EFFECT OF AQUA AND FLOOR AEROBIC TRAININGS ON VO_2MAX OF SOCCER PLAYERS

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Abstract

The aim of the study was to investigate the effect of aqua and floor aerobic trainings on VO_2 max of soccer players settles in Manipur. For the purpose of study, sixty male football players in the age range of 18 to 21 years were randomly selected. The participants were divided into two groups: aqua aerobic training (AAT=20), floor aerobic training (FAT=20) and control (CG=20) groups. Data was collected before and after the training session and statistically evaluated using the sample t-test and analysis of covariance (ANCOVA) to detect differences across the studies. Scheffe's post hoc test was designed to identify differences between each group. The 0.05 threshold of significance was used to determine the individual effect. The data revealed that AAT and FAT are an appropriate protocol for bringing about the desired improvements in soccer players VO_2max.

Keywords:-*Aqua Aerobic Training, Floor Aerobic Training, VO_2Max, Soccer Players.*

Introduction

Soccer also known as football in various areas of the world and is a high-energy athletic team sport. It would be fascinating to follow the creation and development of this popular sport. Soccer has also been a vital component of the world's largest sporting spectacular. Being a fast-paced sport, a player's fitness and strength are vital factors in the game. Soccer is a multifaceted sport that requires well-developed physical condition to be performed well **(Stolen *et al.*, 2005)**. In soccer, physical fitness refers to a player's physiological and functional status, which allows them to play the game effectively, withstand fatigue, and improve overall quality of life **(Mohr *et al.*, 2003)**. A high degree of ability on the ball and understanding of the game are also required. Soccer's simplicity conceals the tremendous physical fitness needs required to compete in the sport. Playing football by the hour will improve a player, but it is targeted and specialised

training directed at every component of the player's essential skill set that will propel a good player to the next level of ability and success **(Kaka & Biru, 2008)**.

Performance in football depends on a variety of factors, including physical, physiological, technical, and tactical abilities. Acceleration, running speed, jumping height, and the ability to release energy are all crucial factors. A 90-minute soccer match requires players to run 10 km **(Bangsbo, Nrregaard, & Thorse, 1991)** at a pace that is close to anaerobic threshold or 80–90% of their maximum heart rate **(Helgerud, Engen, & Wisloff, 2001; Reilly & Ball, 1984)**. This means that at least 90% of the energy released must be aerobic **(Bangsbo, 1994)**. Aerobic performance is dependent on three important elements: maximal oxygen uptake (VO_2max), anaerobic threshold, and work economy **(Pate & Kriska, 1984)**. The maximum amount of oxygen that may be taken in during dynamic activity involving large muscle groups is known as VO2max (Wagner, 1996). There is a significant relation between VO_2max and distance covered during a match **(Smaros, 1980)**.

Aerobic training either perform water or floor aids in the improvement of a player's respiratory capacity. The maximum oxygen capacity that the body can absorb, transport, and consume in a given time is referred to as respiratory capacity. This is significant because the lungs to provide the oxygen that require to maintaining the muscles operating at their best. Without enough oxygen, the muscles fatigued faster, which affected the performance.

Aerobic Training

Aerobic training is defined as any exercise in which all body parts/muscles receive adequate oxygen due to an increased heart rate. Aerobic activities engage the entire body, including major muscular groups such as the legs, torso, and arms. The heart rate increases rapidly during oxygen-consuming activities but never reaches its maximum. The heart is always prepared to deliver appropriate oxygen-rich blood to muscles so that they can obtain vitality from fat and glycogen as quickly as possible. Oxygen-consuming activities generate endurance for games and are also the most important sort of activity for health since they increase the productivity of the heart, circulation, and muscles. Aerobic exercise is the foundation of wellbeing; by performing high-impact activities, the body's lean system is built. This exercise is designed to produce a sustained increase in heart rate and whose energy cost can be met by the body from aerobic sources i.e. from increased oxygen consumption **(Kusumgar, *et al.*, 1998)**.

