INVESTIGATION OF THE CHANGES IN ENDURANCE AMONG BASKETBALL PLAYERS IN THE UNITED ARAB EMIRATES DUE TO DIFFERENT COMBINED TRAININGS.

Mrs.Viji.R[1], Dr. P. Vanithamani[2]
[1]Ph.D. Scholar, [2]HOD
[1,2] Dept. of Physical Education, Avinashilinkam University, Coimbatore, Tamil Nadu, India.

ABSTRACT
This study aimed to investigate the impact of various combined training methods on endurance among basketball players in the United Arab Emirates. Sixty female basketball players aged 12 to 18 from three secondary schools—Gulf Indian School Dubai, Our Own School Dubai, and Cambridge International School Dubai—participated in the study. Group I (n = 15) underwent aerobic and plyometric training, Group II (n = 15) received aerobic and speed training, Group III (n = 15) engaged in plyometric and speed training, while Group IV (n = 15) served as the control group. Each group underwent twelve weeks of training three days a week. Endurance was assessed using a sit-ups test before and after the training period. Statistical analysis employed the paired "t" test and Analysis of Covariance (ANCOVA), with the Scheffé S test conducted as a post-hoc test when significant differences were observed in the adjusted post-test means at the 0.05 significance level. The study revealed that all three combined training approaches had a positive impact on endurance compared to the control group. Specifically, participation in aerobic and plyometric training showed greater potential for enhancing speed among female basketball players compared to other training methods.

KEYWORDS:- Aerobic with plyometric training, Plyometric with speed training, Aerobic with speed training, Basketball and Endurance

STATEMENT OF THE PROBLEM

This study aims to explore the impact of different combined training approaches on endurance among basketball players in the United Arab Emirates.

INTRODUCTION

Cross-training is a method that combines various training modalities to enhance strength and endurance, moving beyond the confines of an athlete's primary sport or activity. It encompasses endurance, strength, flexibility training, and balance-enhancing exercises, recognizing the interconnected nature of muscles, tendons, and ligaments in the body.

This holistic approach of combination training fosters a natural and functional synergy among muscles, akin to real-life movement patterns. By integrating diverse exercises into a training regimen, cross-training aims to boost overall fitness and performance in one's main sport or activity, catering to athletes and individuals of all ages and fitness levels.

Aerobics entail endurance activities that elevate heart rates for extended periods, promoting cardiovascular health by enhancing oxygen delivery to working muscles. The term "aerobic" signifies the utilization of oxygen in metabolic processes, underscoring the intricate mechanisms underlying aerobic exercise benefits.

Plyometric exercises involve explosive jumps that engage large muscle groups through rapid and forceful contractions, leveraging the stretch-shortening cycle where muscles rapidly lengthen and shorten to generate power efficiently.

In speed training, long-term adaptations in both muscles and neural pathways lead to enhanced performance. Focused speed drills following a proper warm-up are crucial for optimizing neuromuscular responses and performance gains.

Endurance encompasses both maximal force output by muscles and the ability to sustain force over time before fatigue sets in. Muscular endurance reflects a muscle group's capacity for prolonged exertion, contributing to overall musculoskeletal health and function.

METHODOLOGY

The study involved sixty female basketball players aged 12 to 18 from three secondary schools in the UAE—Gulf Indian School Dubai, Our Own School Dubai, and Cambridge International School Dubai. Group I (n = 15) received aerobic and plyometric training, Group II (n = 15) underwent aerobic and speed training, Group III (n = 15) engaged in plyometric and speed training, while Group IV (n = 15) served as the control group. Each group underwent twelve weeks of training three days a week. Endurance was assessed using a sit-ups test before and after the training period to evaluate the effects of the interventions.

ANALYSIS OF DATA

The descriptive analysis shows means, standard deviation, percentage of improvement, mean differences and 't' ratio of the collected data on endurance among experimental and control groups are presented in table-I.

