

The effect of eight weeks of educational games on selected motor skills and physical fitness in educable mental retardation boys (8-13 year old)

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ABSTRACT: The purpose of this research was to examine the effect of eight weeks of educational games on selected motor skills and physical fitness in educable mental retardation boys (8-13 years old) in Doroud city. The statistical population of this study was all male students of exceptional schools in Doroud city. 40 students were selected as sample. They were divided in to the control (N=20) and experimental group (N=20). The instrument was included Wechsler Intelligence Scale for exceptional children, Oseretsky Motor Developmental Scale, AAHPERD test, and Sinclair test for the assessment of hand-eye coordination skill. At first, subjects were familiar with the test in a session. Then, they participated in the pre-test. The experimental group was involved to educational games for 8 weeks and each session for 1 hour. The collected data were analyzed by independent and dependent t-test and Levene's test for equality of variances ($\alpha \leq 0.05$). The results of this study showed that eight weeks of educational games had a significant effect on the agility, flexibility, static balance, passing and receiving the ball. But those had no significant effect on the neuromuscular coordination, reaction speed, and precision jump.

Keywords: Educational games, physical fitness, motor skills, educable mental retardation children.

INTRODUCTION

Today, most studies is done about the effect of physical activities on physical fitness and motor abilities in healthy individuals and these studies pay less attention to abnormal people. It seems that it is essential that more studies is done about people with mental retardation due to the reinforcement of their physical fitness and motor abilities by the results of these studies and appropriate exercise programs. This overall impression that we should help all children with special needs so that they can attend in ordinary schools is now supported by educational and cultural organizations. Therefore, it is necessary for physical education experts should have the necessary knowledge about special needs, interests and motor abilities in students with physical, mental, and emotional disabilities. The participation in sport activities is one of these strategies to improve the physical condition. This can help to acquire the physical fitness, perceptual – motor abilities, and social appropriate effects. Many studies have shown the importance of play on children's physical and mental development. Guidetti (2007) examined the effect of a 6-months training period on basketball abilities in players with mental retardation. The results of this study showed that the training improved significantly the passing, receiving, dribbling, and shooting skills (Guidetti, 2007). Guidetti et al., (2009) assessed basketball in players with mental retardation after 4 months of training. The results of this study showed that passing, receiving, dribbling, and shooting skills improved significantly by the training program (Guidetti et al., 2009). Donahoe (2010) examined the effect of yoga postures on the balance, flexibility, and strength in healthy

high school females. The results of this study showed that the even weeks of yoga training had a significant effect on the balance, flexibility, and strength in healthy high school females (14-18 years old) (Donahoe, 2010). Yilmaz et al., (2009) studied the effect of water exercises and swimming on physical fitness in children with mental retardation. The results of this study showed that these exercises had a significant effect on cardiovascular endurance, muscle endurance, speed, static balance, and agility. Results showed that water exercises and swimming appear to be a viable and effective way to improve physical fitness capacity of the children with mental retardation (Yilmaz et al., 2009). Horvat (2005) concluded that balance trainings can improve the balance in male students with mental retardation. Also exercise has a positive effect on physical, mental, and behavioral performance. We can use exercise for the decreasing of mental and behavioral problems in mental retardation people and the regular programs of physical education can improve the physical condition in mental retardation individuals (Karahan et al., 2005). Lewis CL and Fragala-Pinkham (2005) examined the effects of aerobic conditioning and strength training on a child with Down syndrome. They stated that the body weight and flexibility were unchanged (Lewis CL and Fragala-Pinkham, 2005). Sheikh et al., (2003) studied the effect of school games on motor development in female students in the third year of 5 area of Tehran. The results of this study showed that school games had a significant effect on dynamic and static balance, coordination, speed and accuracy of movement. But those had no significant effect on the power (Sheikh et al., 2003). Lawrence (1968) studied the effect of consultant physical education program on the physical fitness in educable mentally retarded children. The results showed that consultant physical education program had a significant effect on the agility and flexibility. But those had no significant effect on precision the jump (Lawrence, 1968). Kordi (2000) concluded that common games in south areas of Tehran provide proper fields to acquire perceptual-motor abilities especially speed and balance in children (Kordi, 2000). Also, Noorbakhsh (2005) concluded that school games can increase the agility and dynamic and static balance in female students (Noorbakhsh, 2005). Some researchers recommend specific motor programs to improve perceptual-motor skills and physical fitness in mental retardation people. These activities can cause a significant progress in physical fitness and motor skills in children with mental retardation. Kosari and Hemayat-Talab (2012) stated that selected motor activities can have a significant effect on the dynamic balance and a positive effect on the static balance, speed, coordination, and accuracy. Also, exercise has a significant effect on the running speed, agility, balance, nerve and muscle coordination, and strength (Kosari and Hemayat-Talab, 2012). Subjects of these studies were over 17 years old and these studies were paid less attention to lower age groups. Karahan et al., (2005) stated that there was no significant effect on the reaction time in their study. However, there was a little information about the effect of educational games on physical fitness and motor skills in children with mental retardation. So, this study examined the effect of selected educable games on children with mental retardation (8-13 years old) with the increasing of sessions to 4 sessions in a week (the time of a session was one hour) to determine that the effect of selected activities will change with the changing of the numbers of sessions, time of each session, and the subjects' age.