Aqua Aerobic Training (AAT)

Aerobic training is essential for soccer players, who play two 45-minute halves in a row. Aquatic aerobic training is referred to as water or aqua aerobics, workouts are performed in shallow water and participants are immersed in water. It is a type of resistance training that is done in waist-deep or deeper water without swimming. Water exercise is less stressful on joints and muscles than jogging. Water exercise, by giving a cardiovascular workout, can supplement typical aerobic training methods such as distance jogging. It also adds diversity to the training programme, which keeps things interesting and prevents monotony.

Aqua aerobics is the performance of aerobic exercises in water. Aquatic aerobic exercise can be executed as a special segment of workout or as a warm-up to the rest of the water activities. At the moment, aqua aerobics is one of the aquatic programmes that health professionals, athletes, and practitioners are most familiar with. This recognition could be attributed to the variety of movements that can be performed using the properties of water to create resistance to motion with less neuromuscular activity required from the antigravity muscles, as well as the organic changes caused by hydrostatic pressure, buoyancy, and thermodynamics **(Barbosa *et al.*, 2009)**.

Floor Aerobic Training (FAT)

Floor aerobics are aerobics that are often practiced without the use of any apparatus. In other words, the only equipment required for floor aerobics is a floor. This type of aerobic exercise can be done in a variety of ways. Floor aerobics frequently use circuits of dance-like actions to raise the heart rate, burn calories, and provide some muscular development. The majority of floor aerobics routines are performed to lively music, and the steps are timed to the rhythms of the songs. Aerobic exercise can increase blood flow and oxygen transmission capacity, and promote blood circulation and inner metabolism. It can also help enhance the function of heart and lung, increase bone density to prevent from, osteoporosis fight against aging, prevent the happening of, disease and help improve attitude to keep good mood **(Sheng, 2015)**.

Methodology

Sixty (60) physically active and enthusiastic football players from Juvenile Association club (JAC), Kakching, Manipur ranging in age from 18 to 21 years, were chosen at random as participants. The participants were split into three groups, aerobic training (FAT), floor aerobic training (FAT) and the control group (CG), each consisting of twenty (20) subjects. VO_2max

were chosen as the criteria variable. The 12 minute run and walk test was used to determine VO_2max.

Training Programme

For the purpose of the study the researcher distributed the sample into three groups. The Group-I & Group-II as experimental group with the training programme of aqua aerobic & floor aerobic trainings respectively. Group- III was the control group they were not assigned any specific training programme. The researcher conducted the training programme three times a week in the evening for twelve weeks, with a 45- 60 minute session on each day. The training programme includes 8 exercises that cover all major muscle groups in the body. The programme was designed with 2-sets of 10 to 15 reps. per exercise in the initial phase and gradually increased the intensity by increasing the repetition of the exercise as the programme advanced.

Statistical Analysis

SPSS version 22 (Statistical Package for Social Sciences) was used for all statistical analyses. The data was statistically evaluated using the sample t-test and analysis of covariance (ANCOVA) to detect differences across the study groups. In addition, the Scheffe's post hoc test was utilized to identify any paired mean differences that may exist. The 0.05 threshold of significance was used to determine the individual effect.

Analysis of VO_2 Max

The table - 1 presents a descriptive analysis of the data, including mean, standard deviation, mean difference, t-ratio and percentages of change for aqua aerobic training, floor aerobic training and control groups.

Table - 1

Descriptive Analysis of the Data on VO_2 Max of Experimental and Control Groups

Group	Tests	VO_2 Max	MD	% of Changes	't'-ratio
Aqua Aerobic Training (AAT)	Pre (M ± SD)	42.80 ± 0.11	3.76	8.78	16.67*
	Post (M ± SD)	46.56 ± 1.24			
Floor Aerobic Training (FAT)	Pre (M ± SD)	42.88 ± 0.63	1.98	4.61	12.04*
	Post (M ± SD)	44.86 ± 0.75			
Control	Pre (M ± SD)	42.42 ± 0.84	0.25	0.25	3.51
	Post (M ± SD)	42.67 ± 0.78			

Table t-value at 0.05 level of significance for1 and 19 df 0.433.

