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The effect of small side game and circuit training and body mass index on increasing VO2max in futsal extracurricular participants at MTS Muallimin, Yogyakarta city

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Abstract
The research aims to determine: (1) the difference in influence between small side games and circuit training methods on improvement*VO2max*; (2) the difference in the influence of high and low Body Mass Index on improvement*VO2max*; and (3) interaction between training methods*small side game* and*circuit training* and high and low body mass index to increase*VO2max*.
The research method is an experiment with a 2x2 factorial design. The population in this study was 40 participants of the MTS Muallimin Futsal extracurricular, Yogyakarta City. The sample in this study was 20 people taken using techniques*purposive random sampling*, then do it*ordinal pairing* to divide each group. The research instruments used were meters and scales to measure body mass index, meanwhile*VO2max* use*multistage fitness test*. Data analysis used tests for normality and homogeneity requirements, Two Way Anova test and Post Hoc test with Tukey.
The results of this research show that: (1) There are significant differences in influence between training methods*small side game* and*circuit training* towards improvement*VO2max*, with an F value of 7.366 and a significance value of p 0.015 <0.05, groups*small side game* better than*circuit training.* (2) There is a significant difference in the influence between high and low Body Mass Index on improvement*VO2max*, this is proven F 19.501 and significance p 0.000 <0.05, participants with a low Body Mass Index are better off using the method*small side game*, while participants with a high Body Mass Index were better off using the method*circuit training*. (3) There is a significant interaction between small side games and circuit training methods and Body Mass Index (high and low) on improvement*VO2max*, with an F value of 12.317 and a significance of p 0.000<0.05.

Keywords: Small side games, circuit training, futsal, VO2max

Introduction

Futsal is a sport that is quite popular in Indonesia. Sutanto (2016: 132) the game of futsal was popularized by Juan Carlos Ceriani in Montevideo, Uruguay in 1930. At that time it was called the game "*indoor soccer*" (Portuguese) or*indoor soccer* (Spanish) with the same meaning, namely indoor football. A new term emerged from these two languages, namely, futsal. Futsal is a sport that is carried out with fast intermittent intensity and optimal heart function, because good heart function will be able to transfer oxygen to active muscle tissue so that energy resistance is fast and can speed up the recovery process. Naser, *et al* (2017: 77) stated that "*Futsal is a 2 × 20-min game of high-intensity and intermittent actions requiring high physical, tactical, and technical efforts from the players. The court measures approximately 40 × 20 m with 3 x 2-m goals".*
The game of futsal is played with fast movements, meaning the ball continues to roll without stopping. Futsal is a dynamic sport and prioritizes changing positions quickly to find space by running. This futsal game requires high physical, tactical and technical efforts from the players, for this reason optimal physical conditions are needed to support the performance of futsal athletes in every match. (Kusuma *et al*., 2019) [42] explains that physical condition is an important aspect for achieving achievement. The physical condition components of futsal are different from other sports. In the game of futsal, the dominant component of physical condition is endurance (*endurance*), explosive power of leg muscles (*explosive power*), speed (*speed*), and agility (*agility*) (Yusuf & Zainuddin, 2022) [49]. If the physical conditions required in playing futsal are in the perfect category, it can certainly support stable technical abilities when competing.
Aerobic endurance plays a very important role in futsal, because futsal, which involves running back and forth, really requires excellent stamina over a long period of time (Syroyyudin *et al*., 2021) [43]. A futsal player with good endurance will certainly not easily experience fatigue when competing and is able to concentrate fully in the game and can minimize mistakes due to fatigue, whereas players with poor physical condition will often make individual mistakes. The quality of endurance of the heart and lungs is expressed by*VO2Max*, namely the maximum amount of oxygen that can be consumed in units of ml/kg/bb/minute (Nugroho, 2021). In futsal, good aerobic endurance or*VO2Max* high levels are highly prioritized (Bausad & Musrifin, 2020) [7].
Volume oxygen maximum (*VO2max*) is a level of body capability expressed in liters per minute or milliliters/minute/kg body weight (Cade *et al*., 2018:2) [13]. Futsal matches are held with high intensity and continuously, so that this can drain the players physically. Players who do not have good physical condition will certainly experience delays in restoring their physical abilities so that players will very easily experience fatigue during matches or training. The higher the capacity*VO2Max* players, the more oxygen the body can use for metabolism and ensuring sufficient stamina when competing. Has capacity*VO2Max* A good futsal player must have it to support the desired achievement.
Enhancement*VO2max* can be influenced by body weight. Obesity is a condition of body weight imbalance in which excess fat accumulates in adipose tissue. This condition is

