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# Analysis of the Physical Condition of Male Sepak Takraw Athletes 2024 Central Java

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## Abstract

**Introduction:** Physical condition is a fundamental factor that determines the performance and achievement of athletes, particularly in sports requiring complex movements such as sepak takraw. **Objectives:** This study aims to find out how the physical condition of PON Central Java men's sepak takraw athletes is and as a benchmark or minimum standard for sepak takraw athletes who want to become national athletes. **Method:** The type of research is Quantitative Research with a Descriptive Approach. The sample extraction technique uses a saturated sample technique, so that the research sample amounted to 10 athletes equal to the population. The population in this study is Central Java sepak takraw training athletes. The variables of the study are the physical condition of the athlete which consists of: 1) leg power 2) strength, 3) agility, 4) speed, and 5) aerobic endurance. The five physical components were measured using valid and reliable instruments. The data used is secondary data obtained from the head coach of the Central Java PON sepak takraw training team. The data analysis technique used in this study is a descriptive statistical technique using SPSS by calculating percentage, mean, minimum value, maximum value and standard deviation. **Result:** the study showed that there was 1 component of physical condition that was in the very good category, namely agility, 2 components of physical condition were in the good category, namely abdominal muscle strength and aerobic endurance, and 2 components of physical condition were in the poor category, namely leg muscle explosiveness and speed. **Conclusion:** The average professional score of the physical condition of PON athletes in Central Java 2025 is in the medium category

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**INTRODUCTION**

Physical condition is the condition of an athlete's body which consists of components that cannot be separated from its maintenance and improvement. Physical condition is a requirement that must be possessed by an athlete in improving and developing optimal sports achievements, so that all physical conditions must be developed and improved according to the characteristics, characteristics, and needs of each sport (Pujianto 2015). According to (Harsono 2018) In his book, the physical condition of athletes has an important role in an athlete's training program. To increase the functional physical freshness of the body system, a well-planned and systematic physical fitness training program is needed in order to achieve even better athlete achievements. Physical exercise is an activity in which there are various forms, attitudes and directed movements, repeated with increasing loads which are useful to increase the efficiency of the ability (Sidik, dikdik zafar, Pasurnay, paulus l., & Afari 2019). Physical conditions consist of general and special physical conditions. General physical condition is an exercise that aims to develop the body's abilities and improve the basic abilities of a specific physical condition (Umar and Pratama 2020). While special physical condition is a very important thing aimed at building punch strength, strength, jump, speed, agility and endurance (Ahsan 2019). According to (Maizan 2020) The physical condition itself not only affects the improvement of technique, but affects the improvement of tactics. Tactics will not work if you have not mastered the technique and are supported by good physical condition. Physical condition is the main factor to show good athlete performance. There are interrelated components in improving the physical condition of an athlete. The components of physical condition are measured strength, endurance (muscle endurance, general endurance, muscle explosiveness), speed, flexibility, balance, coordination, agility, precision, and reaction (David Anderson, Helen Moggridge, Philip Warren 2014). Physical condition cannot be obtained in one exercise, but in a regular, structured, and systematic manner (Donnelly, Joseph E. 2016).

In sports, physical ability achievements have a very important role, an athlete must have good physical abilities because with good physical support can have the opportunity to excel even better. This is because without adequate physical ability, movement techniques will not be able to be done perfectly (Kamaruddin 2019). To get good achievements in a sport, cooperation is needed and seeing all aspects that support the realization of an achievement that has been aspired to (Maizan 2020). Achievement sports coaching is carried out at the non-formal level. Law of the Republic of Indonesia number 11 of 2022 concerning the national sports system in article 1 paragraph 12 which reads "Achievement Sports is a sport that fosters and develops sportspeople in a planned, systematic, integrated, tiered, and sustainable manner through competitions to achieve achievements with the support of sports science and technology."

