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Effects of adapted physical exercise on development of reaction time among children with autism

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Abstract

The aim of this study was to suggest suitable adaptation for physical exercise for the benefit of children with autism and to find out the effect of the same on selected psychomotor variables, such as, movement time and reaction time. For this purpose, the investigator selected 30 children with autism and divided into two groups, experimental (n=15) and control (n=15). The experimental group was asked to perform with normal peers group along with music and video display of the adopted physical exercise. Pre and post test scores on reaction time was collected and subjected to statistical analysis using ANCOVA. The results proved that there was significance on reaction time ($P < 0.05$) due to adapted physical exercise. It was concluded that the adaptation of physical exercise with non-disabled exercise partners along with music and video display make the children with autism involve in the experimental treatment which can be followed future researchers apart from the fact that it contributes for the beneficial improvement of selected psycho motor variables of the children with autism compared to controls.

Keywords: children with autism, adopted physical exercise and reaction time.

Introduction

Physical fitness is of great importance for all human being irrespective of age. Bucher (1985)^[3] explains physical fitness is the ability of an individual to live a full of balanced life. It involves physical, mental, emotional, social and spiritual factors and the capacity for their whole form expression. Human Psychomotor skills are organised patterns of muscular activities guided by changing signals from the environment. In research concerning psychomotor skills particular attention is given to the learning to co-ordinated activity of the arms, hands, fingers and feet. The role of verbal processes is not emphasized. (Oxendline, J.B., 1983)^[8]

The term children with autism is increasingly being used as a synonym for people with significantly below-average IQ. These terms are sometimes used as a means of separating general intellectual limitations from specific, limited deficits as well as indicating that it is not an emotional or psychological disability. Intellectual disability is also used to describe the outcome of traumatic brain injury or lead poisoning or dementing conditions such as Alzheimer's disease. It is not specific to congenital conditions like Down syndrome. Mental retardation is a term for a pattern of persistently slow learning of basic motor and language skills ("milestones") during childhood, and a significantly below-normal global intellectual capacity as an adult. One common criterion for diagnosis of mental retardation is a tested intelligence quotient (IQ) of 70 or below and deficits in adaptive functioning. (Badano, Jose L. et.al. 2006)^[2] People with mental retardation may be described as having developmental disabilities, global developmental delay, or learning difficulties.

Adapting a physical activity may refer either to technical adaptations, such as using assistive aids and adapting the game equipment, structural, for instance adapting rules and instructions of the game or educational, meaning adaptation of teaching methods or the way of practicing and teaching. Good adapted physical education should be associated to psychomotor, cognitive and affective domains of learning. The aims of adapted physical activity should be set down together with the instructor and the participants in order to commit oneself more to the process. (Sherrill, 2004)^[4]. Adapted physical activities strive to bring better fitness and healthier lifestyles through involving in regular fitness programs/exercises to all involved.

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People participating in these often gain and enjoy family support as well as physical fitness and motor skills. Such adapted programs will inspire people with intellectual disabilities to expand their horizons and become physically fit and grow mentally, socially and spiritually. (Sherrill, 2004) [4] Research efforts to increase physical activity by individuals with ID have produced relatively consistent and positive results. While many interventions have been short-term and some have methodological shortcomings (e.g. small sample size), it is beneficial to review the findings of previous work to guide future research and practice. Tomporowski and Jameson (1985) [9] paired adults with ID and nondisabled exercise partners over an 18-week walk/jog program. Partners assisted with pacing and provided ongoing verbal encouragement to motivate the participants with ID while they were engaging in activity. A similar approach was taken by Lavay and McKenzie (1991) [6] who reported that five men with ID actively participated in a supervised walk/jog program three days per week for 12 weeks. Aerobic fitness levels increased significantly as a result of participation. Most importantly, authors noted that once the training program was discontinued, the men continued to walk/jog three days per week for a year. These studies provide evidence that, with some supervision and encouragement, adults with ID will actively engage in short-term walking programs. Research work conducted by Owlia, French, Ben-Ezra, and Silliman (1995) [7] used music and music videos to increase the time on task of five adolescents with profound ID. The findings of these studies further indicate that individuals with ID will participate in physical activity and that level of engagement increases with positive extrinsic reinforcement. The effectiveness of a 12-week (three days/week) low-impact physical exercise program for improving cardiovascular endurance in adults with ID was examined. by Cluphf D, O'Connor J, Vanin S. (2001) [5] and found physical exercise motivating to individuals with ID. And aerobic fitness improved as a result of engaging in aerobic dance, attendance was high, and no individuals dropped out. 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 ($p < 0.05$) The theoretical foundations based on previous researchers have found that a right program exercise and athletic programs for mentally retarded children can be a therapeutic tool resulting in better weight management, development of physical coordination, maintenance of cardiopulmonary fitness, and improved self-esteem. Further, physical exercise may offer promise as an effective, benign, and practical adjunct to other treatment and management techniques. The discussion on the levels of psychomotor fitness of mentally challenged children proved that their psychomotor variables movement time and reaction time are to be studied further in relation to the adapted physical activities imparted to these children in the form of aerobic dance. In this research the investigator was interested to compare the influence of adapted physical exercise on the psychomotor variables of mentally challenged children.

Methodology

Pretest posttest design was used in this research. 30 children with autism (N = 30) were randomly selected for this study. The subjects who were selected for the study were leading purely sedentary life style. From the medical reports and other details of the subjects that the school posses, the researcher was able to mark out the educable intellectual challenged children who acted as the subjects for the study. The selected subjects were divided into two groups, namely, experimental group I to undergo adapted physical exercise, and the remaining group was considered as control group, which did not undergo any special treatment. Pre tests were conducted on all the 30 children before experimental treatments on reaction time. The experimental group underwent adapted physical exercise for 12 weeks. Each subject was paired with nondisabled exercise partners along with music and video demonstration so that the subjects were participated in the physical exercise exercises Immediately after completion of experimental period, post test scores were collected from all the 30 subjects, which formed the final scores on selected variables. 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.

Results

Table 1: Effects of Adapted Physical Exercise on Selected Psychomotor Variable, Reaction Time among Children with Autism (Scores in Seconds)

	Adapted Physical Exercise	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	0.50	0.50	Between	0.0006	1	0.0006	0.60
			Within	0.0268	28	0.0010	
Post Test Mean	0.45	0.50	Between	0.0251	1	0.0251	25.23*
			Within	0.0279	28	0.0010	
Adjusted Post Test Mean	0.43	0.48	Between	0.0238	2	0.0119	11.65*
			Within	0.0276	27	0.0010	
Mean Diff	0.0503	0.0011					

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

The results presented in Table 2 proved that adapted physical exercise training with pre-test reaction time mean score of 0.50 seconds was reduced to 0.45 seconds after 12 weeks experimental treatment and the adjusted mean considering both pre and post test scores was 0.43 seconds. The control group's pre test mean was 0.50, post test mean 0.501 and

adjusted post test mean was 0.48. The net effect on adjusted means of experimental and control group was determined by calculation of F value and the obtained F value of 11.65 was greater than the required table F value of 4.20 and was found to be significantly improved reaction time of children with autism at 0.05 level.

Discussions

Children with autism varying 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, children with autism/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 exercise for children with autism to do the experimental treatment with non-disabled children along with 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 proved that as result of adapted physical exercise for 12 weeks, the psycho motor variables, reaction time 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 physical exercise 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 physical exercise music and video display make the children with autism involve in the experimental treatment which can be followed future researchers. Further it was concluded that the adapted physical exercise beneficially altered children with autism compared to controls.

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