caused by poor diet and lifestyle*hypokinetic*. Futsal players need to maintain their body condition at all times to achieve ideal body weight. To determine an athlete's body composition, it is necessary to measure and measure the body mass index (BMI). The BMI category called "good" is at the threshold (Z-*Score*) between -2 SD to 1 SD (16.9-18.7) with a median of 21.1, categorized as normal. -3 to < -2 SD is categorized as thin, > 1 SD to 2 SD is categorized as fat and > 2 SD is categorized as obese (Ministry of Health of the Republic of Indonesia, 2010: 5).

Body Mass Index (BMI) is a value resulting from calculating a person's body weight (BB) and height (TB). BMI is considered an indicator or explanation for the level of fat cells in the human body. BMI does not measure body fat directly, but research shows that BMI correlates with direct measurements of body fat such as*underwater weighing* and*dual energy x-ray absorbtiometry* (Grummer & Strawn, 2012:37) [21]. BMI is a parameter set by WHO (World Health Organization) as the ratio of body weight to height squared. BMI is a conversion of the results of anthropometric measurements of height and weight. As long as the body proportions are maintained, a tall person is heavier than a short person. From the comparison of the results of anthropometric measurements of BB and TB, a person's nutritional status can be determined whether they are classified as too thin or vice versa (Suharjana, 2013: 120).

Based on the results of observations made by researchers on the MTS Muallimin Futsal team in Yogyakarta City, there are still players who have the ability*VO2Max* which must be improved. This can be seen during the Yogyakarta State University Sportivo JIH Se-DIY Event match which was held at the Yogyakarta State University Sports Hall in November 2019 and the Yogyakarta City AFK U16 Pre League in 2023, showing that*VO2Max* MTS Muallimin Kota Yogyakarta still lacks futsal players because in the match where many players entered the second half, they experienced fatigue so their performance decreased and many players when they entered the first 10 minutes of the second half had a lot going on, movement coordination and technique were not maintained stably towards the end. match, so that the player's concentration in the match is difficult to control due to decreased stamina. The physical condition problems above are some of the problems that occurred in the MTS Muallimin Yogyakarta City futsal team.

The results of observations made by researchers when the Yogyakarta City MTS Muallimin futsal team trained, the training program given was more focused on technical, tactical and game training, and there was a lack of training that led to physical training, especially aerobic endurance. There is still a lack of training that leads to variations in endurance physical training. The physical training provided by the coach is only a form of training according to the experience the coach gained as a player and through videos without using good and correct training methods.

Researchers also conducted interviews with MTS Muallimin Yogyakarta City futsal coaches, namely M. Fadlan, Zaky Fathurrahman in September 2021 and Gusna Abi Nugraha in October 2023, who said that the problem that often occurs in players when competing is that players often experience fatigue during matches, so their concentration the player is disturbed and the player's technique cannot be used optimally. The coach said there are 7-10 players who easily get tired during a match. Another problem is that during training, players often complain of feeling tired even though training has not yet been completed. The coach also said that during the pandemic*Covid-19*special physical training exercise programs are not implemented, this also causes a decline*VO2max* significant impact on players. Physical training program that is not optimal for improvement*VO2max* is an obstacle in improving a player's physical and performance when competing.

Based on the above phenomenon, it can be concluded that the physical condition of players when competing is very important. (Dermawan, 2018) explains that without serious physical preparation, a futsal team will experience difficulties in achieving optimal performance. Several training methods that trainers can use for physical training such as, *cross country*, *fartlek, small side game*, method*continuous, interval*and*circuit training.* Based on several physical training methods for improvement*VO2max*, the researcher chose the training methods*small side game* and*circuit training* in an effort to improve*VO2max* for extracurricular futsal participants at MTS Muallimin, Yogyakarta City.

Small side game is a game played on a field with a smaller size than football in general, using modified rules and involving a smaller number of players than the actual number of players (Mota, *et al*., 2022: 47) [31]. *Small sided games* is a training method by presenting game situations like real games which allows players to gain mastery of technical, tactical and physical aspects (Wardana, *et al*., 2018: 194). *Small sided game* is any game played with fewer than eleven players and on a smaller sized field *(Rowell, et al., 2018: 2)* [37]. Usages*mall side game* As a special instrument for improving physical condition, developing tactical and technical players, increasing the specificity of training stimuli is indeed very effective judging from the progress achieved. This research does not only use a training models*small side game* Researchers also want to collaborate with training models*circuit training* which is expected to improve physical condition, especially capacity*VO2Max* MTS Muallimin Futsal participant, Yogyakarta City.

