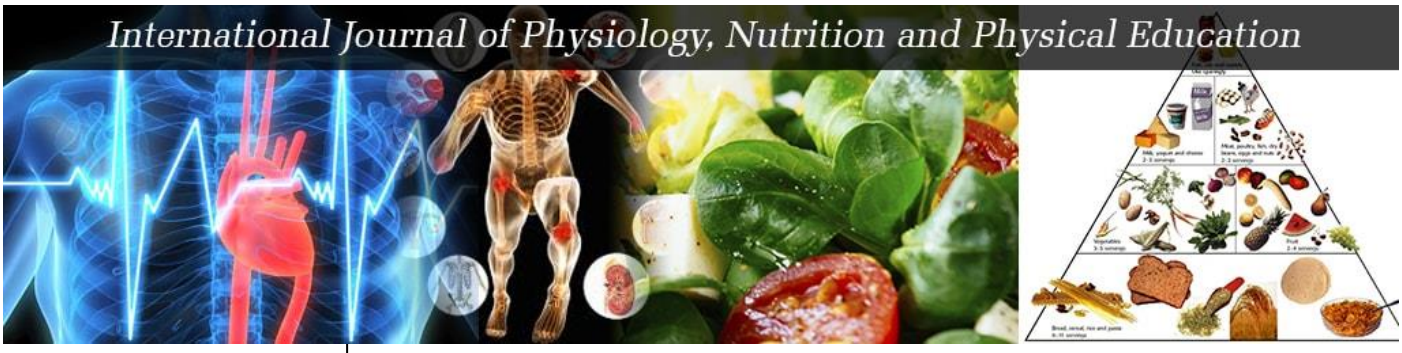

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Outcome of physical exercises on development of motor skill in children with autism

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Abstract
The purpose of the study is to find out the motor development in children with autism spectrum disorder through physical exercises. 20 autism spectrum disorder children with age group of 5 to 6 were selected for this study and prior consign was taken from their parents for this research work. Twenty children were divided in to 2 groups with 10 children in experimental group and 10 in control group and the children in control group did not participate in any of the physical exercises. Pretest taken for the 20 children before the training selection and after 4 days for 16 weeks of training with various physical exercises posttest was taken and the data was statistically calculated using ANOVA. The result confined there was a significant motor development and movement time development after 16 weeks of training in the children with autism spectrum disorder.

Keywords: Physical exercise, Autism, motor skill, movement time

Introduction
"Autism" is a developmental disability significantly affecting motor development, verbal and nonverbal communication and social interaction, generally evident before age 3 that adversely affects a child's educational performance.

Physical exercises
Exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons, including increasing growth and development, preventing aging, strengthening muscles and the cardiovascular system, honing athletic skills, weight loss or maintenance, and also for enjoyment. Many individuals choose to exercise publicly outdoors where they can congregate in groups, socialize, and enhance well-being. Many with disabilities can safely and successfully participate in general physical education, with accommodations and supports. However, some children benefit from specially designed or adapted physical education. Content in adapted physical education should mirror the general physical education curriculum to the greatest extent possible

Gross motor skills
Gross motor skills are movements that involve using the large muscles of the body. The development of gross motor skills starts as soon as a child is born. As children age, their gross motor abilities continue to develop and improve. Boys usually develop gross motor skills much sooner than girls, with the exception of skills that involve balance and precise movements (i.e., skipping and hopping). Children rely on gross motor skills to engage in physical play. For example, playing a game of tag requires running after friends and reaching out and touching someone (gross motor skills). Children also rely on gross motor skills for everyday activities, such as walking in and out of a room.

Other examples of gross motor skills include
- Running
- Climbing up a tree
- Throwing a baseball
- Dribbling a basketball

Methodology

Physical exercises. 20 autism spectrum disorder children with age group of 5 to 6 were selected for this study and prior consignee was taken from their parents for this research work. Pretest taken for the 20 children before the training selection and Twenty children were divided in to 2 groups with 10 children in experimental group and 10 in control group and the children in control group did not participate in any of the physical exercises. Children in experimental group participated in physical exercises for 4 days for 16 weeks of training with various physical exercises and posttest was taken after 16 weeks of training. The differences between the initial and final scores of the selected dependent variables were considered as the effect of experimental treatments. To test the statistical significance, the obtained initial and final scores were subjected to statistical treatment using ANCOVA.

Gross motor skill

Throwing ability (Muscle strength)

Test: Softball throw test

Purpose: Find out the gross motor skill development (Throwing ability).

Equipment: Brightly colored softballs, measuring tape, chunnam powder, whistle.

