Effect Of Training On Physiological And Performance Abilities Of Female Artistic Gymnasts

Gandi Rama Devi,
Physical Director, TSWRDCC, Sangareddy, Telangana, India
Prof.K.Deepla,
Head, Department of Physical Education, UCC&BM, OU, Hyderabad, India

Abstract:
This study was designed to investigate the effect of physiological and performance abilities through specific treatment on female gymnasts of Hyderabad. The scholar selected 45 subjects who are taking training regularly from different institutions and clubs. Their age ranged between 15-18 years. The protocol for the physiological and performance abilities data was collected by Harvard step test for cardiovascular efficiency and Cooper 12 minutes run/walk for VO2max. The performance abilities data were collected by Upstarts test for testing uneven bars ability and Leap jump for testing balance beam ability. T-Test was used to find out the significant difference in Physiological and performance abilities on anaerobic and circuit training (treatment) gymnasts. ANOVA used for significant variation among groups. The level of significance was fixed at 0.05. After examination, there was a significant difference in cardiovascular efficiency and VO2max as well as performance abilities in female gymnasts
Keywords: Gymnastics, physiological abilities, cardiovascular efficiency,VO2max.

I.   Introduction:

Gymnastics is a sport that involves a variety of physical movements and routines that require physical and physiological abilities. It is a discipline that can be practiced by people of all ages and skill levels, from recreational to elite athletes competing at the international level.

Artistic gymnastics, rhythmic gymnastics, acrobatic gymnastics, trampoline gymnastics, and tumbling gymnastics are included in gymnastics. Each discipline has complex techniques on different apparatus. It is a sport that involves a variety of physical movements and routines that require a high amount of physical capacities and abilities. Many elite gymnasts are competing at the national and international level as well.

Artistic gymnastics is a discipline that involves performing a variety of physical movements and routines on different apparatus such as the vault, uneven bars, balance beam, and floor exercise.

Anaerobic Training

The anaerobic training type is a short burst of intense activity that is more effective in increasing physiological variable cardiovascular endurance, VO2max and gymnastics performance abilities i.e. upstarts for uneven bars and leap jump for balance beam.

Circuit Training

Circuit training exercises perform in circle shape with different kinds of exercise in stages. This training helped a lot towards development of physiological variable cardiovascular endurance and gymnastics performance abilities i.e. upstarts for uneven bars and leap jump for balance beam.

The main aim of this study is to analyse the effect of anaerobic and circuit training on physiological variables and performance variables of female artistic gymnasts of Hyderabad. The physiological abilities are essential fitness components apart from other fitness components during training programs and to perform well in high level competitions as well.

Selection of the Subjects:

The scholar had selected a total of 45 subjects randomly from the different training centres of Hyderabad, Telangana, India who had been practicing various institutions and clubs. The subjects were women artistic gymnasts. For this research work the women subjects range between the 15-18 years of age and participated voluntarily with informed consent.

Selection of variables

The research scholar opted for cardiovascular efficiency and VO2 max. as physiological variables and uneven bars efficiency and balance beam ability were the performance variables of artistic female gymnasts.

II. Materials and Methodology

The total women gymnastic subjects were 45 and aged between 15-18 years. These subjects were divided into three equal groups and selected randomly. The first group was assigned to Anaerobic (N=15), the second circuit training (N=15) and the third group was the control group (N=15).

Before study starts the scholar has collected pre test data by applying the entire relevant tests i.e. Harvard step test and Cooper 12 minutes run/walk for physiological and performance variables were Upstarts and Leap jump test. Among women gymnasts the scholar started giving treatment for three days anaerobic and three days circuit training alternatively to the respective experimental groups in a week however the third group i.e. control group was not assigned any specific training program except their regular routine work. The total period of time was 8 weeks. After 8 weeks the scholar conducted again physiological and performance abilities as prior to the study.

Statistical tools used for analysis

The raw data were arranged separately, tabulated and subjected for the descriptive statistical analysis by using SPSS. The statistical tool for analysing the data was paired T-Test to find the significant difference in mean and ANOVA used for between groups. The level of significance was fixed at 0.05.

III. Results:

The study related data are presented in the following tables and graphs below:

Table No:1 Statistical interpretation on Physiological Variables of female gymnasts

Groups		Pre_CVE	Post_CVE	t /sig	F/Sig	Pre_VO2max	Post_VO2max	t /sig	F/Sig
Anaerobic	*Mean*	72.13	77.60	-2.84		28.91	31.03	-28.00	
	SD	5.34	5.12	.001*		4.39	4.36	.000*	
Circuit	*Mean*	63.00	69.00	-11.61	60.14 .000*	21.81	25.14	-8.67	55.68 .000*
	SD	3.59	2.62	.000*		4.49	4.39	.000*	
Control	*Mean*	61.93	62.00	-0.15		12.70	15.09	-13.01	
	SD	2.75	2.62	0.89**		2.79	2.76	.000*	

*CV-Cardiovascular Efficiency, **NS-not significant,*S-significant*

Table 1 indicates the differences among three groups on physiological variables i.e. cardiovascular efficiency and VO2max. The treatment groups had significant improvement by intervention of 8 weeks specific exercises. However, the control group did not change much from pre-test to post test. Anaerobic group and circuit group were statistically significant in cardiovascular efficiency;'t' (14) values were -.2.84(.000)-11.619(.000), -.147(.885). In VO2max. the circuit group had higher results than other groups; 't'(14) values were -28.001(.000),-8.67(.000) and -16.01(.000). The ANOVA results indicated that there was significant difference in groups and within the groups; the F=60.13(.000) and F=55.68(.000) respectively. The mean difference was shown in the below graph.

