



# The influence of push-up training on shooting ability in the handball game of Makassar City athletes

Akbar Yusuf<sup>1A-D\*</sup>, Ikadarny<sup>2B</sup>, Suparman<sup>3BC</sup>, Davi Sofyan<sup>4D</sup>, Andi Sahrul Jährir<sup>5D</sup>

<sup>1</sup>Pendidikan Jasmani Kesehatan dan Rekreasi, STKIP YPUP, Makassar, Indonesia

<sup>2</sup>Pendidikan Jasmani Kesehatan dan Rekreasi, Universitas Negeri Makassar, Indonesia

<sup>3</sup>Pendidikan Jasmani Kesehatan dan Rekreasi, STKIP YPUP, Makassar, Indonesia

<sup>4</sup>Pendidikan Jasmani Kesehatan dan Rekreasi, Universitas Majalengka, Indonesia

<sup>5</sup>Pendidikan Jasmani Kesehatan dan Rekreasi, STKIP YPUP, Makassar, Indonesia

\*Corresponding Author: [Akbaryusuf0@gmail.com](mailto:Akbaryusuf0@gmail.com)

Authors' contribution: A) Conception and design of the study; B) Acquisition of data; C) Analysis and interpretation of data; D) Manuscript preparation; E) Obtaining funding

## ABSTRACT

Makassar handball athletes who took part in the Porprov Exhibition Championship held in Makassar always had difficulty getting the ball into the opponent's goal. In this case, their shooting ability was still very weak, so the ball that was shot could be easily driven away or held by the opposing goalkeeper. The purpose of this study was to determine the effect of push-up training on the shooting ability of the Makassar City athlete's handball branch. The population of this study used a total sampling technique with a total of 14 athletes. This type of research uses a one-group pretest-posttest design. at the beginning (pretest) and end (posttest) of the treatment. This type of research has applications. Based on inferential statistical analysis using the t-test and a t-count value of  $17.793 > t_{table} 2.160$  (sig. value  $0.000 < 0.05$ ), it means that there is a significant effect after being given push-up training. To prove the increase in shooting ability, an average value of 4.333 is evidenced, or, in other words, the results of the t test obtained show that the t-count is greater than the t-table at a significant level of 0.05. So it can be concluded that there is a significant influence between push-up exercises (X) and the shooting ability (Y) of Makassar City handball athletes.

## ARTICLE HISTORY

Received: November 22, 2022

Accepted: December 28, 2022

Publish: January 12, 2023

## KEYWORDS

Push-up exercise;  
Arm muscle strength;  
Shooting;  
Hand ball

**How to Cite** : Yusuf, A., Ikadarny, Suparman, Sofyan, D., & Jährir, A.S. (2022). The influence of push-up training on shooting ability in the handball game of Makassar City athletes. *Journal RESPECS (Research Physical Education and Sport)*, 5(1), 49-55. <https://doi.org/10.31949/respecs.v5i1.3783>

## INTRODUCTION

Exercise is an important thing that needs to be done to keep the body healthy, strong, and fit. Exercise has numerous health benefits because it increases the body's resistance,



making it more difficult to become ill. However, many people do not realize the importance of exercise. Many factors contribute to people rarely exercising; everyone should be self-aware. There are many sports that are very popular with the community, from children to the elderly; some of the sports they like are self-defense sports such as karate, judo, wrestling, martial arts, and others, and sports games such as football, futsal, basketball, handball, and many other sports.

Handball is a very simple game. Handball is played on a field with a ball and two goals. In a match, the game of handball consists of 2 teams, each consisting of 6 players and 1 goalkeeper, both male and female. The aim of the handball game is the same as that of football, namely to score points by putting as many balls into the opponent's goal as possible and preventing the opponent from putting the ball into our own goal. A team can change players in the middle of a game without notifying the referee. Baseball is played in two innings. Each round lasts 30 minutes, with a 15-minute break between rounds.

Handball is defined as a team game that uses a ball as a tool and is played using one or both hands. The ball can be thrown, bounced, or shot. Bayu Segara, et al. (2020) Meanwhile, according to Lutan (Afif, 2022), handball is a game with a fast rhythm involving two teams, each consisting of seven people with various tasks, such as passing, throwing, catching, and dribbling a small ball using their hands while trying to score goals against the opposing team. The team with the most goals is declared the winner. The game consists of two halves of 30 minutes each, interrupted by a 10-minute break.

Handball games generally train basic movement skills to form speed and strength abilities besides, of course, coordination and collectivity. This game requires basic movements that resemble basketball games, such as the ability to run fast and change direction by jumping, throwing, and making explosive moves. A feature of the game of handball is the quick transition between offensive and defensive actions during a game with the aim of scoring a goal. To accomplish this, offensive players attempt to create space in which they can throw the ball towards goal under favorable conditions, whereas defenders attempt to prevent offensive players from creating opportunities. The attack phase in handball is dynamic, characterized by fast movements and a high frequency of ball flow.