MATERIALS AND METHODS

Method

The method of research was semi empirical and design of it included pre-test, post test with control group.

Participants

The statistical population of this study was all male students of exceptional schools in Doroud city. The students who had not physical health or were above or below the mean in terms of height and weight of a standard deviation were excluded (Table 1). 40 students were selected as sample with IQs between 70-50 (educable).

Instruments and Tasks

The instrument was included Wechsler Intelligence Scale for exceptional children, Oseretsky Motor Developmental Scale, AAHPERD test, Sinclair test for the assessment of hand-eye coordination skill, and a personal information form to record individual data (age, education level, weight, height, and IQ).

Procedure

Subjects were divided in to the control (N=20) and experimental group (N=20). Physical fitness and motor skills tests were considered for exceptional children's training in the first session and both groups were participated in the pre-test. Then, the experimental group carried out educational games including the rejecting the ball from the tunnel, the precision jump, the carrying the ball with the knee for 8 weeks (4 sessions every week, each week was one hour including 10 minutes warm up, 5 minute educational games, and 5 minute cool-down).

Data Analysis

The collected data were classified by descriptive statistical methods and were analyzed by independent and dependent t-test and Levene's test for equality of variances ($\alpha \leq 0.05$).

Table 1. The subjects' descriptive information

Variable	Group	Mean and SD	Minimum	Maximum
Weight	Experimental	5/09 ± 28/26	22	38
	Control	4/8 ± 30/4	23	37
Height	Experimental	8/08 ± 133/9	119	153
	Control	0/9 ± 135/8	115	154
Age	Experimental	1/7 ± 9/55	8	12
	Control	1/38 ± 10/7	8	12

RESULTS AND DISCUSSION

Results

Kolmogorov - Smirnov test was used to determine the normal distribution of data and Levene's test was used for homogeneity. The results showed that all variables data have normal distribution except the agility. The results of table (2) show the effect of eight weeks of educational games on the agility was shown in the control and experimental groups.

Table 2. The results of independent and dependent t-test for the analysis of agility test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	4/6 ± 15/89	5/4 ± 15/46	2/7 (decrease)	-3/68	0/002
Control	1/9 ± 14/46	2/2 ± 15/9	9/9 (increase)	-4/28	0/0001
Independent t	1/28	-0/39			
P	0/21	0/7			

Results of table (2) showed that the mean of post-test has changed in the control and experimental groups than the pre-test. There was a 7.2 % decreasing in the experimental group that this decreasing was significant. It means that the record of agility has decreased significantly by educational games in the experimental group. Also, it was observed a 9/9% increasing in the post-test of agility in the control group that this increasing may be due to the inactivity and lack of exercise. While the record of agility changes usually in repetition of tests. There was no significant difference between the control and experimental groups in the agility in the pre-test and post-test. This showed similar results in both groups. But, it was observed a significant decreasing in the post test of experimental group and a significant increasing in the post test of control group.

