

# Analysis of the Physical Condition of Athletes in the XXI PON Training Camp in Aceh-North Sumatra, Indonesia

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**Abstract.** Physical condition plays a crucial role in supporting athletes' performance and achievements. National athletes are required to maintain optimal fitness levels to support their technical skills and endurance during competition, and to prevent injury and excessive fatigue. Physical condition evaluation is a strategic step in designing appropriate training programs to improve physical capacity and competition readiness for the XXI PON. The objective of this study is to determine the physical condition of athletes in the Aceh-North Sumatra XXI PON Training Camp. This study uses a quantitative, descriptive design. The population in this study consists of athletes in the Aceh Training Camp, and the sample size is 319. Data collection utilised the following test items: 1) Speed, 2) Muscular endurance, 3) Explosive power, 4) Strength, 5) Agility, 6) Flexibility, and 7) Lung capacity.

Based on the research results and data analysis, the researchers concluded that: 1) Four sports (bodybuilding, chess, e-sports, and gateball), representing 11% of the total, fell into the very low category; 2) One sport (air pistol), representing 3%, fell into the low category; 3) Twenty-five sports (motorcycle racing, lion dance, handball, dance sport, futsal, wrestling, hapkido, kabaddi, korfbal, jujitsu, khuras, archery, pencak silat, petanque, rugby, sambo, roller skating, softball, soft tennis, tennis, table tennis, indoor volleyball, beach volleyball, woodball, and wushu), representing 68%, fell into the moderate category; 4) Six sports (basketball, rowing, diving, surfing, windsurfing, and tarung derajat), representing 16%, fell into the high category; and 5) One sport (equestrian), representing 3%, fell into the very high category. The researchers therefore concluded that most sports disciplines fall into the moderate classification, indicating substantial potential for further development to achieve higher classifications.

In contrast, limitations in human resources, facilities and infrastructure, limited competition opportunities, and insufficient attention to regional sports development policies generally lead to very low classifications for some sports disciplines. Therefore, strategic efforts are needed to improve the quality of coaching and support for sports disciplines that are still in the low and very low classifications.

**Keywords:** Physical Condition; Athletes; Regional Training Camp; National Sports Week; Aceh-North Sumatra.

## INTRODUCTION

The National Sports Week, or PON for short, is a government mandate to implement the National Sports Law (Articles 42 and 43). The National Sports Law also stipulates that every sports competition organised by the government, organisations, institutions, or the public must take into account the objectives of national sports and the principles of sports administration. Furthermore, the achievements at such events serve as a talent pool for high-performing athletes to enhance their dignity and prestige—both as individuals and as representatives of the nation—at international events.

High-level competitions like the National Sports Week (PON) demand top-tier athletic performance in technique, physical conditioning, tactics, and mental fortitude. These four components functionally complement and reinforce one another within an interactive dynamic. To perform well in sports, athletes must combine three key components: physical condition for competition, skill level, and psychological preparation. The key difference between good and poor performance lies in the athlete's psychological skill level, which is more critical than physical skill. The mental or psychological aspect must receive the same amount of training as physical, technical, and tactical skills to ensure the athlete's best performance [1].

Physical conditioning is a key component of athletic performance, and to achieve their desired goals, athletes must undergo a relatively long period of preparation [2]. Physical conditioning training comprises ten components, including 1) Endurance, 2) Muscular power, 3) Speed, 4) Flexibility, 5) Agility, 6) Coordination, 7) Balance, 8) Accuracy, 9) Reaction, and 10) Strength [3].

High-performing athletes must possess both general and sport-specific physical fitness appropriate to their discipline. Athletes acquire physical fitness through training. Before an athlete competes in a match, thorough preliminary preparation is essential, particularly regarding physical conditioning. This preparation aims to enhance the athlete's physical capacity, enabling them to maintain optimal performance under various pressures during competition—both physical and mental. Excellent physical condition is essential for athletes to cope with the physiological and psychological stress that typically arises in competitive match situations. To

achieve maximum readiness, an athlete must be in good physical fitness, enabling them to handle various challenges and physical demands throughout the match.

Optimal physical condition is important not only during training sessions but also during every competition, alongside other factors such as mental strength, technical proficiency, and the proper application of tactics. As such, physical conditioning is one of the key foundations for improving athletes' performance across various sports.

