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Effectiveness of a Recommended Program Using Gymnastic Competitive Situations on Some Motor Cognitive Abilities, Skills Abilities and Hyperactivity in Individuals with down Syndrome

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Abstract: The current research aims at identifying the effectiveness of a recommended program using gymnastic competitive situations on some motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome. The researcher used the quasi-experimental approach (two-group design) with pre- and post- measurements. Results showed that the recommended program using gymnastic competitive situations had a positive effect on improving motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome. Results showed that the recommended program using gymnastic competitive situations had a positive effect on improving motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome. There are no statistically significant differences between the means of pre- and post- measurements for the control group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of post-measurement. There are statistically significant differences between the means of pre- and post- measurements for the experimental group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of post-measurement. There are statistically significant differences between the means of post- measurements for the experimental and control group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of the experimental group.

Key words: Competitive situations · Gymnastics · Down Syndrome

INTRODUCTION

Down syndrome is a mystery for researchers in childhood disorders. Due to their chromosomal disorder, those children have several specific physical, mental and physiological characteristics. Some of these characteristics are delay in growth and motor development, slowness in walking and running, decrease in physical fitness, de-coordination among body parts (hand-eye and other parts), body instability, reaction delay (response delay), quick fatigue, decrease in balance, cardio-vascular inefficiency, the ability of imitation and enjoying musical activities [1-4].

Children with Down syndrome have several behavioral disorders like hyperactivity, short attention span, impulsiveness, aggressiveness and self-injury and temper tantrums. They may have abnormal responses like over reaction to pain, noise, light and odors and fascination with specific stimuli [5].

Several authors indicated the abnormal psychological and social characteristics of children with Down syndrome. Some of these characteristics are distraction, short memory span, decrease in thinking and comprehension abilities, impulsiveness, decrease in responsibility, low academic achievement, low career achievement, rejection from peers and low self-esteem [6-8].

There is evidence indicating that positive enforcement for hyperactive children leads to improvements in performance level of tasks without using medical drugs [9].

Motor ability helps this type of children to react socially in a correct way as it helps them to discover their natural and social environments [5]. However, various authors used various terms to express these motor abilities like motor efficiency, motor ability and perceptual motor efficiency. Sports activities play a major role in improving physical, motor, mental and behavioral

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abilities in children with disabilities as they have positive effects in that field [10].

Gymnastic competitive situations are very favorable among children with disability as they work on assuring self-esteem. They are easy to learn and very safe for children with Down syndrome. Non-competitive activities are boring and need a great deal of concentration when learning the basics. Therefore, it is very important to teach these basics along with competition as competition leads the individual work on achieving his/her own goals. This type of activities also provides the child with Down syndrome with a healthy way to discharge his/her over-energy through motor activity [11-13].

One study aimed at designing a recreational program based on integrating both disabled and normal children to identify its effects on disabled children's self-concepts and normal children's attitudes towards their disabled peers. The study indicated that such programs increase the disabled children's motivation towards better performances. Another study aimed at designing a motor program for mentally retarded children and identifying its effects on self -concept and motor perception of such children. Results showed improvements in balance, some physical fitness components and self-concept of the sample. A third study aimed at identifying the effects of a recommended motor program on improving self-concept and adaptive behavior in mentally retarded children, who are able to learn. Results showed that the program improved self-concept of the sample in the dimensions of physical self, social self and emotional; self. Another author compared posture stiffness and fixation in a sample of Down syndrome children and normal children. This study indicated that posture stiffness with closed eyes was greater than with open eyes in children with Down syndrome as they have the ability to coordinate motion under posture stiffness conditions. In another study, the authors tried to identify the effects of environment on planning processes used in individual learning and child needs, aims and objectives for children with Down syndrome. This study indicated that cooperative learning is very important for such children. In addition, another group of authors tried to identify the effects of learning a sequence of motions under various sight conditions for adults with Down syndrome. Results showed improvements in performance under both types of feedback, although there were no statistically significant differences in reaction time or motion time compared to normal individuals [14-19].

Studies dealing with competitive sports programs and its effects on improving motor perceptual abilities and skills abilities to prevent hyperactivity in children with Down syndrome are very rare [9-20-26].

Research Objective: The current research aims at identifying the effectiveness of a recommended program using gymnastic competitive situations on some motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome.

Hypotheses:

- There are statistically significant differences between the means of pre- and post- measurements for the experimental group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of post-measurement.
- There are statistically significant differences between the means of pre- and post- measurements for the control group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of post-measurement.
- There are statistically significant differences between the means of post- measurements for the experimental and control group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of the experimental group.

MATERIALS AND METHODS

Approach: The researcher used the quasi-experimental approach (two-group design) with pre- and post-measurements.

