

Physical Fitness of Futsal Athletes in Competition Preparation

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Abstract The purpose of this study was to reveal the physical fitness of futsal athletes in the match preparation stage. This study was a descriptive research with 22 futsal athletes from Cimahi, West Java, Indonesia. As the research sample, we included 12 male futsal athletes and 10 female futsal athletes. The used instruments to measure physical fitness are; (1) Speed (i.e. run test for 30 meters); (2) Flexibility (i.e. sit and reach); (3) Arm strength (i.e. medicine ball); (4) Leg strength (i.e. vertical jump); (5) Arm muscle endurance strength (i.e. 1-minute push up); (6) Abdominal muscle endurance strength (i.e. 1- minute sit up); (7) Back muscle endurance strength (i.e. 1-minute back up); (8) Abdominal muscle endurance strength (i.e. 1-minute half squat); and (8) VO₂ Max (i.e. Yoyo test). Collected data were analyzed descriptively and analytically using SPSS version 24. The result showed that physical fitness male athletes in Cimahi have an average completion of each component of 73%, categorized as Fair. Meanwhile, the female athletes in Cimahi only have an average completion of each component of 63%, categorized as Poor. Some factors such as genetics, training, gender, age, body fat, and daily activities affect physical fitness. A physical fitness training program should be arranged, organized, and implemented properly and systematically to work up the dominant physical fitness in preparing for a competition.

Keywords Physical Fitness, Futsal, Competition Preparation

1. Introduction

Physical fitness is a basic need for every sports activity, especially professional sports. The components, such as speed, strength, endurance, and flexibility, along with other physical fitness, are essential for excellence in professional sports [1]. Athletes in every sport need great physical fitness to support the implementation of techniques and tactics when practicing or competing. Great physical fitness is one of the ways to gain achievement [2,3]. Sports coaches highlight the improvement of athletes' physical fitness and motoric quality, called conditioning [4]. A good conditioning program relies on the overall professional sports coaching responsibility. Physical fitness is divided into general physical fitness and special physical fitness. General physical fitness is related to the competence qualities needed by every athlete, such as speed, strength, flexibility, endurance, and coordination. Every sport demands certain ability qualities, as in this case, futsal [1].

Futsal is a sport that involves intermittent periods of high intensity over two periods, 20-minute periods per game. The sport requires sudden changes in movement patterns, fast sprints, and quick decision-making to gain or maintain possession of the ball. This research shows that agility appears to be a critical component of a successful play [5–7]. Furthermore, all three playing areas (e.g., guard, winger, pivot) must be able to change their position effectively during the game, which emphasizes the need of agility performance [8]. In other words, regardless of the specific task of their main game, all futsal players must have extraordinary agility with and without the ball.

The pattern of futsal activity may differ from other sports as each player must carry out attacking and defensive tasks constantly at a high tempo. Futsal is a sprint sport with a higher intensity phase than other intermittent sports. However, compared with other sports, it has its own limitations. Some useful comparisons could be made with similar intermittent team sports such as football, basketball, and handball [9,10]. As an example, the total-covered distance at high intensity and maximum speed is greater in futsal than in football or handball. It reflects the nature of the high intensity of a futsal game [11]. The ratio of playing to rest in futsal is approximately 1:1, where rest means the player is not moving, walking, or jogging, and the covered distance is at moderate, high, or maximum speed [12,13]. From these findings, it could be concluded that futsal is an anaerobic sprint sport where high-intensity exercise has a greater proportion of match time than in soccer and some other sports such as sprinting. The previous research has provided important information about the physical fitness of futsal athletes in competition preparation to planning and setting the futsal training, but it is primarily concerned with either the pre-season [1–3].

Therefore, a consecutive test is needed to acknowledge the status of futsal athletes' physical fitness [14], in which this research focused on the physical fitness of futsal athletes in Cimahi, West Java, Indonesia, as some research findings showed that physical fitness affects athletes' performance [1,3,7]. Some physical components may not be possessed properly through the analysis of the characteristics of the futsal game, but there should be more dominant components possessed by futsal players, namely endurance, strength, and speed, without leaving other components, 1]. The general preparation stage is the foundation stage for building the dominant physical fitness component. The stage plays the most strategic role in the overall training program as several research results state that the general preparation stage is a crucial phase in

building the great physical fitness of the athletes [15,16]. Research findings are needed to uncover the result of the physical fitness test of futsal athletes in the competition preparation stage to determine the types and proportions of the training in the general preparation stage. Thus, this study was conducted to reveal the physical fitness of futsal athletes in the match preparation stage.