Table –I

Descriptive analysis of the data on endurance of experimental and control groups

(Unit of Measurement - Counts)

Training	Pre-test		Post-test		M.D	% of changes	't' ratio
	Mean	S.D	Mean	S.D			
APTG	25.200	1.264	30.333	0.723	5.133	16.92 %	9.124*
PSTG	25.466	0.915	27.133	0.833	1.667	6.14 %	4.342*
ASTG	25.333	0.975	29.000	0.845	3.667	12.98 %	5.139*
CG	25.266	1.099	25.600	0.828	0.334	0.10 %	0.486

Table t-ratio at 0.05 level of confidence for1 and 14 (df) = 2.145

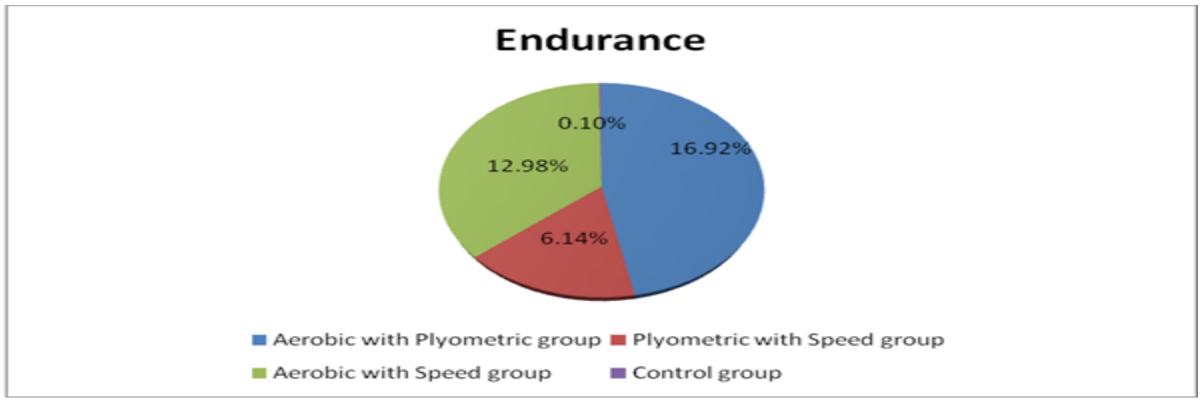
The obtained 't' ratio of aerobic with plyometric training, plyometric with speed training and aerobic with speed training are 9.124, 4.342, and 5.139 which are greater than the required table value of 2.145 at 0.05 level of significance for df 1 and 14. It is clear that there was a significant difference between pre-test and post-test on endurance of aerobic with plyometric training, plyometric with speed training and aerobic with speed training groups. However, the't' ratio of the control group was 0.486, which was less than the required table value of 2.145 for df 1 and 14 at the 0.05 level of significance. As a result, it's clear that it was found insignificant.

From the findings, it shows that aerobic with plyometric training caused 16.92 % increased in endurance, 6.14 % increased in plyometric with speed training, 12.98 % increased in aerobic with speed training and 0.10 % changes in the control group.

The percentage of changes on endurance of experimental and control group are given in figure-I.

Figure – I

Pie diagram showing the percentage of changes on speed of experimental and control groups



The data collected from the experimental and control groups on speed was statistically analysed by ANCOVA and the results are presented in table- II.

Table – II

Analysis of covariance on speed of experimental and control groups

APTG	PSTG	ASTG	CG	SOV	SOS	df	M.S	f-ratio
30.342	27.122	28.999	25.604	**B**	194.648	3	64.883	98.230
				W	36.329	55	.661	

***Significant at 0.05 level of confidence.*

(The table value required for significance with df 3 and 55 is 2.77)

The adjusted post-test mean values on speed of aerobic with plyometric training, plyometric with speed training and aerobic with speed training and control group are 30.342, 27.122, 28.999 and 25.604 respectively. The obtained 'F' ratio of 98.320 for adjusted post-test score was greater than the required table value of 2.77 for df 3 and 55 for significance at 0.05 level of confidence on endurance. It proved that, the differences exist among the adjusted post-test means of aerobic with plyometric training, plyometric with speed training and aerobic with speed training on endurance.