Previous research by the authors [4] also confirms that physical fitness is a fundamental ability every athlete must possess. In addition to maintaining performance during competition, physical fitness also plays a crucial role in continuously improving athletes' performance. The results indicate that all 15 athletes studied were in good physical condition. This finding reinforces the view that well-structured physical conditioning programs can make a tangible contribution to athletes' performance in various competitive events.

The author conducted direct observations over two days, specifically on Saturday and Sunday, January 3–4, 2024. On those dates, the Aceh National Sports Committee (KONI Aceh) conducted the first phase of physical testing for athletes participating in the Regional Training Camp (Pelatda) program as part of preparations for the 21st National Sports Week (PON) in Aceh-North Sumatra. During the observation process, the author noted several important findings in the field. One of them occurred on the second day of the physical tests, when the author observed several female athletes who appeared to have difficulty completing the lung endurance test, a 15-minute run. Some athletes were even seen walking on the running track because they were unable to maintain the required running intensity as per the established test standards.

In addition, the author noted that not all sports were able to complete this first phase of physical testing because several sports were undergoing a training camp (TC) program on Java at the time as part of their preparations for the 21st National Sports Week (PON XXI). Following the physical testing process, the 21st National Sports Week (PON XXI) was officially held from September 9 to 25, 2024. In this event, the Aceh contingent improved its performance, ranking in the top 6

nationally, in line with the target previously set by KONI Aceh to place in the top 10.

## METHODS

This study employs a quantitative, descriptive approach. The sample for this study consists of athletes from the Aceh-North Sumatra PON Training Camp. The sampling technique used in this study is total sampling.

This study uses two types of data sources: a) Primary data and b) Secondary data.

*Primary Data.* Primary data is data obtained directly by the researcher through research instruments and physical testing. In this study, primary data consists of the results of physical condition tests for athletes, which include: 1) Speed (20-meter run, 300-meter run); 2) Muscle endurance (sit-ups); 3) Explosive power (10 hops to the right and left); 4) Strength (leg dynamometer); 5) Agility (T-test); 6) Flexibility (sit-and-reach); 7) Lung capacity (Balke Test).

All data were collected on-site at the Jasdam facility in January 2024, including 319 athletes from the Aceh-North Sumatra PON Training Camp across various sports disciplines.

*Secondary Data.* Secondary data is supporting data obtained from sources other than direct field tests. In this study, secondary data includes:

- 1) Athlete enrollment data: a list of sports and the number of athletes in the Aceh-North Sumatra PON Training Camp.
- 2) Documentation: attendance records, official registration data from the Training Camp committee, and administrative documents indicating the number and identities of the athletes.
- 3) Literature: theories, concepts, and the theoretical basis for physical testing methods from books, previous research journals, and references such as authors [5–7], which serve as the basis for the physical testing procedures. Thus, the combination of primary and secondary data provides strong support for the quantitative descriptive analysis used in this study.

## RESULTS AND DISCUSSION

Physical testing was conducted on athletes in the 2024 KONI Aceh Provincial Training Camp to assess their physical capabilities. Each individual must recognise the importance of their physical condition to achieve optimal athletic perfor-

mance. Physical condition is one of the dominant factors determining an athlete's performance, along with mastery of technique, tactics, and mental ability [8, 9].

In psychomotor activities, physical ability plays a crucial role in supporting and developing motor skills. The level of athletic achievement is greatly influenced by the alignment between an athlete's physical needs and the characteristics of the sport they practice [10]. Each sport has different demands, thus requiring specific emphasis on physical conditioning, technique, tactics, and mental preparation to achieve maximum performance [11].

Understanding the specific physical conditioning required by athletes and the level of physical fitness needed to achieve optimal performance is crucial in the sports development process. A comprehensive understanding of these physical fitness requirements will serve as the foundation for planning, implementing, and evaluating effective training programs tailored to each sport's characteristics [8, 12]. Therefore, accurate measurement and analysis of the relevant components of physical fitness are essential.

In this context, the aspects measured through physical fitness tests include several key components, such as:

- a) Speed, which describes an athlete's ability to perform rapid movements in a short period of time;
- b) Muscular endurance, which indicates the muscles' ability to perform repeated contractions;
- c) Power, which reflects the muscles' capacity to generate explosive force;
- d) Strength, which relates to the muscles' ability to generate maximum force;
- e) Agility, which describes an athlete's ability to change direction quickly and accurately;
- f) Flexibility, which relates to joint flexibility and range of motion; and
- g) General endurance, which reflects the capacity of the cardiovascular and respiratory systems [7, 13].