Sepak takraw is a game that uses a ball made of rattan or fiber (takraw), played on a flat field measuring 13.40 m long and 6.10 m wide. In the middle of being limited by a net or net like a game of badminton (Sulaiman 2008). Sepak takraw has developed in Indonesia and is known by the public. This sport is very interesting because it contains acrobatics that can be played by all levels of society. Various basic techniques need to be mastered in the game of sepak takraw, including kicking (sepak sila, sepak kura, sepak cukil, mepak, and sepak badek), head games, understanding, crushing, and blocking (Adrian Sya'ban 2020). The numbers contested in sepak takraw are teams, doubles, double teams, teams, quadrants. To be able to become a sepak takraw athlete, you must have a good physical condition in order to overcome the fatigue that arises during competition.

Sepak Takraw in Central Java is a sport that has never been absent in donating mendali in various matches. Central Java men's sepak takraw PON athletes succeeded in donating mendali at the PON event which is held every four years. Judging from the last three PONs, namely in the West Java PON, the Central Java men's sepak takraw PON athletes succeeded in contributing gold medals in the men's doubles team number, Silver in the men's doubles team, and bronze medals in the men's team number, PON Papua managed to donate silver in the doubles and teams, and the Aceh – North Sumatra PON succeeded in donating gold in the team number and silver in the quadrant number.

**Peraih Medali**

| Event | Emas | Perak | Perunggu |
|---|---|---|---|
| Ganda regu putra *(detail)* | Jawa Timur | Jawa Tengah | Gorontalo<br>Sulawesi Selatan |
| Inter regu putra *(detail)* | Gorontalo | Sumatera Barat | Sulawesi Selatan<br>Jawa Timur |
| Tim ganda putra *(detail)* | Jawa Tengah | Jawa Timur | Sumatera Barat<br>Sulawesi Selatan |
| Tim regu putra *(detail)* | Gorontalo | Riau | Jawa Timur<br>Jawa Tengah |

**Peraih Medali Putra**

| Event | Emas | Perak | Perunggu |
|---|---|---|---|
| Ganda | Gorontalo | Jawa Tengah | Kalimantan Timur<br>Sulawesi Tenggara |
| Beregu | Gorontalo | Jawa Tengah | Kepulauan Riau<br>Sumatera Barat |
| Kuadran | Sulawesi Selatan | Jawa Timur | Papua<br>Riau |
| Ganda beregu | Jawa Timur | Sulawesi Selatan | DKI Jakarta<br>Papua |

From the empirical data above, it shows that Central Java PON sepak takraw athletes are very accomplished. To be able to achieve these results, of course, PON Central Java men's sepak takraw athletes must have good physical condition. Evaluation of physical condition in sepak takraw is not only important, but very crucial to support athletes' performance, safety, and long-term development. Research on physical factors include (Jufrianis, Akbar, and Tangkudung 2018) showed that the relationship between ankle coordination, flexibility and

balance had an effect on accuracy in the sepak takraw game of PPLP students. (Qurun 2015) which examines agility in sepak takraw athletes which is linked to somatotype. From the study, it can be concluded that physical factors can affect the performance of athletes, especially sepak takraw sports. Therefore, based on several studies that discuss the physical factors of sepak takraw athletes at the school level, this study will examine different subjects, namely in Central Java PON athletes and physical aspects that have not been tested in previous studies. Based on the explanation above, the researcher is interested in conducting research with the aim of finding out how the physical condition of PON Central Java men's sepak takraw athletes is and as a benchmark or minimum standard for sepak takraw athletes who want to become national athletes. With the hope that this research can provide insight benefits for coaches and athletes in determining optimal training strategies.

**METHOD**

The type of research is Quantitative Research with a Descriptive Approach. Because this study aims to find out how the physical condition of PON Central Java male sepak takraw athletes is and as a benchmark or minimum standard for sepak takraw athletes who want to become Central Java athletes.

(Arikunto 2017) states that "Population is the whole subject of research". The population in this study is 10 athletes from PON Central Java men's sepak takraw. The data collection method is test and measurement. The sample extraction technique uses the total sampling technique so that the research sample of 10 athletes is equal to the population.

