The Differences of Fartlek and Plyometric Exercises on Increasing Body Immunity through VO2 Max with Multistage Fitness Test for Women Volleyball Players

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Introduction

- Sports activities during this pandemic are very important, because by exercising regularly, measurably and programmed, the impact that occurs on the body becomes more fit so that a body that has good fitness will contribute to increasing body immunity.
- The impact of the COVID-19 pandemic has brought many changes in attitudes and behavior in society.
- However, during this pandemic, activities outside the home including sports must be done carefully.
- In this study, we will develop a form of physical activity that can increase body immunity by comparing fartlek and plyometric exercises which are more effective which method of exercise.
- Fartlek and plyometric exercises are sports training methods that can increase the body's immunity. Choosing the right exercise will produce good results, one of which can increase the body's immunity. Good body immunity can be seen from the level of physical fitness.
- To determine the level of the body's immunity through the ability of VO2 Max with the Multistage Fitness test. One of the indicators that support VO2 Max is Body Mass Index [BMI], in determining the right, effective and efficient type of exercise to increase body immunity.

Fartlek practice

Fartlek exercise or speed play is a form of continuous exercise in which athletes change speed during the session, with slow intensity then fast then slow then fast alternating so on. The point is that fartlek training is a combination exercise of walking, jogging, sprinting where fartlek training is a variation of speed playing exercises can be started from slow, medium and fast exercises.

Plyometric Exercise

Plyometric exercises have characteristics and characteristics, namely the strength of muscle contractions with the speed of motion reactions both dynamically and statically, plyometric exercises in principle have elongated and shortened muscle movements with the aim of increasing muscle nerve reactions, explosiveness, speed and strength. ability to change style under certain circumstances.

Method

Research Type or Design

- The research method used in this study is a 2 x 2 factorial design, which is a factorial experiment involving two factors, each factor consisting of two levels, using an initial test (pre-test) and a final test (post-test).

Table 1 . Research Design Framework

Research Design Framework		
Manipulative variable	Exercise method	
Attributive Variable	Fartlek Exercise (A1)	Plyometric Exercise (A2)
Low Body Mass Index (B1)	a_1b_1	a_1b_1
High Body Mass Index (B2)	a_1b_2	a_1b_2

Population and Research Sample

- The population of this research is the volleyball players at the SPIRITS Sleman Volleyball Club, totaling 24 players. The sample used was women volleyball players obtained from the entire population. In determining the sample in this study by random.
- This measurement is used to determine the level of low and high Body Mass Index. Then each low and high group was divided into two groups respectively. Fartlek exercise and plyometric exercise group. Samples that have a low Body Mass Index and samples that have a high Body Mass Index are drawn by lot. So that there will be four groups according to research needs.

Data collection technique

- The technique of collecting data is the initial test (Pre-test) and the final test (post-test). In accordance with the variables, to collect research data, the data collection instrument used was Body Mass Index, which was calculated based on body weight (kg) divided by height (meters) squared.
- Before the treatment was given to volleyball players. Body Mass Index data can be used to classify: a) samples that have low Body Mass Index abilities, b) samples that have high Body Mass Index abilities and multistage fitness test aims to measure the maximum ability of the heart and lungs with the prediction of VO2 Max.

Data analysis technique

- The data analysis technique used is two-way analysis of variance (ANAVA) at = 5%. If the obtained F value (Fo) is significant, the analysis is continued with the Newman-Keuls range test. To meet the assumptions in the ANOVA technique, the normality test was carried out with the Lilliefors test and the homogeneity test of variance with the Bartlett test.

Result and Discussion

Data Description

Table 2. Data Description The results of VO2 Max ability with multi-stage fitness test Volleyball Athletes

Treatment	BMI	Statistics	Preliminary test results	Final test results	Enhancement
Fartlek	Low	Total	199,67	299,65	29,98
		Mean	33,2783333	38,275	4,9966667
		SD	4,081830063	4,798306993	1,2665649
	Height	Total	180,46	197,45	16,99
		Mean	30,076666667	32,90833333	2,831666667
		SD	3,149594683	3,128804351	1,240522739
plyometric	Low	Total	196,47	217,41	20,94
		Mean	32,745	36,235	3,49
		SD	3,0002917	3,355763698	1,490932594
	Height	Total	180,98	193,75	12,77
		Mean	30,1633333	32,29166667	2,128333333
		SD	2,02461519	1,795666079	1,523094438

- These results become VO2 Max ability data with a multi-stage fitness test. Fartlek exercises and plyometric exercises have different effects on increasing VO2 Max abilities.

- If the groups of athletes who received fartlek training and plyometric training were compared, it can be seen that the fartlek training treatment group had an average increase in VO2 Max ability of 0.703333334 which was higher than the plyometric exercise group.

- If the group of athletes with low and high BMI is compared, it can be seen that the group of athletes with low BMI has an average increase in VO2 Max ability of 1.763333333, which is higher than the group of athletes who have high BMI.

- The effectiveness of increasing VO2 Max ability is influenced by the use of the type of exercise and is influenced by the athlete's BMI classification. Significant interaction effect between fartlek exercise, plyometric exercise and BMI to increase VO2 Max ability. Athletes increase their VO2 Max ability with fartlek training and plyometric exercises more effectively if they have a low BMI.

Conclusion

- The effect of fartlek training is better than plyometric training on increasing VO2 Max,
- Increasing VO2 Max ability in athletes with low BMI is better than athletes with high BMI,
- Increasing VO2 Max ability with low BMI fartlek is better than low BMI plyometric exercise.
- Increased VO2 Max ability high BMI fartlek exercise is better than high BMI plyometric exercise.
- There is an interaction effect between fartlek training, plyometric training and BMI to increase VO2 Max ability.
- Athletes if they have a low BMI with fartlek and plyometric exercises can increase their VO2 Max ability.

THANK YOU