Table 3. The results of independent and dependent t-test for the analysis of flexibility test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	5/8 ± 20	6/1 ± 21/9	9/5 (increase)	-2/36	0/30
Control	8/9 ± 22/1	9/02 ± 20/9	5/4 (decrease)	-4/28	0/90
Independent t	-0/88	0/41			
P	0/39	0/68			

Results of table (3) showed that the mean of pre-test and post-test had a significant difference in the experimental group. There was a 9/5 % increasing in the experimental group due to educational games that this increasing was significant. It means that the flexibility has increased significantly by educational games in the experimental group. It was observed a 5/4% decreasing in the flexibility of control group with the comparison of mean of pre-test and post-test that this decreasing was not significant. The comparison of mean of the control and experimental groups showed

that there was no significant difference between the control and experimental groups in the pre-test and post-test. This means that the mean of the pre-test and post-test was similar in both groups. We can conclude that effect of eight weeks of educational games had a significant effect on the flexibility in educable mental retardation children.

Table 4. The results of independent and dependent t-test for the analysis of static balance test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	16/4 ± 15/49	38/3 ± 40/88	163/9 (increase)	3/29	0/004
Control	34/9 ± 37/39	26/9 ± 27/55	26/32 (decrease)	0/99	0/33
Independent t	2/56-	1/27			
P	0150/	0/21			

Table 5. The results of independent and dependent t-test for the analysis of pass test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	3/1 ± 4/15	5/8 ± 9/6	131/33 (increase)	-6/12	0/0001
Control	3/35 ± 6/1	2/83 ± 5/65	7/4 (decrease)	0/66	0/52
Independent t	1/9-	2/7			
P	060/	0/01			

Table 6. The results of independent and dependent t-test for the analysis of receiving test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	1/31 ± 3/6	1/19 ± 4/4	22/2 (increase)	-2/1	0/049
Control	3/31 ± 3/35	1/45 ± 3/1	7/4 (decrease)	1/31	0/2
Independent t	3/1	0/603			
P	0/004	0/55			

Results of table (4, 5, and 6) showed that the mean of pre-test and post-test had a significant difference in the static balance, pass, and receiving the ball in the experimental group. There was respectively a 163/9, 131/33, and 22/2% increasing by educational games that these increasing were significant. So, the static balance, pass, and receiving the ball have increased significantly by eight weeks of educational games in the experimental group.

Table 7. The results of independent and dependent t-test for the analysis of neuromuscular-coordination test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	2/4 ± 6/25	2/3 ± 6/5	4 (increase)	-1	0/33
Control	2/5 ± 7/25	3/2 ± 6/9	4/8 (decrease)	0/92	0/37
Independent t	-1/29	-0/55			
P	0/2	0/58			

Results of table (7) showed that the mean of pre-test and post-test had no significant difference in the neuromuscular-coordination in the experimental group. There was a 4% increasing that it was not significant. The comparison of mean in the pre-test and post-test showed a 4/8% decreasing in the control group. The comparison of mean of pre-test and post-test showed there was no significant difference between the control group (P=0.2) and experimental group (P=0.58). So, the effect of eight weeks of educational games had no significant effect on the neuromuscular-coordination in educable mental retardation children.

Table 8. The results of independent and dependent t-test for the analysis of speed of reaction test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	10/6 ± 15/65	11/1 ± 19/23	22/87 (increase)	-1/06	0/3

Control	11/4 ± 20/6	10/4 ± 23/17	12/47 (increase)	-1/38	0/18
Independent t	-1/42	-1/16			
P	0/16	0/25			

Results of table (8) showed that the mean of pre-test and post-test had a significant difference in the speed of reaction in the experimental group. There was a 22/87 increasing in the experimental group. But this increasing was not significant. This means that educable games had no significant effect on the speed of reaction in the experimental group. The comparison of mean of pre-test and post-test showed there was no significant difference between the control group (P=0.16) and experimental group (P=0.25). So, the effect of eight weeks of educational games had no significant effect on the speed of reaction in educable mental retardation children.

Table 9. The results of independent and dependent t-test for the analysis of precision jump test

Dependent t	Mean and SD		The amount of change (%)	Dependent t	P
	Pre-test	Post-test			
Experimental	29 ± 101/7	31/6 ± 100/9	0/78(decrease)	0/17	0/86
Control	27/38 ± 119/75	27/08 ± 117/8	1/6 (decrease)	0/46	0/65
Independent t	-2/02	-1/8			
P	0/05	0/08			

Results of table (9) showed that the mean of pre-test and post-test had a significant difference in the precision jump in the experimental group. There was a 0/78 decreasing in the experimental group that it was not significant. The comparison of mean of pre-test and post-test showed there was a 1/6 decreasing in the control group. So, the effect of eight weeks of educational games had no significant effect on the precision jump in educable mental retardation children.