Circuit training is a form of exercise used to improve physical quality which consists of several training posts, each post has different training items. *Circuit Training* is a form of training program model that is combined from several items and divided into several posts, circuit training aims to carry out exercises with several forms of training variations that will not be boring for the players and are more efficient (Kusuma, 2017). *Circuit training* effect on cardiovascular endurance, using the method*circuit training* Players can customize training variations, saving time and tolerating individual differences. Harsono (2015: 39), namely*circuit training* is a training system that can simultaneously improve the overall fitness of the body, namely the elements of power, endurance, strength, agility, speed and other physical components.

Practice method*small sided games* and*circuit training* designed to increase*VO2max* and developed to improve body composition. It is hoped that the training program offered will be an attraction for players to improve*VO2max*, so that players can have a good level of fitness, will have a proportional body, have strong bones, flexible joints and strong muscles. Proper training must apply the basic

principles of training to achieve maximum physical performance for a person.

Based on the background described above, the author is interested in conducting research related to training to improve*VO2max* with the aim of finding out more effective exercises to improve*VO2max* for MTS Muallimin Futsal participants in Yogyakarta City. This is realized in the form of scientific research entitled "The Effect of Exercise*Small Sided Games* and*Circuit Training* and Body Mass Index for Increase*VO2max* MTS Muallimin Futsal Extracurricular Participants in Yogyakarta City."

Research Methods

This research is quantitative research which aims to research and find as much information as possible about a particular phenomenon. Quantitative research methods are a type of research whose specifications are systematic, planned and clearly structured from the start until the creation of the research design (Sugiyono: 2015). This research is a type of experimental research, experimental research methods can be interpreted as research methods used to find the effect of certain treatments on others under controlled conditions Sugiyono (2017: 72). Based on the problems to be studied, this research includes quasi-experimental research *(quasi experimental)* which aims to determine cause and effect between research variables. Dwiyogo (2010: 45) states that the quasi-experimental method is a research method that takes into account that not all variables (symptoms that appear) and experimental conditions can be given full control and to find out which variables may not be fully controlled and controlled.

The design used in this research is an experimental method using a 2x2 factorial design. Creswell (2015: 49) says that a factorial experiment is a variation between group designs consisting of two or more treatment variables to test independent variables and the simultaneous effect of treatment variables on an outcome. Meanwhile, according to Sugiyono (2015: 46) factorial is an action on one or more variables which is manipulated simultaneously in order to study the influence of each variable on the dependent variable or the influence resulting from interactions between several variables. This experimental research used two groups that received different treatments, namely providing training methods*small side game* and*circuit training*. The following is the research design for this experimental research.

Table 1: 2 x 2 Factorial Research Design

Practice Method (A) Body Mass Index (B)	*Small Side Game* (A1)	*Circuit Training* (A2)
High BMI (B1)	A1.B1	A2.B1
Low BMI (B2)	A1.B2	A2.B2

Information

A1: Method*Small Side Game*

A2: Mode*Circuit Training*

B1: High Body Mass Index (BMI).

B2: Low Body Mass Index (BMI).

A1.B1: Group of participants trained with the method*small side game* with a high body mass index (BMI).

A2.B1: Group of participants trained with the method*circuit training* with a high body mass index (BMI).

A1.B2: Group of participants trained with the method*small side game* with a low body mass index (BMI).

A2.B2: Group of participants trained with the method*circuit training* with a low body mass index (BMI).

Time and Place of Research

This research was carried out at MTS Muallimin, Wirobrajan, Patangpuluhan, Yogyakarta City, Special Region of Yogyakarta. This research was carried out from January to March 2024.

Population and Sample

The population in this study itself was all the Futsal extracurricular participants at MTS Muallimin, Yogyakarta City. In this study, the total population was 40 participants. The total population in this study consisted of 40 participants taken using techniques*purposive random sampling*.

Instruments and Data Collection

Instruments are measuring tools that will be used in Body Mass Index (BMI) research, the test used to measure*VO2max* in this research, namely*multistage fitness test*. The data collection techniques used in this research are tests and measurements. Before taking measurements*pre-test* and*post-test*, the sample was first measured based on body mass index (BMI) to determine the high and low BMI of the participants.