2. Materials and Methods

This study used descriptive analysis. The sample in this research was 22 futsal athletes in Cimahi, West Java, Indonesia, consisting of 12 male futsal athletes and 10 female futsal athletes. Total sampling was used in this research to unveil the overall physical fitness of the futsal athletes in Cimahi. The used instruments to measure physical fitness are; (1) Speed (i.e. run test for 30 meters); (2) Flexibility (i.e. sit and reach); (3) Arm strength (i.e. medicine ball); (4) Leg strength (i.e. vertical jump); (5) Arm muscle endurance strength (i.e. 1-minute push up); (6) Abdominal muscle endurance strength (i.e. 1-minute sit up); (7) Back muscle endurance strength (i.e. 1-minute back up); (8) Abdominal muscle endurance strength (i.e. 1minute half squat); and (8) VO₂ Max (i.e. Yoyo test). [17]. Collected data were analyzed descriptively and analytically using SPSS version 24. The test result was analyzed and shown in the form of a bar diagram.

3. Results

The result data from the test physical fitness were analyzed based on the type of test and shown by the percentage on every item, so the comparison between male futsal athletes' and female futsal athletes' results could be identified.

Table 1. Physical fitness result of male futsal athletes

Test Items	Test Result		Norm		Achievements	Category
speed	4,7	sec	3,75	100	80%	Good
flexibility	49	cm	53,9	100	91%	Excellent
agility	14,7	sec	10,76	100	73%	Fair
Strength (leg)	50,11	cm	66	100	77%	Good
Endu. strength (abdominal muscle)	33	rep	49	100	68%	Poor
Endu. strength (back muscle)	44	rep	50	100	79%	Good
Endu. strength (leg muscle)	35	rep	45	100	67%	Fair
VO ₂ Max	42,20	ml/kg/sec	51,13	100	83%	Fair

Table 1 describes the test results of the physical fitness of the male futsal athletes for the test results on speed reaching 80% in the Good category; Flexibility reached 91% in the Excellent category; Agility reached 73% in the Fair category; Strength (leg) reached 77% in the Good category; Endurance strength (abdominal muscle) reached 68% in the Poor category; Endurance strength (back muscle) reached 79% in the Good category; Endurance strength (leg muscle) reached 67% in the Fair category, and VO₂Max reached 83% in the Fair category. Figure 1 describes an image of a spider web to unfold the

achievement of the physical fitness of male futsal athletes compared to the existing norms to be able to make a form of exercise that is suitable for their best performance.

Based on Figure 1, the achievement target of the physical fitness of the male futsal athletes from each component still has to be improved, with an average achievement of each component of 73% in the Fair category. The results revealed that the agility component, which should be important for a futsal player, only reaches 73%. This achievement target must be carried out in every practice before the competition season.