The variables of the study are the physical condition of the athlete which consists of: 1) leg power 2) strength, 3) agility, 4) speed, and 5) aerobic endurance. The five physical components were measured using valid and reliable instruments. (Adolph 2016) Validity is a condition that describes the level at which the instrument in question is able to measure what is being measured, describing the level of validity of the instrument used. The data used is secondary data obtained from the head coach of the Central Java PON sepak takraw training team. The data instruments used in this study include:

Leg muscle power using the Vertical jump test. It has a reliability of 0.99 and a validity of 0.989 (Nugroho, M.B. Sutardji and Nugroho 2016).

The abdominal muscle strength test uses a sit up test. The validity of the sit up test was the content validity and reliability of the test of 0.91 (Bernanda 2023).

The agility test uses a 6 x 5 meter sutle run test. The validity is about 0.82 and the reliability is about 0.93 for men (Bernanda 2023).

The Speed Test uses a 20-meter running test. It has a validity value of 0.95 and a reliability of 0.92 (Fuziyono 2013).

Durability tests use MFT tests. Multistage Fitness Test (MFT) with a validity value of 0.77 (face validity) and reliability of 0.98 (Doewes, M., & Furqon 1999).

The data analysis technique used in this study is a descriptive statistical technique using SPSS by calculating percentage, mean, minimum value, maximum value and standard deviation.

## RESULT AND DISCUSSION

### Result

Based on the results of the analysis of data obtained from the field, namely: *Vertical Jump, Sit-Up, Shuttle Run, 50 Meter Sprint, and MFT (Multistage Fitness Test)* tests on Central Java PON sepak takraw athletes. The descriptive analysis in this study discusses the minimum, maximum, mean, and standard deviation values of the *results of the Vertical Jump, Sit-Up, Shuttle Run, 50 Meter Sprint, and MFT (Multistage Fitness Test)* test results in Central Java PON sepak takraw athletes. The results of the descriptive analysis are presented as follows:

Table 1. Descriptive Analysis Results

| Test Item | N | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|---|
| Vertical Jump | | 52 | 74 | 60,50 | 7,169 |
| Sit Up | | 40 | 80 | 62,70 | 12,957 |
| Shuttle Run | 10 | 8,57 | 10,86 | 9,5390 | 0,79145 |
| Sprint | | 3,33 | 3,55 | 3,4080 | 0,0654 |
| MFT | | 0 | 55,10 | 39,4400 | 21,0517 |

Furthermore, to interpret the data, frequency analysis was carried out on the 5 test items, namely: *Vertical Jump, Sit-Up, Shuttle Run, 50 Meter Sprint, and MFT (Multistage Fitness Test)* tests on Central Java PON sepak takraw athletes. The results of the frequency analysis are presented as follows:

Table 2. Vertical Jump Frequency Analysis Results

| Test Item | N | Category | Frequency | Percentage |
|---|---|---|---|---|
| Vertical Jump | 10 | Very good | 0 | 0% |
| | | Good | 0 | 0% |
| | | Keep | 2 | 20% |
| | | Less | 8 | 80% |
| | | Less Than Once | 0 | 0% |

From the results of the vertical jump frequency analysis above, it shows that most of the leg muscle strength of PON Central Java sepak takraw athletes is in the poor category. This indicates a lack of leg muscle strengthening exercises, specifically in the quadriceps, hamstrings, gluteus, and calves muscles.

Table 3. Sit Up Frequency Analysis Results

| Test Item | N | Category | Frequency | Percentage |
|---|---|---|---|---|
| Crunches | 10 | Very good | 3 | 30% |
| | | Good | 5 | 50% |
| | | Keep | 1 | 10% |
| | | Less | 1 | 10% |
| | | Less Than Once | 0 | 0% |

The success of abdominal muscle strengthening exercises can be seen from the results of the sit-up test. From the results of the analysis of the frequency of the sit-up test above, it shows that most of the abdominal muscle strength of the Central Java PON sepak takraw athletes is in the good category, but there are still 2 athletes who are in the medium category and do not show the need for coach evaluation of their athletes in order to be able to catch up.