Data Analysis Test

The data analysis technique used in this research was SPSS 20, namely by using two-way ANOVA at a significance level of □= 0.05. Before arriving at the use of two-way ANOVA, prerequisite tests need to be carried out, including: (1) normality test and (2) variance homogeneity test, and (3) hypothesis test

Research Results and Discussion

a. Interaction between training methods*small side game* and*circuit training* and high and low Body Mass Index (BMI) towards improvement*VO2max*.

The third hypothesis that has been built is "there is an interaction between training methods*small side game* and*circuit training* and high and low Body Mass Index (BMI) towards improvement*VO2max*". Based on the analysis, the following data has been obtained:

Table 2: Results of interaction tests between training methods*small side game* and*circuit training* and high and low Body Mass Index (BMI).

Source	Type III Sum Of Square	Df	Mean Square	F	Say
SSG & CT* High BMI & Low	58.585	1	58.585	12.317	0.003

The results of the analysis above can be observed that the significance value is 0.003<0.05 and the F value is 12.317. This means that there is an interaction between training methods*small side game* and*circuit training* and high and low Body Mass Index (BMI) on increasing Vo2max. Observing this, there is an interaction so further tests are needed to see the interaction in more depth with the Post Hoc Tukey test. Further test results are presented as follows:

Table 3: Post Hoc Test Results with Tukey

Group	Interaction	Mean Difference	Std. Error	Say.
A1B1 SSG High BMI	A2B1 CT IMT Height	-.7760	1.37931	0.942
	A1B2 SSG IMT Low	.8840	1.37931	0.917
	A2B2 CT IMT Low	6.9540*	1.37931	0.001
A2B1 CT High BMI	A1B1 SSG IMT Height	.7760	1.37931	0.942
	A1B2 SSG IMT Low	1.6600	1.37931	0.633
	A2B2 CT IMT Low	7.7300*	1.37931	0.000
A1B2 SSG Low BMI	A1B1 SSG IMT Height	-.8840	1.37931	0.917
	A2B1 CT IMT Height	-1.6600	1.37931	0.633
	A2B2 CT IMT Low	6.0700*	1.37931	0.002
A2B2 CT Low BMI	A1B1 SSG IMT Height	-6.9540*	1.37931	0.001
	A2B1 CT IMT Height	-7.7300*	1.37931	0.000
	A1B2 SSG IMT Low	-6.0700*	1.37931	0.002

The discussion of research results in this section will explain in more detail the experimental results that have been obtained with relevant studies so that the research will provide strong facts. This study aims to determine (1) the effect of differences in small side games and circuit training methods on increasing vo2max, (2) the effect of differences between high and low body mass index (BMI) on increasing vo2max, (3) the interaction between the two training methods and the index. high and low body mass on increasing vo2max.

There is a difference in the influence of small side games and circuit training methods on increasing vo2max

Based on the research results that have been obtained, the author found the fact that small games and circuit training methods can have a significant influence on increasing Vo2max. This is proven by the significance results being 0.015<0.05, meaning the first hypothesis is accepted. The physical aspect is very important in physical contact sports (Yudhistira, 2023) [48]. Like the sport of futsal, which involves attacking and defensive movements, it certainly causes fatigue when you are not in good physical condition (Fitrian *et al*., 2023). Fustal is high intensity exercise with 75% of the energy used coming from aerobics (Casamichana & Castellano, 2009) [16].

In line with other studies, futsal is a sport with high intensity characteristics and has changing intervals (Moore & Laupheimer, 2015). Facts in the field reveal that futsal players perform fast acceleration movements with a duration of 1 to 4 seconds with maximum effort. Apart from that, futsal is played in two halves with a duration of 20 minutes and a break of 10-15 minutes, but in a real match sometimes the ball comes out and the time is stopped so it takes approximately 75-80 minutes in total (Moore & Laupheimer, 2015). In this case, it is necessary to improve training performance in addition to resistance training, sprinting and agility training, namely the need to develop aerobic endurance so that vo2max results can increase (Moore & Laupheimer, 2015).

