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VO_2max Rate Based on Ideal Weight of Female Players in a Futsal Team

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Abstract: ***This research aimed to find out the VO_2max rates of female players in a futsal team based on ideal weight. It was a survey research and involved 32 people. Measurement method VO_2max is bleep test. In this experiment, the participants run 20 meters back and forth and start with a slow run. This study focuses on the results of VO_2max measurements and the presentation of the results of the analysis through the frequency table. The sample of research was the female player with have ideal weight. Data analysis technique by quantitative method. VO2max of female futsal players regarding endurance. VO2max determines the ability to maintain stamina of female player futsal. The players with ideal weight and age between 20-30 years showed relatively the same VO_2max value.***

Keywords: Ideal Weight, Bleep Test, Gender

1. Introduction

The sports are one of the efforts to improve the quality of human life. This activity not only contributes to physical health but also can improve the psychological condition of human beings. Also, sports achievements will encourage the image of the nation. Almost all sports will have a significant impact on health and fitness. Furthermore, one way to assess a person's eligibility is the endurance. People who have good tolerance will be able to do their activities in a long time. According to [1], patience is the ability to perform a continuous event in a long time.

In a sporting event, the endurance element becomes a critical thing to achieve the victory. Good endurance can be obtained with regular and programmed physical exercise as well as with the quality and quantity of training. The level of one's physical fitness can be measured based on nine elements, namely endurance, speed, agility, reaction time, muscle strength, explosive muscle power, balance, and coordination [2]. Someone who conducts activities in the long term must need the oxygen to use as energy in the body. The more oxygen supplied by a body, the better performance of the muscles will show, so it substances which cause the remnants of exhaustion amount will be less. When someone felt tired, it indicates less of aerobic capacity.

Futsal is a sport that requires a functional aerobic capacity. This exercise played by two teams and used the ball. The technique of futsal game determined by the ability to enter the ball on the opponent's goal by manipulating the ball using the foot. In addition to the five main players, each team is also allowed to have a backup player. The maximum performance in futsal games required several factors such as physical exercise, technical exercises, tactical exercises, and mental exercises [3].

In the futsal sports, there are specific movements that require anaerobic energy, such as repetitive sprints, dynamic movement, fast passing. The length of time futsal game needed aerobic energy system to support the implementation of these activities. Unlike the futsal sport, the amateur level certainly has the characteristics of slow movement, passing, jogging, without the sprint done many times. It indeed requires anaerobic energy system to support the activity

Futsal is not only played by men but also women Characteristics of female players differ from male players. Some competition experience defeats as the players tired very quickly. Moreover, all the players involved in the club are very diverse from posture small to large, from skinny to fat, so players who get fat are tough to balance the competition opponents when compared with players who have an ideal body [4].

The real differences between women and men are apparently visible in the anatomical aspect, but the physiological side of the difference is unclear. Anatomical differences cause capable of physical activities that require strength. However, many of these differences can change through physical exercise.

The futsal player has various postures. Some of them are small or thin, and some are fat. Players with overweight stance show a fatigue performance. High body fat can cause fatigue. Fatigue during exercise influenced by the oxygen content or maximal oxygen volume (VO_2max) [5]. VO_2max is an indicator of fitness during training or the maximum amount of oxygen required by one kg of body weight. High VO_2 max values indicate that a person is capable of performing a stronger activity compared to a person with a lower VO_2 max score.

The mechanism of oxygen entry in the body begins in the respiratory system or the capture of oxygen from the atmosphere [6]. Hemoglobin transports the oxygen to the cells in the body. The function of the cardiovascular system is the heart pumping blood and blood vessels as a means of carrying oxygen to reach the battery. The ability of oxygen to flow through red blood cells depends on the biochemical factors of the tissues. Thus, efforts to optimize the oxygen content in the body with aerobic exercise to improve the cardiovascular system and improve blood hemoglobin content as an oxygen transport system. The buildup of fat in the body can affect the ability of cardio-respiration and the heart's ability to pump blood. Cardiac output also changes the

amount of oxygen that circulated to the muscles. The amount of oxygen in the tissue affects the ability of muscle work. The deposition of fat in the body also disrupts the activity of the motion, or the body becomes less sensitive. The genetic component also influences cardiorespiratory fitness in addition to being affected by the intensity of physical exercise [7][8].

Facts about the endurance of female futsal players can attribute to the VO_2max content. This study aims to describe the VO_2 max rates of female players in a futsal team based on ideal weight. The results of this research became the basis of consideration in the training system of female players as well as the potential development of playing techniques. Thus, achievement of achievement by female players can increase.

2. Method

It was a survey research involving 32 female futsal players selected purposively. The female player who has the ideal weight chosen as the research sample. This study focuses on the results of VO_2 max measurements and the presentation of the results of the analysis through the frequency table.

Measurement method VO_2 max is bleep test. In this experiment, the participants run 20 meters back and forth and start with a slow run [9]. Gradually, the speed of the runner is enhanced until the athlete is unable to keep up with the rhythm of the running time. This condition shows the maximum ability of the athlete. The measurement divided into many levels:

- Level 1: 20 meters distance taken within 8.6 seconds in 7 times back and forth.
- Level 2 and 3: 20 meters distance taken within 7.5 seconds in 8 times back and forth.
- Level 4 and five the distance of 20 meters is taken within 6.7 seconds in 9 times back and forth, and so on.