Success in handball can be influenced by several factors, namely technique, tactics, and physical condition. In handball, there are several basic movements that build movement patterns, namely locomotor movements, non-locomotor movements, and manipulative movements (Burhanuddin, 2022). This move is used both when defending and when attacking. In addition to the movements described above, this handball sport also requires supporting factors such as playing technique, playing tactics, and the athlete's physical quality.

In the game of handball, there are several basic techniques that need to be mastered, including: 1) The passing technique is carried out in an effort to control the ball by throwing and catching the ball using either one or two hands, 2) This dribbling technique is used to control the ball in the player's hands with the goal of getting the ball to the opponent's defense area, 3) Shooting Techniques: The aim of shooting is to create

points by putting the ball into the opponent's goal. Of course, to achieve greatness in handball, you have to master the technique, but this research only discusses one technique, namely shooting.

The physical condition of the athlete also influences the success of the player, one of which is when shooting. Many muscles play a role in this, one of which is arm muscle strength. These muscles are very influential on players when they want to score, which is often called "shooting." To get the desired shooting form, an athlete must have good arm muscle strength to support the movement. In order to be able to do the desired shooting, an athlete must have the strength of the supporting muscles so that he can carry out the desired shooting results. He must do arm muscle strength exercises such as push-up exercises.

According to Harsono (2015), training is a systematic process of practicing or working that is repeated by increasing the number of exercises or tasks, whereas Suharjana (2013) defines training as a systematic process for developing and maintaining elements of physical fitness that are carried out for a long time, are gradually increased, and the load is individual and carried out continuously. Based on the opinion above, it can be said that training is the maximum effort made by an athlete, and to achieve the ultimate goal of an appearance, namely increasing optimal performance, training activities must be carried out systematically, gradually, and repeatedly, with increasing numbers of training loads.

The handball sport branch, commonly referred to as "ABTI," is one of the new sports branches that joined KONI Makassar City, namely in 2019 under the name Indonesian Handball Association (ABTI) Makassar City. This sport has not been very developed in Makassar City because in the last two years there was the COVID-19 pandemic, so handball activities and all physical contact sports were very limited. South Sulawesi handball is one of the sports that competed in the 2022 Porprov exhibition and finished second, or runner up. Based on the survey results in the field, one of the weaknesses of the Makassar handball athletes who failed in the final match was their poor shooting ability.

Shooting is a very decisive technique in the success of a handball athlete's attempt to score balls or points and achieve a victory. The quality and quantity of exercise determine whether a person has good or bad physical components. One of the physical components that plays an important role in shooting in handball is the strength of the arm muscles. In the arm of an athlete, there are several muscles that have an important role, including the biceps.

According to Irawandi (2011), strength is the ability of muscles and nerves to overcome internal and external loads, while according to Widiastuti (2011), strength is the ability to move a mass (one's own body, tools) and also overcome a burden through the work of nerve muscles to overcome internal and external loads. From the opinions above, it can be concluded that strength is the ability to move a load, both external and internal.

In the human body system, movement is created by the cooperation of the muscles and nerves that move the skeleton. Muscles and nerves work through brain commands to create the desired movement. The arm muscles are the muscles that attach to the arm

from the upper arm to the forearm. The arm muscles are divided into two, namely the biceps and triceps; the biceps are at the front of the arm and the triceps are at the back. The triceps branch into three parts. If we move our hands in a straightening motion, the muscles that work, including the biceps, will relax while the triceps will contract. If we move the arm to bend, the biceps will contract while the triceps will relax.

Arm muscle strength is the ability of the arm muscles to withstand loads for the shortest possible time. In increasing the strength of the arm muscles, of course, it is influenced by the various types of training methods provided by athletes using both internal and external loads. One of the exercises that can increase the strength of the arm muscles is the push-up. Push-ups are a form of exercise using internal weights or the athlete's own body weight.

## MATERIALS AND METHODS

Sugiyono (2018) carried out a one-group pretest-posttest design study. At the beginning (pretest) and end (posttest) of the treatment, in the sense of the word, the results of the treatment can be known more accurately because they can be compared with the conditions before and after the treatment. This research was carried out in the field of the Ujung Pandang Education Foundation's Teacher Training and Education College in Makassar and was carried out from October 2022 to November 2022 with a total of 18 meetings, including pretest and posttest. The population used in this study were the male athletes of Makassar City, using total sampling, which amounted to 14 people. The instrument used in this study was the shooting test, which provided shooting opportunities 10 times by directing the ball according to the target that had been prepared at the goal with points 5, 3, and 1. All points obtained during shooting were added up as the final result. This shooting was carried out both during the pretest and posttest, while the data analysis technique in this study used the normality test and t test.