The obtained t-ratios of 16.67, 12.04 on VO_2max are higher than the required table value of 0.433. It is clear that there was a significant difference between pre and post tests on VO_2max of AAT and FAT groups. Also, the results revealed that AAT increased VO_2max by 8.78% and FAT by 4.61%.

Figure - I
Pie Diagram for Experimental and Control Groups

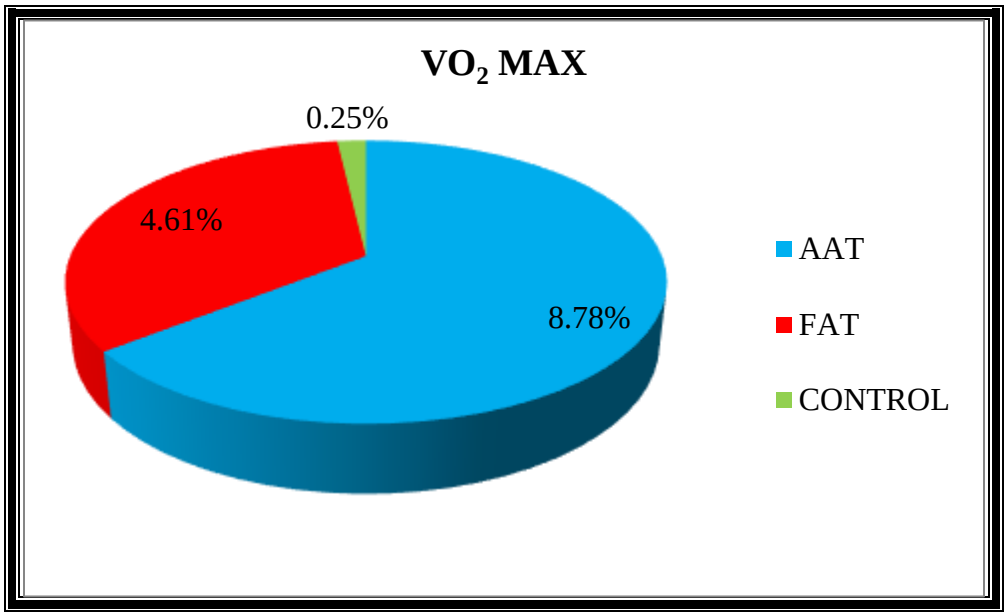


Table - 2
Adjusted Post Test means of VO_2 Max of Experimental and Control Groups

Adjusted Post Test Mean	Aqua Aerobic Training (AAT)	Floor Aerobic Training (FAT)	Control	S O V	SS	df	MS	'f'- ratio
VO_2 Max	46.80	44.73	42.88	BG	121.52	2	60.76	85.66*
				WG	39.72	56	0.70	

Table t-value at 0.05 level of significance for 2 and 56 df 3.16.

The adjusted post-test mean values of AAT, FAT and control groups are 46.80, 44.73 and 42.88 on VO_2max respectively. The obtained 'F' ratio of VO_2max 85.66 which was greater than the required table value of 3.16 for df 2 and 56 for significance at 0.05 level of confidence. It was concluded that, there was a significant differences exist among the AAT, FAT, and control groups on VO_2max.