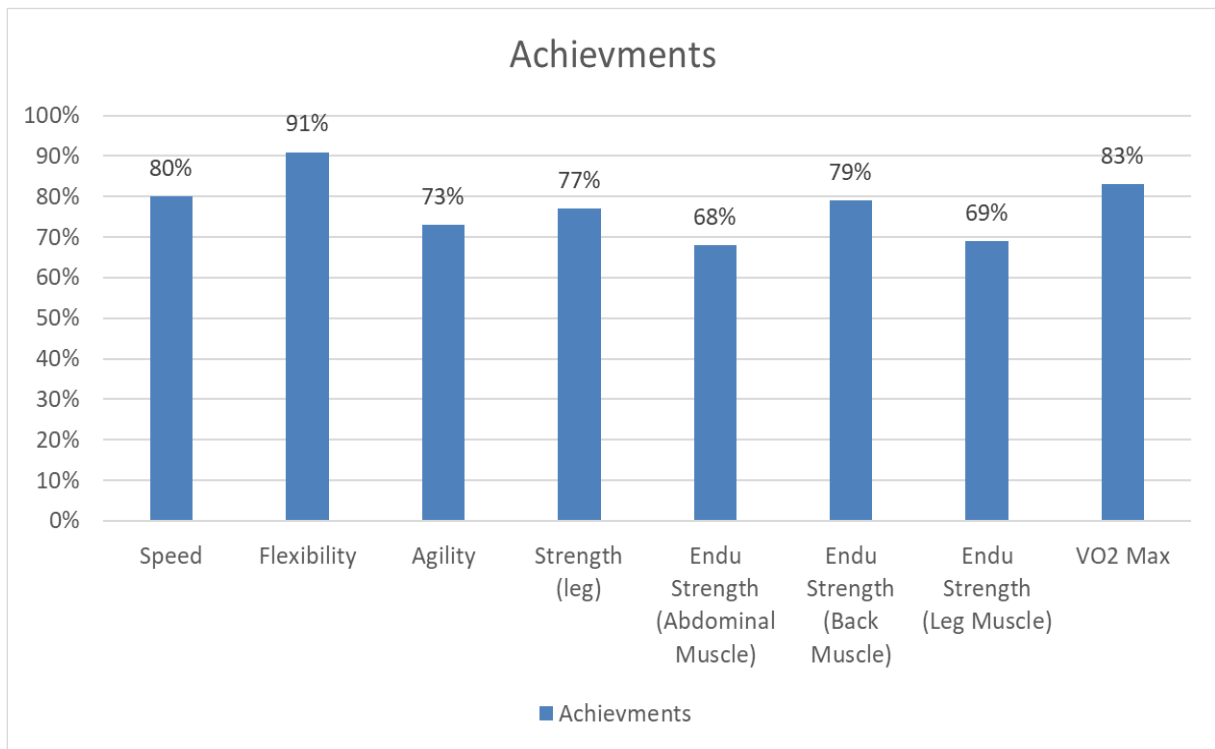


Figure 1. Diagram of physical fitness result of male futsal athletes

Table 2. Physical fitness result of female futsal athletes

Test Items	Test Result	Norm	Achievements	Category	
speed	5,77 sec	3,75	100	65%	Fair
flexibility	25 cm	53,9	100	46%	Poor
agility	13,72 sec	10,76	100	78%	Good
Strength (leg)	35 cm	66	100	53%	Poor
Endu. strength (abdominal muscle)	33 19	42	100	46%	Poor
Endu. strength (back muscle)	29 rep	47	100	61%	Poor
Endu. strength (leg muscle)	30 rep	40	100	74%	Fair
VO ₂ Max	39,05 ml/kg/sec	51,13	100	76%	Good

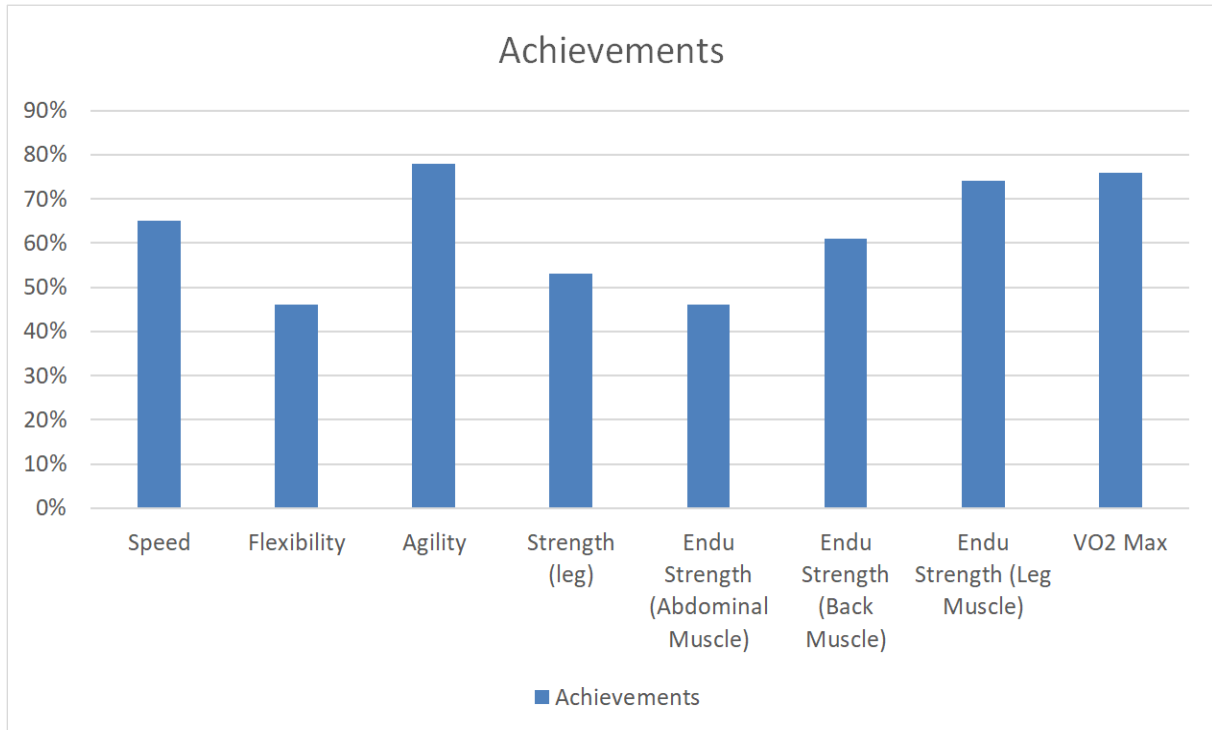


Figure 2. Spider Diagram of physical fitness result of female futsal athletes

Table 2 explains the test results of the physical fitness of female futsal athletes for the test results on speed reaching 65% in the Fair category; Flexibility only reached 46% in the Poor category; Agility reached 78% in the Good category; Strength (leg) reached 53% in the Poor category; Endurance strength (abdominal muscle) reached 46% in the Poor category; Endurance strength (back muscle) reached 61% with Poor category; Endurance strength (leg muscle) reached 74% in the Fair category, and VO₂ Max reached 76% in the Good category. Figure 2 shows a picture of a spider web to present the achievement of the physical fitness of female futsal athletes compared to the existing norms to be able to make a form of exercise that is suitable for their best performance.