One method used to increase vo2max is with a technical and physical approach or often called small side games (SSG). Studies state that on the other hand, small side games are a game-based method that utilizes a narrowed field width, so that with this hope futsal players can move with high mobility for a predetermined duration (Moore & Laupheimer, 2015). Even though the nature of small side games training is more about technical movements, it can have an effect on physical performance. Moreover, when futsal players will face a match in less than 2 to 1 month, of course, to train the physical aspects, they need to use a technical and strategic approach according to the characteristics of the sport of futsal. In his studies. For 6 weeks, treatment with the small side games training method had an influence on aerobic endurance as evidenced by the results of the vo2max test (Moore & Laupheimer, 2015).

Studies state that with adequate training periodization, the small side games training method can have an influence on futsal players' vo2max (Fitrian *et al*., 2023). This means that coaches can program training to increase endurance by using a game approach, namely small side games by modifying the field and the rules therein so as to provide optimal improvement (Fitrian *et al*., 2023). Several studies that have been reviewed show that they support the author's findings that the small side games method can be a training method to increase vo2max, considering that the urgency of physical condition in futsal games is very crucial, especially as the endurance aspect must be developed as optimally as possible.

Apart from the small side games method, the author's findings also highlight that the circuit training method also has a positive effect on vo2max results. This can be seen from the pretest and posttest results in similar groups, providing information that the posttest average score results are better than the pretest average score results. The circuit training method is a physical training method characterized by moving between posts with the aim of providing a stimulus to increase endurance (Yudhistira, Suherman, *et al*., 2021). This training method can be combined with sprint training and strength training or also with a technical approach, meaning that coaches can innovate with circuit training exercises (Hadi & Yudhistira, 2023) [48].

Studies state that futsal is a game sport that involves attacking and defensive movements which cause fatigue. One method that has been used to increase endurance is using circuit training, in this case circuit training has a positive impact on increasing the vo2max of young futsal players, meaning the circuit training method. training can be one of the training methods in the sport of futsal (Ronzi & Taufik, 2021).

Providing a circuit training program with a training frequency of 3 times and for 8 weeks was able to increase the vo2max of futsal players. In this study, the circuit training method improved better than the interval training method in young professional futsal players (Yunus & Raharjo, 2022). Responding to this from the author's study and supported by several previous studies, the two training methods, small side games and circuit training, have a significant influence on the results of the vo2max test for futsal players participating in extracurricular activities.

There is a difference in the influence of high and low Body Mass Index (BMI) on improvement*VO2Max*

Based on the research results, it is known that there is a difference in the influence of high and low body mass index on increasing vo2max. This is proven by the hypothesis test with a significant value of 0.000<0.05. Therefore the first hypothesis is accepted. In this case, a high body mass index is better given circuit training, while a low body mass index is better given small side games.

The author sees that the increase in vo2max in futsal players is influenced by BMI. This means that increasing BMI will affect body fat on the cardiovascular system. Therefore, excessive amounts of body fat do not provide good benefits for oxygen uptake by working muscles, so increasing BMI can reduce Vo2max capacity (Wibowo & Dese, Christovel, 2019).

Previous studies stated that there is a relationship between BMI and vo2max, meaning that an increase in BMI followed by an increase in fat will result in a decrease in vo2max, so that this affects the athlete's performance when competing (Pandey *et al*., 2014) [35]. An increase in BMI of around 1 kilogram/m2 can be predicted to reduce v02max ability by around 0.234 ml/kg/min, in this case when BMI increases it has the effect of decreasing v02max (Pandey *et al*., 2014; Wibowo & Dese, Christovel, 2019) [35]. Apart from that, an increase in BMI is of course influenced simultaneously by an increase in fat, so it will have the effect of reducing athlete performance and increasing the risk of cardiovascular system disease (Shah *et al*., 2017) [38].

Efforts made to manage BMI so that it is ideal are of course maintaining diet and exercise patterns with appropriate programming. Insufficient Vo2max is one of the factors that cannot optimize performance and achievement in futsal. Apart from that, interestingly, the correlation factor between BMI and vo2max has a significant relationship, so it requires a special approach and programming as well as consultation with a nutritionist to get good vo2max results with an ideal BMI.

Apart from that, the researcher highlights that the results of the author's findings state that a high BMI is better given circuit training exercises, this is possible because the principle of circuit training is through training by moving between posts by combining cardio training and strength training and of course the intensity of the training and Training volume can be controlled according to trainability factors. Seeing this, the BMI is high because the exercise programming has not been managed well and eating arrangements are irregular.