Procedure

The subjects stand behind a check mark and throw the softball using an overhead throw as far as they can. They were allowed to take a run up provided they did not cross the check mark. The distance from the check mark to the point at which the ball first landed was measured in meters and noted. A total number of 3 trails were given and the average of the best two were taken as the final score.

The differences between the initial and final scores of the selected dependent variables were considered as the effect of experimental treatments. To test the statistical significance, the obtained initial and final scores were subjected to statistical treatment using ANCOVA.

Table 1: effects of physical exercise on selected motor variable (throwing ability), movement time among children with autism

	Experimental Group	Control Group	S o V	Sum of Squares	df	Mean squares	F" ratio
Pre-Test Mean	2.24	2.25	B	33.7	1	16.8	0.00
SD	0.99	0.90	W	0.28	38	6.89	
Post test Mean	2.63	2.22	B	1.63	1	1.636	1.81
SD	0.99	0.89	W	34.19	38	0.90	
Adjusted Post Test Mean	2.63	2.22	B	1.68	1	1.68	214.74
			W2.5	0.29	37	0.008	

Required table F (df 1 and 38): 4.10 * Significant at 0.05 level

The results presented in Table 1 proved that adapted physical exercise training with pretest movement time mean score of 2.24 mts was increase to 2.63 mts after 16 weeks experimental treatment. The control group's pretest mean was 2.25, posttest mean 2.22. Since there is insignificant existed among the group adjusted posttest was analyzed to find out the significant difference among the group. The adjusted posttest mean of experimental group is 2.63 and control group is 2.22 The net effect on adjusted means of experimental and control group was determined by calculation of F value and the obtained F value of 214.7 was greater than the required table F value of 4.10 and was found to be significantly improved the throwing ability (motor development) children with autism at 0.05 level.

Table 2: effects of physical exercise on selected psychomotor variable, movement time among children with autism (Scores in Seconds)

	Physical Exercise Training	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	14.29	13.27	Between	7.91	1	7.91	1.26
			Within	175.74	28	6.28	
Post Test Mean	13.44	13.30	Between	0.15	1	0.15	0.03
			Within	134.43	28	4.80	
Adjusted Post Test Mean	13.8	13.4	Between	3.75	2	1.87	5.37*
			Within	9.42	27	0.35	
Mean Diff	0.85	0.03					

Required table F (df 1, 28): 4.20 * Significant at 0.05 level

The results presented in Table 2 proved that adapted physical exercises training with pre test movement time mean score of 14.29 seconds was reduced to 13.44 seconds after 16 weeks experimental treatment and the adjusted mean considering both pre and post test scores was 13.8 seconds. The control group's pre test mean was 13.27, post test mean 13.30 and adjusted post test mean was 13.4. The net effect on adjusted means of experimental and control group was determined by calculation of F value and the obtained F value of 5.37 was greater than the required table F value of 4.20 and was found to be significantly improved movement time of children with autism at 0.05 level.

Discussions

Children with autism vary in degrees of functioning share common behavioral and psychomotor characteristics. A specially designed instructional approach with positive social attitude is necessary when dealing with this population. Researches reveal that many of these individuals have developmental delays in the acquisition of basic motor skills. Further comparing as a group to their non-handicapped peers, intellectually challenged adolescents display low physical fitness and have perceptual-motor difficulties, which affect their learning. In addition, some possess physical characteristics, which pose constraints in learning and performing of motor skills. A social attitude of equality and acceptance plays a major role in their successful inclusion in society. (Aharoni H (2005) [1]. Keeping this in mind the investigator has adapted physical exercises for children with autism to do the experimental treatment with non-disabled children along with exercise, games, music and video display to gain more attention and concentration. The experimental

treatment was well followed by the subjects and the results presented in Tables 1 and 2 proved that as result of physical exercise for 16 weeks, the psycho motor variables, movement time and throwing distance were improved significantly compared to control group. The improvement was found to be significant at 0.05 level.

The findings of this study were in agreement with the findings of Owlia, French, Ben-Ezra, and Silliman (1995) [7] who used music and music videos to increase the time on task of five adolescents with profound intellectually disabled (ID). Cluphf D, O'Connor J, Vanin S. (2001) [5] also found aerobic dance improved aerobic fitness of adults with ID. Inchulkar Shilpa and Venugopal Reeta (2013) determined the effect of 10-weeks exercise program on psychomotor ability (reaction ability and speed of movement time) of mentally challenged (MC) children and found significant difference in pre and posttest measurements in all studied variables in the experimental group under study ($p<0.05$).

Conclusion

The adaptation of exercise, sports, games with non-disabled exercise partners along with music and video display make the autism children involve in the experimental treatment which can be followed future researchers.

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