The 'F' value in the adjusted post-test means was found significant, hence Scheffe's test was applied to assess the paired mean of endurance difference and the results are presented in table-III.

Table – III

Scheffe's post hoc test for the differences among adjusted post-test paired means of experimental and control groups on endurance

APTG	PSTG	ASTG	CG	M.D	C.I
30.342	27.122			3.22	0.156
30.342		28.999		1.343	
30.342			25.604	4.738	
	27.122	28.999		1.877	
	27.122		25.604	1.518	
		28.999	25.604	3.395	

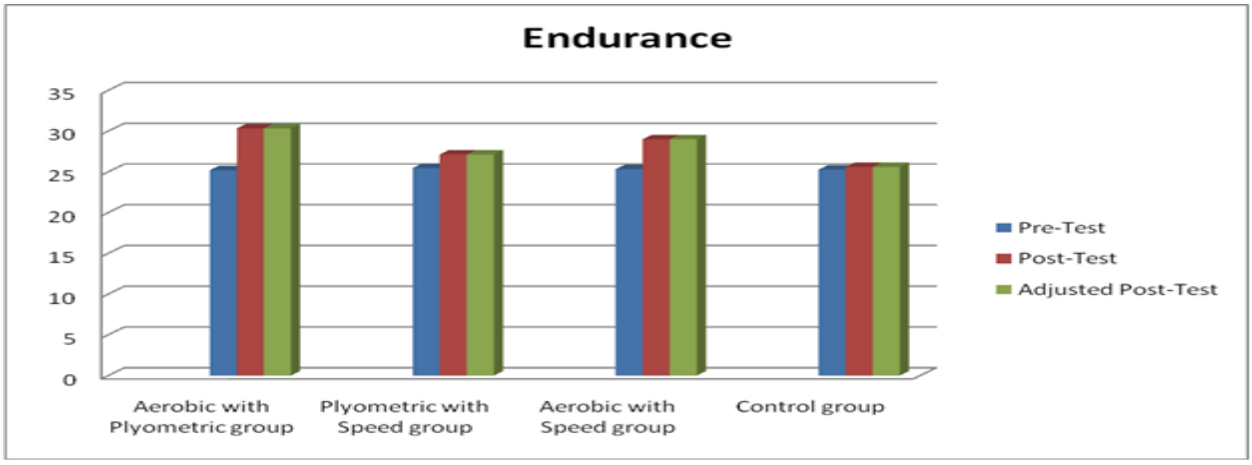
**Significant at 0.05 level*

As the confidence interval required to be significant at 0.05 levels is 0.156 and the obtained values are greater than the required value, it is observed that the significant difference is found to be existed.

The ordered adjusted means on endurance are illustrated through bar diagram for better understanding of the results of this study in Figure-II.

Figure – II

Bar diagram showing the mean values on endurance of experimental and control groups



RESULTS

1. It was concluded that due to the effect of aerobic with plyometric training, plyometric with speed training and aerobic with speed training the endurance was significantly improved among female basketball players.
2. It was also concluded that aerobic with plyometric training group was better than other training groups in increasing endurance among female basketball players.
3. From the findings, it shows that aerobic with plyometric training caused 16.92 % increased in endurance, 6.14 % increased in plyometric with speed training, 12.98 % increased in aerobic with speed training and 0.10 % changes in the control group.

CONCLUSION

When compared to the control group, the effects of aerobic with plyometric training, plyometric with speed training, and aerobic with speed training are all seen in terms of endurance. According to the study's findings, female basketball players might increase their speed more quickly by participating in an aerobic and plyometric training group as opposed to another type of training.

RECOMMENDATIONS

The following recommendations were drawn, from the results of the present study:

1. To assist all basketball players, combined training may be included to the curricula of schools and universities.
2. It is advised that coaches, physical educators, and fitness trainers combine their instruction to positively impact basketball players' game-related fitness factors.
3. For the benefit of players, the government and educational authorities may step up and propose adding basketball games to physical education curricula in schools and colleges.

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