Table 4. Shuttle Run Frequency Analysis Results

| Test Item | N | Category | Frequency | Percentage |
|---|---|---|---|---|
| Shuttle Run | 10 | Very good | 4 | 40% |
| | | Good | 0 | 0% |
| | | Keep | 3 | 30% |
| | | Less | 1 | 10% |
| | | Less Than Once | 2 | 20% |

In the results of the analysis of the frequency of the shuttle run test, most of the agility levels of Central Java PON sepak takraw athletes are in the very good category. However, there are still athletes whose agility test results are in the category of less and less once. Showing the need to emphasize agility training in the athlete in order to be able to increase his agility, where agility is one of the important factors in sepak takraw.

Table 5. Results of the 50 Meter Sprint frequency analysis

| Test Item | N | Category | Frequency | Percentage |
|---|---|---|---|---|
| Sprint | 10 | Very good | 0 | 0% |
| | | Good | 0 | 0% |
| | | Keep | 4 | 40% |
| | | Less | 5 | 50% |
| | | Less Than Once | 1 | 10% |

Judging from the results of the analysis of the frequency of speed tests above, it shows that most of the physical conditions of athletes' speed are in the poor category. This is a special concern for coaches in evaluating their training programs and athletes, where speed is one of the important factors in sepak takraw.

Table 5. MFT Frequency Analysis Results

| Test Item | N | Category | Frequency | Percentage |
|---|---|---|---|---|
| MFT | 10 | Very good | 0 | 0% |
| | | Good | 5 | 50% |
| | | Keep | 3 | 30% |
| | | Less | 0 | 00% |
| | | Less Than Once | 2 | 20% |

Judging from the results of the analysis of the frequency of endurance tests above, most of the physical conditions of aerobic endurance of PON Central Java sepak takraw athletes are in the good category. However, there are still athletes who are in the medium category and less so. It is necessary to know the cause of this lag so that it becomes an evaluation for

coaches so that their athletes are able to catch up. Because good aerobic endurance will support athletes in maintaining their stamina during the match.

**Discussion**

**Leg Muscle Explosiveness (*Vertical Jump*)**

The results of the analysis of vertical jump test data showed that most of the physical conditions of the leg muscles of the PON men's sepak takraw athletes in Central Java were in the poor category with a frequency of 8 athletes with a percentage of 80%. This has an impact on the main abilities of athletes. The explosiveness of the leg muscles is one of the dominant physical conditions in the sport of sepak takraw. Good leg muscle explosiveness will support athletes in making movements in the game of sepak takraw. For example, research conducted by Setiawan, Sugihartono, and Nopiyanto (2022) It shows that the explosive power of the leg muscles has a contribution of 46.24% to the smash ability of sepak takraw athletes. This shows that the greater the explosive power of the leg muscles, the athlete can make stronger kicks as well, thus creating a point for his team.

In addition to making strong kicks, the explosiveness of the leg muscles is needed in making jumps to head the ball. For example, research conducted by Sapira, Sugihartono, and Idivine (2022) shows the contribution of leg muscle explosiveness of 15.3% to jump heading ability. Heading is one of the techniques in sepak takraw that aims to give a pass to teammates. This means that if sepak takraw athletes have less explosive power in the leg muscles, this will make it difficult for athletes to make movements to kick the ball and head the ball to create points, and it will be difficult to defend themselves from the opponent's target.

For this reason, this physical condition needs to be maintained and improved. The explosiveness of the leg muscles can be increased through a wide variety of exercises. Specific to the movements in the sepak takraw sport, the researcher recommends plyometric exercises and explosive strength training because these two exercises are important aspects of the sepak takraw player training program to increase the effectiveness of these techniques.