All of these aspects must be carefully measured, analysed, and tailored to the specific needs of each sport, so that the results of the physical condition evaluation provide an accurate picture of the athletes' readiness to meet the demands of competition. Thus, coaches can design training

programs that are more targeted, systematic, and effective to support the maximum improvement of athletes' performance [11].

The researchers found, based on the test results, that:

- 1) Four Sports (bodybuilding, chess, e-sports, and gateball), representing 11% of the total, fell into the very low classification;
- 2) One sport (air pistol), representing 3%, fell into the low classification;
- 3) 25 sports achieved the moderate classification with a percentage of 68%;
- 4) 6 sports achieved the high classification with a percentage of 16%; and
- 5) The researchers classified one sport (equestrian), representing 3% of the total, as very high. These results indicate that the majority of athletes are still at a moderate fitness level, thus requiring a planned and sustained improvement in physical condition [8].

Coaches have not yet fully implemented the training program, as indicated by the physical test results. To achieve performance goals, training must adhere to principles tailored to the sport's needs and characteristics, ensuring athletes are in optimal physical condition to handle the intensity and pressure of competition [11]. Physical training focused on strength and endurance must continue during the pre-competition phase to maintain and enhance athletes' physical condition [8].

To assess the success of a training program, systematic evaluation through periodic physical condition tests and measurements is necessary. This evaluation is crucial in the sports development cycle as it provides an objective picture of the athlete's physical condition progress and serves as the basis for decision-making in refining the training program [7, 10].

Based on the results of physical fitness tests for athletes participating in the 2024 Aceh–North Sumatra PON XXI Training Camp, the majority are still in the moderate fitness category. This finding is a serious concern for coaches, sports federation officials, and KONI Aceh, necessitating strategic measures such as increasing training intensity, improving training program design, and optimising recovery and nutrition to help athletes achieve optimal fitness ahead of the competition [13].

It is hoped that this study will provide constructive input for KONI Aceh to improve the quality of athlete development management, particularly in the ongoing management and monitoring of athletes' physical condition. Regular, periodic assessments of physical condition are expected to yield accurate data that can serve as the basis for policy decisions to improve athletic performance in Aceh.

## CONCLUSIONS

Based on the research findings, it can be concluded that:

- 1) The "very low" classification was assigned to four sports—bodybuilding, chess, esports, and gateball—each of which achieved a completion rate of 11%.
- 2) The "low" classification was assigned to only one sport—air pistol—with a completion rate of 3%.
- 3) The moderate classification is the most dominant category, achieved by 25 sports, including: motorcycle racing, lion dance, handball, dance sport, futsal, wrestling, hapkido, kabaddi, korfbal, jujitsu, khuras, archery, pencak silat, petanque, rugby, sambo, roller skating, softball, soft tennis, tennis, table tennis, indoor volleyball, beach volleyball, woodball, and wushu, with a total percentage of 68%.
- 4) A high classification was achieved by 6 sports, namely basketball, rowing, diving, surfing, windsurfing, and tarung derajat, with a total percentage of 16%.
- 5) Meanwhile, a very high classification was achieved by only 1 sport, namely equestrian, with a percentage of 3%.

Based on the research findings, the very low physical achievement classification obtained by bodybuilding, chess, e-sports, and gateball, as well as the low classification for air pistol, can be interpreted as the result of various constraints specific to those sports. Sports such as bodybuilding, chess, e-sports, and gateball generally face limitations in terms of optimally trained human resources and facilities and infrastructure that support physical training tailored to their specific needs. For example, bodybuilding, which demands high muscle strength and explosive power, requires specialised training programs and facilities that are currently inadequate. Meanwhile, sports like chess and esports, which

are more technical and cognitive in nature, place different physical demands, so standard physical test results may not reflect their true potential or indicate low fitness levels due to insufficient attention to physical fitness in their training.

In addition, the lack of competition and limited attention from regional sports development policies toward these sports have resulted in suboptimal athlete development, leading to low motivation and limited opportunities for athletes' physical development, as reflected in the very low and low classification percentages. Conversely, sports with moderate and high classifications

indicate that athlete development in these disciplines has received better attention and support. However, there is still room for further improvement to achieve higher classifications. Therefore, strategic efforts are needed—in terms of improving training quality, providing facilities and infrastructure, and increasing policy attention—for sports disciplines still in the low and very low classifications so that athletes' potential can be maximised to the fullest extent possible, in accordance with the characteristics and needs of their respective sports disciplines.

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