The start done by standing, and both legs behind the starting line. With a "ready yes" command, the athlete ran in front to the rhythm of the boundary line until one foot passed the line. If the sound is not audible, the athlete has crossed the line, but to run back must wait for the sound signature. Conversely, when there has been an athlete's sound not yet reached the boundary line, the athlete must accelerate the run to cross the boundary line and immediately re-run in the opposite direction. If two consecutive athletes are not able to follow the rhythm of running time means maximum ability only at the level and feedback.

After the athlete is unable to keep up the rhythm of the run, the athlete should not continue to stop, but continue to run slowly for 3-5 minutes for cooling down.

The athlete's score indicated by the level of running back and forth achieved before they fail to adjust to the beep record [10]. This score can convert into VO_2 max equivalent score' (Table 1).

Table 1: The standard VO_2max for female

Age	*Very poor*	*Poor*	*Fair*	*Good*	*Excellent*	*Superior*
13 - 19	< 25.0	25.0 – 30.9	31.0 – 34.9	35.0 – 38.9	39.0 – 41.9	> 41.9
20 - 29	< 23.6	23.6 – 28.9	29.0 – 32.9	33.0 – 36.9	37.0 – 41.0	> 41.0
30 - 39	< 22.8	22.8 – 26.9	27.0 – 31.4	31.5 – 35.6	35.7 – 40.0	> 40.0

3. Result and Discussion

Every cell in the human body needs oxygen to convert food energy into ATP (Adenosine Triphosphate) ready for use for each cell. Muscles in the state of consuming less oxygen contrast contraction muscle cells require a lot of ATP. Consequently, muscles used in exercise need more oxygen for "combustion" energy and this also produces a lot of carbon dioxide (CO2). When the muscles work the body's need for Oxygen can see through our breathing. By measuring the amount of oxygen used during the intensive exercise, we can know the amount of oxygen used by the working muscle. The more the amount of muscle used, the higher the intensity of muscle work and the required oxygen automatically increases. The result of VO_2max of female futsal player shows in Table 2.

Table 2: The statistic of VO2 max

Statistic	*Value*
Mean	31,308
Std. Deviation	2,28
Variance	4,92
Range	8,20
Minimum	27,60
Maximum	35,80
Sum	500,94

The results of statistical tests VO2 max value shows the lowest amount of 27.60 and the highest value is 35.80. The value indicates that the oxygen content in the body of the player is relatively the same based on standard deviation value of 2.28. The distribution of VO2 max female futsal player values shown in Table 3.

Table 3: Frequency of VO_2 max

Interval	*Frequency*	*Percent*	*Criteria*
< 23.6	0.00	0.00%	Very Low
23.6 - 28.9	5.00	16.00%	Low
29.0 - 32.9	22.00	69.00%	Fair
33.0 - 36.9	5.00	16.00%	Good
37.0 - 41.0	0.00	0.00%	Very Good
> 41.0	0.00	0.00%	Excellent
Total	32.00	100.00%	

Table 3 shows that the VO_2 max of female futsal players is mostly in the fair category. None of the players have a low VO_2 max. Furthermore, none of the players with VO_2 max value. Low and fair VO_2 max conditions cause low endurance of the player. They feel tired faster when they compete due to their small oxygen content.

The level of VO_2 max affects the person's endurance and stamina [11]. If someone quickly feels tired despite doing a mild activity, then the level of VO_2 max is categorized as low. Conversely, if VO_2 max in a high category then endurance also will good. It associated with VO_2 max as the body's ability to deliver oxygen to the muscles in the body and as a critical element of energy burners. Standard level VO_2 max is affected by age and gender. For 30 years female, the level of VO_2 max for men must be at least a usual level of 10 while for women minimum standard level 9 [12]. The factors that affect the VO_2 max level are:

- Gender. After puberty, women in the same age with men have maximum maximal oxygen consumption of men.
- Age. After age 20, VO_2 max decreases slowly. At 55 years of age, VO_2 max is approximately 27% lower than the age of 25. By itself, this is different from one person to another. They have many activities VO_2 max will decrease more slowly.
- Body composition. Although the VO_2 max represented in the milliliters of oxygen consumed per kg of body weight, the difference in the structure of a person leads to different consumption. For example, they have high percentage fats, have a lower maximum oxygen consumption. If the muscular body is active, then the value of VO_2 max is more elevated, therefore if the fat in the body reduced, the maximum oxygen consumption can increase without additional exercise.
- Exercise or exercise. VO_2 max can fix with sports or exercise. With a regular endurance exercise, it can improve maximal oxygen consumption from 5% to 25%. The maximum amount of maximal oxygen consumption can be developed, depending on the status at the start of the exercise. Research shows that 65-74 years can increase the maximum VO_2 max about 18% after exercising regularly in 6 months.

4. Conclusions

Physical fitness level is a measure of a person's ability to perform his or her daily physical activity. The better the level of physical fitness then the level of ability to carry out activities tend to be better, especially regarding physical or stamina.

One's physical fitness shaped by components of physical fitness such as strength, speed, agility, muscle endurance, lung heart and so on. Muscular, heart and lung resistance can measure by the ability of the body to carry out activities in a relatively long time.

VO_2 max of female futsal players regarding endurance. VO2 max determines the ability to maintain stamina of female player futsal. The players with ideal weight and age between 20-30 years show relatively the same VO_2 max value.

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