**Abdominal Muscle Strength (*Sit-Up*)**

The results of the analysis of sit-up test data showed that most of the physical conditions of the abdominal muscle strength of the PON Central Java men's sepak takraw athletes were in the good category. The abdominal muscles have an important role in maintaining the stability and flexibility of a sepak takraw athlete's movements. The strength of the abdominal muscles plays a crucial role in supporting various movements in sepak takraw. As part of the core muscle (*Core*), abdominal muscles function to maintain stability, balance, and body coordination when performing dynamic movements such as serves, smashes, and headers (Hermawan, Susanti, and Nahdliyyah 2023; Hsu et al. 2018). Research (Jufinda 2019) Indicates that the strength of the abdominal muscles contributes significantly to basic technique abilities such as the header of the takraw ball. In addition, good abdominal muscle strength helps in maintaining optimal posture, allowing players to perform movements

efficiently and reducing the risk of injury (Primary 2020). Exercises that focus on strengthening the abdominal muscles, such as crunches, hanging leg raises, and planks, can improve the overall performance of sepak takraw athletes (Syaifuddin and Hakim n.d.). Thus, the development of abdominal muscle strength is an important aspect of the training program for athletes to achieve optimal performance in the sport of sepak takraw.

**Agility (Shuttle Run)**

The results of the analysis of shuttle run test data showed that most of the physical conditions of the agility of PON Central Java male sepak takraw athletes were in the very good category. This is one of the success points of coaches in training Central Java PON athletes, where agility is one of the components of physical condition that is indispensable in sepak takraw. This is proven when the game takes place agile movements are needed when running which is a movement to change places quickly to chase takraw balls (Riskita, Bulqini, and Wijaya Kusuma 2019). The influence of agility in playing sepak takraw is very large, because on average in playing sepak takraw requires good agility, with an overview of the results of this agility test showing that the agility component is quite important in sepak takraw.

**Speed (20 Meter Sprint)**

The results of the analysis of the 20-meter sprint test data showed that most of the physical conditions of the speed of PON Central Java male sepak takraw athletes were in the poor category. This shows that attention to the running speed component is still too low. According to Syaifuddin and Aziz Hakim (2019) Although running speed only plays a small role in sepak takraw, this cannot be used as an excuse in training physical condition because in the match all elements are very useful. The importance of training the speed component is an evaluation of the trainer in making training programs. Exercise models to increase sprint speed specifically such as sprints on inclines, hill runs, and are also balanced by muscle-strengthening exercises such as weight training or plyometrics (Rumpf et al. 2016). With systematic and measurable training, it is hoped that the physical condition of athletes' speed can increase so as to support athletes in achieving even better achievements.

**Aerobic Endurance (*MFT)***

The results of the analysis of MFT test data showed that most of the physical condition and aerobic endurance of PON Central Java male sepak takraw athletes were in the good category. This shows the success of the implementation of the training program that has been carried out by the athletes. Systematic and integrated training will help athletes improve their physical condition, and when there is an improvement in physical condition, athletes can play better as well (Purnomo 2019). Sepak takraw is one of the sports that has a close relationship with the physical condition of endurance. There has been no study that specifically discusses the duration of the sepak takraw game, but it is based on official regulations from the International Sepaktakraw Federation (ISTAF). Sepak takraw matches are played in a best-of-three set format, where each set is played until one of the teams reaches 15 points, with a

minimum difference of two points to win the set. If the score is 14-14, the game continues until one of the teams reaches a maximum score of 17 points. This shows that sepak takraw athletes need high aerobic endurance to be able to maintain their stamina until the end of the game. With a good level of aerobic endurance, it will make it easier for athletes to complete each match optimally (Mara and Çobaj 2025). One of the training methods to improve aerobic endurance is circuit training. Research (Aryatama 2022) showed that circuit training exercises significantly improved students' aerobic endurance with an increase in $VO_2$max by 13.54%. Circuit training is a training method that consists of a series of movements in at least 6 posts, where the athlete must move from one post to the next without a break in rest so as to force the athlete to maximize his aerobic capacity (Jan 2019)

## CONCLUSION

Based on the results of the research and discussion above, it shows that there is 1 component of physical condition that is in the very good category, namely agility, 2 components of physical condition are in the good category, namely abdominal muscle strength and aerobic endurance, and 2 components of physical condition are in the poor category, namely leg muscle explosiveness and speed. Thus, it can be concluded that the average profile value of the physical condition profile of PON athletes in Central Java 2024 as a whole is in the medium category. This needs to be used as a special attention for coaches and management to be used as material for evaluating even better training programs.

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