Graph No.1 Comparison of physiological variables among groups
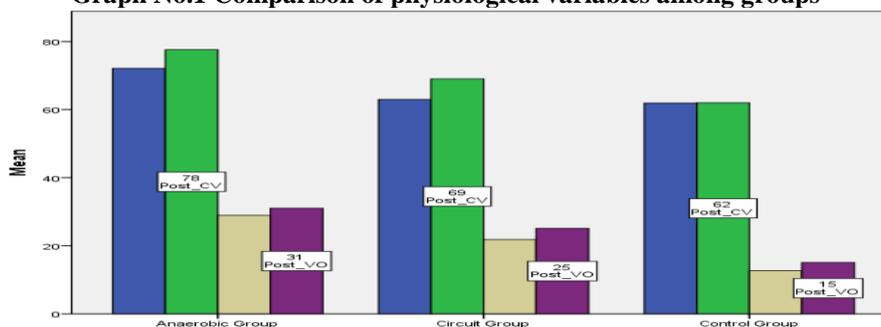
Table No.2 Statistical interpretation on Performance in gymnastics of female gymnasts

Groups		Pre_US	Post_US	t /sig	F/Sig	Pre_LJ	Post_LJ	t /sig	F/Sig
Anaerobic	Mean	11.60	14.33	-8.27	44.24 .000	13.60	15.80	-7.43	22.74 .000
	SD	2.29	2.97	.000		1.93	2.38	.000	
Circuit	Mean	8.73	10.33	-4.98		10.87	12.73	-4.00	
	SD	2.16	2.95	.000		2.34	3.36	.000	
Control	Mean	5.53	5.07	2.82		9.47	8.67	-57.08	
	SD	1.17	1.30	.001		2.42	2.28	.000	

US- Upstarts, LJ-Leap jump

Above table describes the performance variables i.e. uneven bar efficiency and balance beam ability in gymnastics. The experimental groups had significant improvement through the treatment of 8 weeks. The control group did not improve much from pre-test to post test. Anaerobic group subjects had better performance in uneven bars efficiency and balance beam ability 't' (14) values were -.8.27(.000)-7.43(.000) than circuit group -.4.98(.000)-4.0(.000) respectively. The ANOVA results indicated that there was significant difference between groups and within the groups the F=44.24(.000) and F=22.74(.000) respectively. The mean differences was shown in the below graph.

Graph No:2 Comparison of performance abilities in gymnastics among groups
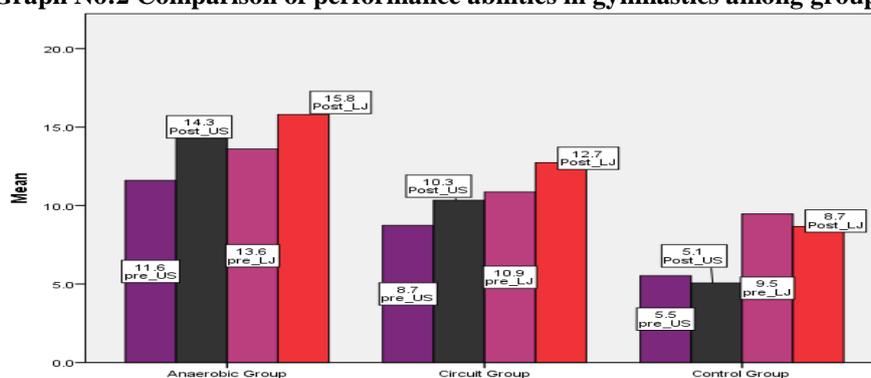
IV.   Discussion and conclusion

The results showed that there was a significant effect in cardiovascular efficiency and VO2max through anaerobic and circuit training. The impact of these physiological abilities certainly influenced performance abilities like uneven bars and balance beam abilities of women gymnasts. Similar results found in Piotr SAWICKI et.al. (2017) explained young gymnasts may significantly influence aerobic capacity parameters and Seemann SINN Alexander et.al (2022) results showed specific HITT improves specific endurance performance among pommel horse gymnastics.

V.   Recommendations

1. A similar study may be recommended on male gymnasts.
2. These reasons for improvement of abilities on performance would be more authenticated and reliable if further study taken up on psychological factors on the same female gymnasts.

References

[1]. SINN Alexander Et.Al Et.Al. Effects Of Specific High-Intensity Interval Training On Endurance Performance On Pommel Horse And Arm Ergometer, Journal Of Physical Education And Sport ® (JPES), Vol. 22 (Issue 5), Art 153, Pp. 1219 - 1226, May 2022

[2]. Piotr SAWICKI Et.Al (2022)The Effects Of Gymnastics Training On Selected Parameters Of Anaerobic Capacity In 12-Year-Old Boys,The Journal Of Sports Medicine And Physical Fitness · April 2017.

[3]. Fehlings D, Vajsar J, Wilk B, Stephens D, Oded BO. Anaerobic Muscle Performance Of Children After Long-Term Recovery From Guillain- Barre Syndrome. Dev Med Child Neurol 2004;46:689-93.

[4]. Montgomery Dl, Beaudin Pa. Blood Lactate And Heart Rate Response Of Young Females During Gymnastic Routines. J Sports Med Phys Fitness 1982;22:358-65.

[5]. Koutedakis Y, Sharp NC. A Modified Wingate Test For Measuring Anaerobic Work Of The Upper Body In Junior Rowers. Br J Sports Med 1986;20:153-6.

[6]. Marina, M. & Rodríguez, F. (2014). Physiological Demands Of Young Women's Competitive Gymnastic Routines.Biology Of Sport, 31 (3), 217-222.