist the data collection process in the study, namely Mr. Andre Wicaksono, M.Pd. The data taken in this study are in accordance with the Test Components in the Hockey sport branch including Strength, Agility, Speed, Flexibility and Endurance. The test instruments used to measure the strength test using push-ups, agility test using T-tests, speed tests using 30-meter runs, flexibility tests using V-sit and reach, and endurance tests using 12-minute runs.

The analysis data was obtained through calculations using the Statistical Package For The Social Sciences (SPSS 23), each category of norms and data from each component of the physical test so that the average physical condition of the Hockey sport branch in Extracurricular



students of Muhammadiyah 6 High School Palembang can be known. For more details, see the following **Table 6**.

**Table 6.** Data Analysis Results

Indicator	Category				
	Very Good	Good	Enough	Not Enough	Less Than Once
Strength	50%	21,3%	13%	0%	0%
Agility	0%	10%	36,6%	53,3%	0%
Speed	0%	10%	0%	36%	53,3%
Flexibility	16,6%	26,6%	33,3%	23,3%	0%
Durability	0%	0%	6,6%	13,3%	80%
Average	16,64%	13,58%	92,9%	89,2%	29,98%

Based on **Table 6**, the results of the analysis of physical condition data of students of Hockey Extracurricular at Muhammadiyah 6 High School Palembang, for the very good category with an average of 16.64%, the good category with an average of 13.58%, the sufficient category with an average of 92.9%, the less category with an average of 89.2%, and the very less category with an average of 29.98%, from all the categories above, it can be concluded that the average value of the physical condition of students of Hockey Extracurricular at Muhammadiyah 6 High School Palembang is in the sufficient category with a percentage of 92.9%.

Based on the results of collecting physical test data and measuring data on physical test results using the PE application, a discussion is needed regarding the application of measuring physical test results for the sport of Hockey in order to help teachers or coaches in determining or compiling the results of physical tests that have been carried out.

Based on the data from the arm muscle strength test results obtained with an average of 50% in the Hockey Extracurricular of Muhammadiyah 6 High School Palembang, when conducting the arm muscle strength test, many received the Very Good category. Arm muscle explosive power is a basic physical condition ability which is the mainstay in achieving hockey achievements, especially in passing. Points (numbers) will not occur if passing is not done correctly. Based on the data from the strength test results obtained with an average of 50%, if classified, the majority are in the Very Good category where when conducting the strength test, extracurricular students of Muhammadiyah 6 High School Palembang were in the SB category, and it is hoped that students can maintain their strength by often doing Push-ups and sit-up.

Based on the data from the agility test results obtained with an average of 53.3% for the Hockey Extracurricular of Muhammadiyah 6 Palembang High School, if classified, it is included in the Less category, this is because the majority of students when doing the agility test are in the Less category, which means that in the Hockey Extracurricular of Muhammadiyah 6 Palembang High School in the Hockey sport branch, the agility is K, and it is hoped that with these test results, students can improve their agility by often doing T-shaped running exercises, T-test running, zig-zag running, and back and forth running, for coaches so that there are more test variations so that they don't get bored when the athletes do the test, and hopefully in the future the Hockey Extracurricular students of Muhammadiyah 6 Palembang High School will be better than the current results.

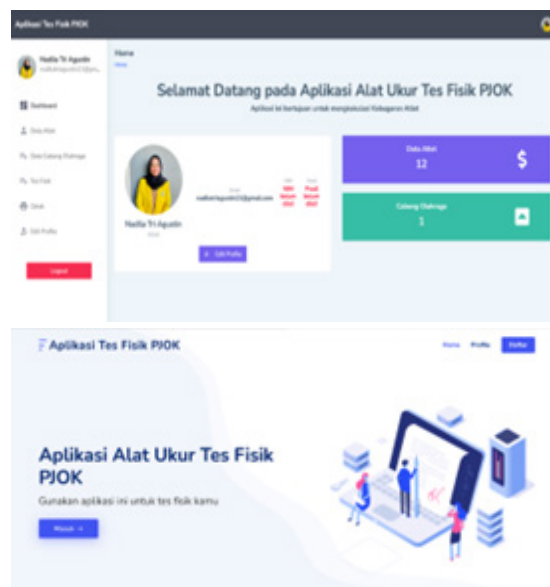
Based on the speed test results data obtained with an average of 53.3% for hockey athletes, in the hockey extracurricular activities of Muhammadiyah 6 High School Palembang, if classified, it is included in the Less Once category because during the test, most of them got KS results, so extracurricular students of Muhammadiyah 6 High School Palembang, the Hockey sport branch needs to improve their physical speed condition by often practicing short runs by doing them quickly repeatedly and so that in the future they can get better results, because speed in hockey is very much needed (Dwi Wicaksana & Rizanul Wahyudi, 2020).