Discussion and conclusion

The results of this study showed that there was a significant difference between the pre-test and post-test results of the agility in the control group. This difference can be due to that the control group did not participate in sport activities. There was a 2/7% decreasing in results in the experimental group after educational games. This could be due to that educational games may minimize the speed during the change of the center of body gravity that it can improve educable mental retardation children’s agility. This finding is consistent with the results of Kosari and Hemayat-Talab (2012); Yilmaz et al., (2009); and Noorbakhsh’s (2005) study. These studies showed the significant increasing in the agility. The results of this study showed that there was a significant increasing (9/5%) in results of flexibility test after educational games that it could be due to the increasing of the stretching of the muscles and tendons of the trunk, pelvis, and back of the thigh to meet the full range of motion for elated joints. This finding is consistent with the results of Karahanet al., (2005) and Donahoe’s (2010) study. It is conflict with the results of Lewis and Fragala-Pinkham’s (2005) study. They examined the effects of aerobic conditioning and strength training on a child with Down syndrome. The results of this study showed that the body weight and flexibility were unchanged. This lack of consistence may be due to subjects’ age and gender and the type of training program. The results of this study showed that there was no significant difference between the pre-test and post-test results of neuromuscular-coordination in the control and experimental group. We can say that educational games could not the appropriate coordination between central nervous system, muscles, and sensory organs (eyes, ears, etc.) so there was no difference. Of course there was a 0/04% increasing after educational games but it was not significant so eight weeks of educational games had no effect on the neuromuscular coordination in educable mental retardation boys. This finding is conflict with the results of Sheikh et al., (2003) and Kosari and Hemayat-talab’s (2012) study. This lack of consistence may be due to subjects’ gender, games type, the time of trainings, individual differences, and test type. The results of this study showed that that there was a significant difference between the pre-test and post-test results of static balance in the experimental group. This shows that a persons’ balance is maintained by the alternate contraction and relaxation of foot extensor and flexor muscles and there are also similar movements to the two sides at the same time. Educational games could probably create the appropriate coordination between agonist and antagonist muscles in the maintaining of balance in educable mental retardation children. Therefore, we can conclude that eight weeks of educational games had no effect on the neuromuscular-coordination in educable mental retardation boys. This finding is consistent with the results of Sheikh et al., (2003); Noorbakhsh (2005); Yilmaz et al., (2009); Horvat and Smail (2005); and Kosari and Hemayat-Talab’s (2012) study. The results of this study showed

that that there was no significant difference between the pre-test and post-test results of reaction speed in the experimental group. This showed that educational games could not decrease the interval between stimulus and response action. There was a 22/87% increasing in reaction speed but this change was no significant. So, eight weeks of educational games had no significant effect on the reaction speed in educable mental retardation boys. This finding is consistent with the results of Karahanet al's (2005) study. The results of this study showed that that there was no significant difference between the pre-test and post-test results of precision jump in the experimental group. There was a 0/78 decreasing in the precision jump after educational games. This change may be due to that educational games could not create the maximum force in foot extensor muscles in the shortest time. So, eight weeks of educational games had no significant effect on the precision jump in educable mental retardation boys. This finding is consistent with the results of Lawrence's (1968) study. Lawrence (1968) examined the effect of consultant physical education program on the physical fitness of educable mentally retarded children. This finding is conflict with the results of Karahanet al's (2005) study. The lack of consistence can be due to subjects' age (subjects age was 14 years old in Karahanet al's (2005) study). The results of this study showed a 131/33 increasing in the passing skill. It can be due to the increasing of the quality neuromuscular coordination between eye and hand and also due to children's interest to this test. There was a 22/2% increasing in the ball receiving. This increasing can be due to the improving of the coordination between central nervous system and muscles and sensory organs in the ball receiving skill. Therefore, eight weeks of educational games had a significant effect on the passing and receiving skills in educable mental retardation boys. This finding is consistent with the results of Guidetti et al., (2009) and Guidetti (2007)'s (1968) study. Therefore, authorities should pay more attention to the role of exercise in the reinforcement of physical fitness in educable mental retardation children due to these children's weakness in doing of daily tasks.

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