Based on Figure 2, the achievement target for the physical fitness of female futsal athletes from each component still has to be improved, with the average achievement of each component as much as 63% in the Poor category. It requires the achievement target to be carried out in every practice before the competition season comes. The results revealed that the components that were lacking, such as flexibility, strength, endurance strength (abdominal muscle), and endurance strength (back muscle), must be increased in each training session.

4. Discussion

In general, the level of physical fitness of men futsal players is in the Fair category (73%) in the competition preparation stage. Physical fitness is also influenced by

several influencing factors such as genetics, exercise, gender, age, body fat, and daily activities [18,19]. On the other hand, factors influencing achievement are physical, technique, tactics, mental, and body constitution [6]. It is obvious that looking at the circumstances, a solution must be found for the problem of the level of the physical fitness of players to increase the achievement at the national and international level, one of which is improving physical fitness at the training stage [20]. Considering the status of a professional player, improving physical fitness is necessary, especially the components of physical fitness that were lacking to achieve higher achievements in the future [21]. The results reveal that the other physical fitness of male futsal athletes with sufficient category was agility. Endurance strength muscle and VO₂ Max should be in the Good category for the futsal player and become the dominant physical fitness component that must be possessed [6]. Therefore, the physical fitness training program must be arranged, organized, and implemented properly and systematically to improve the dominant physical fitness of futsal and increase the required biomotor abilities [22]. Physical fitness highly supports players in a competition to avoid significant fatigue and injuries that could interfere with their performance [9]. The factor of physical fitness is very important to the achievement of a player or team. Additionally, it is necessary to face competition with a busy schedule. It is hoped that with excellent physical fitness, the players could play better and increase their achievements [6,10].

Differently, the result of physical fitness tests of female futsal athletes was still far from expectations. It only shows

the average of 63% in the Poor category on each component. Therefore, every practice's achievement target must be achieved before the competition season. The results revealed that the lacking components were flexibility, strength, endurance strength (abdominal muscle), and endurance strength (back muscle). Those components must be increased in each training session. Physical fitness could not be improved and developed only in a relatively short period. Experts say that good physical fitness requires continuous and progressive exercise [1,23]. The physical fitness components should not be all properly possessed. The type of movement in the futsal game requires the player to manage maximum aerobic energy to avoid fatigue in the futsal game, which is a hard and long-term-draining-energy game [7,10]

Futsal is a very complex sport, requiring great physical fitness, good technique, and an understanding of tactics. Additionally, the difference in the physical fitness of futsal with other sports makes it difficult for players to excel if they do not have good physical fitness, no matter how good the players' techniques and tactics they have [24,25]. The coach must acknowledge and understand physical fitness and its factors before the training stage [1]. Physical demands in futsal could be evaluated from each player's movements during the competition. It is meant to find out each player's similar or different activity in a competition. Each player has a different type of physical activity and physical fitness. This necessity is used for data analysis of activity movements in futsal [26].

Factors of exercise and training have a great influence on improving an athlete's physical fitness. A person who regularly trains according to his needs and achieves physical fitness from the effort is called training. On the other hand, a person who lets his muscles limp hanging and is in poor physical fitness is called untrained [1]. The results show that male futsal athletes fall into the Good category since these players were used to physical fitness training even with less intensity so that during the test, these players could do better than other players [10]. The different portions of exercise and lifestyle caused the fact that female futsal athletes are classified as Poor before joining the training camp. It was improper to get the optimal results from previous training [16]. The limitation of this research relies on the physical fitness test instrument for male and female futsal athletes which may not be following their regular training. Therefore, they were not familiar with the used test instrument.

5. Conclusions

The physical fitness of the men futsal athletes in Cimahi, West Java, Indonesia, has an average achievement of each component of 73% in the Fair category, while the physical fitness of the female futsal athletes only has an average achievement of each component of 63% in the Poor category. Several factors affect the physical fitness of

futsal athletes in preparation for this competition, such as genetics, training, gender, age, body fat, and daily activities. The solution must be found for relatable problems. Therefore, the level of physical fitness of male and female futsal players to increase achievement at the national and international levels could be achieved in the competition preparation stage. One of the solutions includes improving physical fitness at the more intensive training stage.

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