The study stated that training using the high intensity circuit training method applied 3 times a week for 12 weeks on female student participants with overweight criteria was able to have a significant influence on blood sugar levels, muscle strength and vo2max (Fitri *et al*., 2015). Apart from that, futsal players who have a low BMI with small side games treatment provide more significant results on vo2max. Analysis of these results, the author sees that futsal athletes who have a low BMI have ideal body fat so they are able to provide optimal training performance in the small side games treatment. Apart from that, the characteristics of the small side games training method are that it is fast and the intervals in it are only walking when they don't get the ball, but it also doesn't rule out the possibility of players still making mobility movements without the ball to see empty space so they can actively dribble the ball while running and passing to teammates.

In line with previous studies, the application of the small side games training method to young elite pro soccer players with an average BMI of 22.47 for men had a significant influence on vo2max (Pamungkas *et al*., 2023). In addition, it was explained that the small side games training method provides a stimulus in match conditions that requires athletes to be able to make quick decisions, demonstrate good technique, and make frequent changes of direction (Pamungkas *et al*., 2023).

There is interaction between training methods*small side game* and*circuit training* and high and low Body Mass Index (BMI) towards improvement*VO2max*.

Based on these findings, there is an interaction between small side games training and high and low BMI circuit training on increasing vo2max for futsal players. This means that the small side games and circuit training training methods provide good benefits together in increasing Vo2max by considering the BMI of each athlete given the training. In implementing good training programming, of course there are many aspects to consider, such as considering the nutritional status of the athletes who will be given training (Simanjuntak *et al*., 2022). Apart from that, considering the level of training of the athlete, the chronological age of the athlete, the suitability of the training stages, determining the appropriate training dosage between intensity and volume (Pramono *et al*., 2023; Sulistiyono *et al*., 2021; Yudhistira, Siswantoyo, *et al*., 2021).

Based on the results of the Post Hoc test with Tukey with an asterisk (*), it shows that these groups have real and significant interactions. These results are shown by pairs of groups that have significantly different interactions and pairs, namely: (1) A1B1 - A2B2, (2) A2B1- A2B2, (3) A1B2 - A2B2, (4) A2B2 - A1B1,

(5) A2B2 - A2B1, (6) A2B2 - A1B2. Meanwhile, other groups that do not have an asterisk above do not have real or significant interactions. The results of this research are interactions which means that in each cell or group there are differences in the influence of each group that is paired. Pairs that have significantly different interactions or partners are as follows.

a. The group of participants who were trained used the practice method*small side game* with a high body mass index were better than participants who were trained using exercise method*circuit training* with a low body mass index, with a p value <0.05.
b. The group of participants who were trained used the practice method*circuit training* with a high body mass index were better than participants who were trained using exercise method*circuit training* with a low body mass index, with a p value <0.05.
c. The group of participants who were trained used the practice method*small side game* with a low body mass index performed better than participants who were trained using exercise method*circuit training* with a low body mass index, with a p value <0.05.

Conclusions and Suggestions

1. There are significant differences in influence between training methods*small side game* and*circuit training* to*VO2max* with significance value*p* of 0.015 and an F value of 7.366 and a significance value*p* equal to 0.015<0.05. Practice group*small side game* higher (good) compared to the training group*circuit training* towards improvement*VO2max*.
2. There is a significant difference in influence between futsal players who have low and high BMI on*VO2max* with significance value*p* of 0.000 and an F value of 19.501 and a significance value*p* equal to 0.000<0.05. Players who have a high BMI are higher (good)

compared to players who have a low BMI with respect to improvement*VO2max*.

3. There is a significant interaction between training methods*small side game* and*circuit training* and Body Mass Index (high and low) against*VO2max* with a significance value of p of 0.003<0.05. Based on the results of the Post Hoc test with TukeyPairs that have significantly different interactions or partners are as follows:(1) A1B1 -A2B2, (2) A2B1- A2B2, (3) A1B2 - A2B2, (4) A2B2 - A1B1, (5) A2B2 - A2B1, (6) A2B2 - A1B2. Pairs that have significantly different interactions or partners are as follows.

a. The group of participants who were trained used the practice method*small side game* with a high body mass index were better than participants who were trained using exercise methods*circuit training* with a low body mass index, with a p value <0.05.
b. The group of participants who were trained used the practice method*circuit training* with a high body mass index were better than participants who were trained using exercise methods*circuit training* with a low body mass index, with a p value <0.05.
c. The group of participants who were trained used the practice method*small side game* with a low body mass index performed better than participants who were trained using exercise methods*circuit training* with a low body mass index, with a p value <0.05.

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