Based on the flexibility test results data obtained with an average of 33.3%, if classified Most fall into the category of Sufficient, where when conducting the flexibility test, extracurricular students of Muhammadiyah 6 High School Palembang were in category C, and it is hoped that students can improve their flexibility by often doing flexibility exercises such as opening both legs wide until they touch the floor (split), and by stretching properly from the neck, shoulders, waist and joints because in hockey flexibility is needed when practicing hockey, because flexibility reduces injury and is very good for playing matches. Menurut Syafruddin (2021: 111) Flexibility is "The body's ability to perform exercises with large and wide amplitude of movement" With wide body flexibility means that a person can move freely, so that less energy is expended to carry out daily activities. Flexibility is the effectiveness of a person's adjustment in body activities using stretching the arms as wide as possible in the muscles and ligaments around the joints. Conclusion from the analysis results of physical

condition of students of Hockey Extracurricular Muhammadiyah 6 High School Palembang, for push-up instrument that got very good category 2 males and 13 females, good category 8 males and 4 females, sufficient category 2 males and 1 female, less category 0 males and 0 females, very less category 0 males and 0 females, 30 meter running instrument that got very good category 1 male and 4 females, good category 3 males and 0 females, sufficient category 5 males and 7 females, less category 2 males and 3 females, very less category 1 male and 4 females, T test instrument that got very good category 0 males and 0 females, good category 2 males and 1 female, sufficient category 6 males and 5 females, less category 4 males and 12 females, V sit and reach instrument very good category 0 males and 6 females, good category 3 males and 5 females, sufficient category 7 men and 3 women, lacking category 2 men and 4 women, very lacking category 0 men and 0 women, 12 Minutes Running instrument category very good 0 men and 0 women, good category 0 men and 0 women, sufficient category 2 men and 0 women, lacking category 1 man and 3 women, very lacking category 9 men and 15 women, for the physical category for the extracurricular hockey students at Muhammadiyah 6 Palembang High School is in the Sufficient category. The implication of this study is to provide recommendations for the results of the physical fitness test of students of the Hockey Extracurricular Program at Muhammadiyah 6 High School, Palembang with the help of an application.

According to Aryanti, Hartati, and Syafaruddin (2020:49) the advancement of digital technology is expected to help overcome current learning problems. Therefore, to support teaching and learning activities, sophisticated learning resources are needed that can also be accessed online (Aryanti et al., 2021).

Coaches experience problems in athletic physical tests so that with the existence of a physical test application that has been created, it is necessary to have socialization and training in the use of the physical test application (H., V. A. R., Y. H., & D. D. Hartati, 2019). the application used is a product of a physical test result measurement application designed by Prof. Dr. Dra. Hj. Hartati, M.Kes. This measurement application can be accessed via smartphones and computers connected to the internet in order to carry out the measurement process from physical test result data. For the effectiveness of the application measurement, it is highly recommended to use a laptop or computer.



Picture 1. App development

## CONCLUSION

Based on the results of the study, it can be seen that the results of the physical condition test on extracurricular students of Muhammadiyah Senior High School 6 Palembang Hockey branch for the average physical condition in the very good category with a percentage of (16.64%), in the good category with a percentage of (13.58%), in the sufficient category with a percentage of (92.9%) in the less category with a percentage of (89.2%), and in the very less category with a percentage of (29.98%), it can be concluded that the average physical condition of extracurricular students of Muhammadiyah Senior High School 6 Palembang is in the "Enough" category with a percentage of (92.9%). The implication of this study is the recommendation of the results of the physical condition of extracurricular students of Muhammadiyah Senior High School 6 Palembang using the help of the application.

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