Table -3

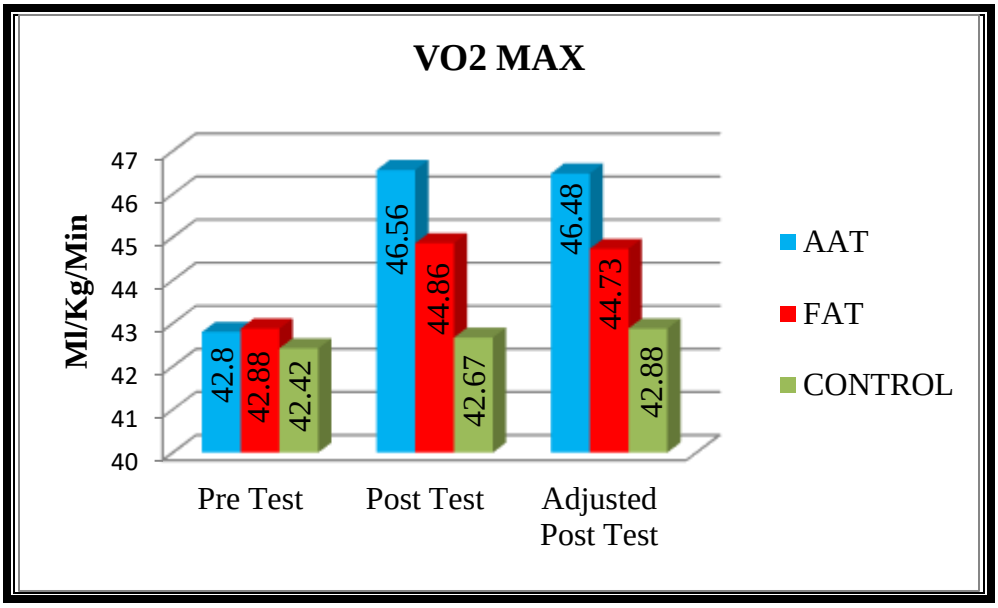
Scheffe's Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on VO_2 Max

Dependent Variables	Aqua Aerobic Training (AAT)	Floor Aerobic Training (FAT)	Control	Mean Difference	Confidence Interval
--	46.80	44.73	--	2.07*	0.66
--	46.80	--	42.88	3.92*	0.66
--	--	44.73	42.88	1.85*	0.66

The Scheffe's post hoc test analysis proved that significance mean differences existed between AAT & FAT groups, AAT & control groups, FAT & control groups on VO_2max. Since, the mean differences 2.07, 3.92 and 1.85 are higher than the confident interval value 0.66. Hence, it is concluded that due to the effect of AAT and FAT the VO_2max was significantly improved in soccer players. It was also concluded that AAT group was better than FAT and control groups in improving VO_2max in soccer players.

Figure - I

Graphical Representation of Pre, Post and Adjusted Post Tests Data on Vo_2 Max of Experimental and Control groups



Discussion

The soccer players VO_2max improved as a result of aqua aerobic training (AAT- 8.78%) and floor aerobic training (FAT–4.61%). Both the experimental groups show better improvement while compared to control group. When between the experimental groups were compared, the AAT group outperformed than FAT group.

The present finding is consistent with earlier research done by **Nagaraj & Senthil Kumar (2020)** results reported that the aqua aerobic exercises and aerobic exercises had significantly improved in VO_2max among school men understudies. And also their study confirmed that the water aerobic exercises better than the aerobic exercises for the enhancement of VO_2max. **Madhankumar & Sundar (2017)** also found that six weeks of aqua aerobic exercise group (AAEG) and aerobic exercise group (AEG) improved VO_2max level of college men students. **Davidson & McNaughton (2000)** analyses also indicated that both the deep water running (DWR) training and road running (RR) training significantly ($p < 0.001$) increased VO_2max of untrained women. The positive impact of aqua and floor aerobic training on VO_2max is supported by previous studies conducted by **Lohote (2021)** who found that 6 weeks of aqua and ground exercise training has a significant impact on breath holding capacity, vital capacity, respiratory rate resting heart rate and blood pressure among School boy students.

Conclusion

From the results of the study and discussion, the following conclusions are drawn.

1. Due to the influence of aqua aerobic training (AAT) and floor aerobic training (FAT) the VO_2max of soccer players was significantly improved.

2. Aqua aerobic training (AAT) and floor aerobic training (FAT) was better than the control group while improving VO_2max of soccer players.

4. Aqua aerobic training (AAT) was better than the floor aerobic training (FAT) in improving VO_2max of soccer players.

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