## RESULTS AND DISCUSSION

The data obtained as a result of the study are quantitative data obtained through tests conducted before and after treatment on the effect of push-up training on the shooting ability of male athletes in handball in Makassar City. The variables in this study are push-up exercises, which are symbolized by X as the independent variable, while shooting ability is symbolized by Y as the dependent variable. The results after the test shooting was carried out before and after the push-up exercise method was carried out are presented as follows:

### ***Descriptive Analysis***

This section is the central part of the article. It is where the author should explain in words what the author's discovered in the research. It should be laid out and in a logical sequence. The results of the study presented in this section result from a clean process of data analysis, such as statistical calculations and testing processes or other processes for the achievement of its research. State the findings of the study concisely. If the authors want to display a table, use the following format:

**Table 1.** Descriptive Analysis of the Effect of Push-Up Exercise on Shooting Ability in the Handball Game of Makassar City Male Athletes

Group	N	Range	Min	Mak	Sum	Mean	SD
Pretest shooting skills	14	13	22	35	362	25,86	3,527
Posttest Shooting ability	14	12	33	45	546	39,00	3,211

From the results of the descriptive analysis, it can be said that the pretest value of shooting ability in handball games is a range of 13 points, a minimum value of 22 points, a maximum value of 35 points, a mean value of 25.86 points, and a total of 362 points, while the posttest value of shooting ability in handball games is a range of 12 points, a minimum value of 23 points, a maximum value of 42 points, a mean value of 39 points, and a total of 546 points. As a result, it is possible to conclude that push-up exercises have an effect on handball shooting ability.

### **Data Normality Test Results**

**Table 2.** Data Normality Test Results for the Effect of Push-Up Exercise on Shooting Ability in the Handball Game of Makassar City Male Athletes

Research variable	N	K - SZ	sig.	$\alpha$	description
Pretest shooting skills	14	0,594	0,873	0,05	Normal
Posttest Shooting ability	14	0,535	0,938	0,05	Normal

According to the results of the data normality test, the pretest shooting ability on the sumirnof kolmogrof value and a significance value of 0.873 0.05, the data belongs to the normal distribution. While the data for the posttest shooting ability on the sumirnof collotrophic value and a significance value of 0.938 0.05 is classified as normal distribution, both data meet the requirements for further testing.

### **Inferential Data Analysis Test Results (Paired T Test)**

**Table 3.** Results of Paired T Test Data Analysis Data on the Effect of Push-Up Exercise on Shooting Ability in the Handball Game of Makassar City Male Athletes

Research variable	Mean	t-hitung	ttabel	sig.
Effect of Push up Exercise	4,333	17,793	2,160	0,05

There is a significant effect of push-up training on increasing the shooting ability of Makassar City handball athletes. According to the results of the t test, data on the shooting ability of Makassar handball athletes was obtained with a t-count value of 17.793 > ttable 2.160 (sig. value 0.000 0.05), meaning that there is a significant effect after being given push-up training. To prove the increase in shooting ability, an average value of 4.333 is evidenced, or, in other words, the results of the t test obtained show that the t-count is greater than the t-table at a significant level of 0.05. Based on the results of the data analysis, it can be said that there is a significant increase in the average value of shooting ability in the handball game of Makassar City athletes.

Exercise is a process that is carried out regularly to achieve a predetermined goal. But there are still many children who play games or joke while doing exercises. The main goal of training in performance sports is to develop biomotor abilities or physical components to the highest standard, or in a physiological sense, athletes try to achieve

the goal of improving the organism's systems and their functions to optimize their sports performance.

From the results above, it is clear that there is an increase in arm muscle strength after doing push-up exercises. In order to achieve the goal of the push-up exercise, an appropriate training program is needed; for this reason, it is necessary to develop an exercise program with the right dose of exercise, taking into account the principles of the exercise. With regular, continuous, and programmed training, it will have a very good effect on muscle strength using both external and internal loads.

According to Ardian (2018), one of the basic techniques that must be possessed by a handball player is the shooting technique, namely the shooting movement carried out in handball with the aim of scoring points in a match. Therefore, to score the desired number, players need to exert all their abilities, including arm muscle strength, while shooting during the match. Arm muscle strength is one of the most dominant elements supporting success in handball.

Likewise, what was found by Burhanuddin (2021) were the results of research conducted on Bojonegoro handball athletes on the strength of the abdominal muscles and arm muscles against shooting in handball, both individually and as a team. So the researchers can conclude that the strength of the arm muscles and abdominal muscles affect shooting in handball, with an average increase of 5.57 points.

Based on the results of previous research and the results of this study, it is clear that push-up training on shooting skills in handball games for Makassar City athletes has a significant effect with an average increase of 4.33 points with a significance level of 0.000 0.05. In this study, arm muscle strength is a determining factor in the success of a player's or athlete's shot to get points so that the ball is not easily driven away or caught by the goalkeeper. Whether or not the arm muscles of a handball player are strong depends on the portion of each exercise.

## **CONCLUSION**

After shooting before and after the push-up training method was carried out, data was obtained, with the details in the analysis of the results of the pretest and posttest shooting as follows: Based on the t-test analysis, it produces a t-count of 17.793 and a t-table of 2.160. It can be concluded that  $H_a$  is accepted. From the results of the analysis above, it can be concluded that there is a significant influence between push-up exercises and shooting skills in the handball game of Makassar City athletes, with an average increase of 4.33 points and a significance level of 0.000 0.05.

## **ACKNOWLEDGMENT**

Thank you to the reviewers who have provided input on improving this article. Also, thank you to the Makassar City male athletes who have agreed to participate in this research.

## **CONFLICT OF INTEREST**

All authors declare that there is no conflict of interest in this research.

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