Community and Sample: The research community includes children with Down syndrome in one school in Nasr City - Cairo - Egypt for the school year 2009-2010 (22 students). Age was between 13 and 17 years while mental age was between 6 to 10 years. IQ was between 50 and 70 according to the school records. 7 Students were excluded because of their illness and another 5 students were dedicated to pilot study. Main sample (10 students) was divided into to two groups (5 students each) for the purposes of the main study.

Tools and Equipments: A medical balance - a restameter - a stop-watch - hoops - benches - plastic balls with various colors and sizes - lime for drawing line, circles and triangles on floor - 20 cm boxes - jumping ladder - matrices - seed bags - chairs.

Mental Tests Used:

Drawing a Man iq Test (Dessin du Bon Home): This test measures the perfection of the child's drawing for a man. He/she has the freedom to draw vertically or horizontally on the paper with preferred colors and for the preferred sex.

Hyperactivity Test for Children with down Syndrome: This test includes 42 items. The specialist responsible for the child responds to each item on a four-point scale (often - sometimes - rarely - never) according to the occurrence of each item. This test identifies the child's real behavior in various situations [27].

Physical Ability Tests: The researcher used the following tests after literature review [25]:

- Hanging with bent arms.
- 45m running.
- 270m running and walking.
- Sit-up for 30 seconds.
- Wide jump from stance.
- Throwing a softball.
- Long sit.
- Hooping.
- Jumping on one foot.
- Excelled moves.
- Aiming at a target.

Gymnastic Skills Ability Tests: Skills abilities for performing some gymnastic skills (front summersault and back summersault) were measured according to 93) judges as each judges gives up to five points according to each performance.

Physical Ability Tests: The researcher chose the following tests after literature review [2]:

- Digital circles (for coordination).
- Throwing and receiving a tennis ball (for accuracy).
- Standing on one foot (for balance and stability).
- Bending trunk forward (for flexibility).

Pilot Study: The pilot study was done on a sample of (5) students with Down syndrome, outside the main sample, from 14-9-2009 to 16-9-2009 to identify the following:

- Any difficulties that may arise during main study.
- The suitability of the program for the chosen sample.
- The suitability of the tools and equipments.
- Training assistants on how to collect data.
- Calculating validity and stability coefficients of tests.

Main Study:

The Recommended Educational Program: he recommended educational program was applied to the experimental group from 7-10-2009 to 13-1-2010 according to the following:

- Program total duration was 12 weeks.
- Each week includes 2 educational units.
- Total unit duration was 45 minutes divided into: 5 minutes warm up -10 minutes for physical preparation - 10 minutes for educational activity - 10 minutes for applying the recommended exercises - 5 minutes cool down.

The control group used the traditional program for the same period.

Pre-Tests: Pre-tests for research variables (motor perceptual abilities - skills abilities - hyperactivity) were taken for both groups on 5-10-2009 and 6-10-2009.

Post-Tests: Post-tests for research variables (motor perceptual abilities - skills abilities - hyperactivity) were taken for both groups on 15-1-2010 and 16-1-2010.

Statistical Treatment: The researcher used the following statistical tests: mean - Standard deviation - median - correlation coefficient - Mann Whitney test (U) - Wilcoxon Test (Z) for difference significance.

RESULTS AND DISCUSSION

Table 1 indicated that there are no statistically significant differences between the pre- and post-measurements on all research variables for the control group. The researcher thinks that this is due to the lack of care provided for those students to decrease their hyperactivity. This can be explained in the light of the fourth statistical diagnostic guide (DSM-IV) that indicates the behavioral symptoms of children with Down syndrome (hyperactivity - short attention span - impulsiveness - aggressiveness - self harm - temper tantrum) [28].

Table 2 indicates statistically significant differences between the pre- and post- measurements, on all research variables, for the experimental group in favor of the post-measurements. The researcher thinks that this is due to the use of the recommended program as it

Table 1: Difference significance between the mean ranks for pre- and post- measurement for the control group (n1=n1=5)

Variables	Tests	The direction of the reference	The number of levels	Average level	Total	Z	P
Cognitive motor	Hanging with bent arms	-	2	1.00	2.0	0.558	0.222
		+	3	1.00	3.0		
	45m running	-	3	1.50	4.5	0.942	0.094
		+	2	1.25	5.0		
	270m running and walking	-	3	1.00	3.0	0.847	0.155
		+	2	1.50	1.5		
	Sit-up for 30 seconds	-	2	1.00	2.0	0.844	0.159
		+	3	0.50	1.5		
	Wide jump from stance	-	1	2.50	2.5	0.780	0.267
		+	4	0.50	2.0		
	Throw a soft ball to	-	1	4.00	4.0	0.675	0.321
		+	4	1.00	4.0		
	Long sit	-	2	0.50	1.0	0.843	0.122
		+	3	0.50	1.5		
	Hooping	-	1	1.00	2.0	0.789	0.135
		+	4	0.50	1.5		
	Jumping on one foot	-	2	1.00	2.0	0.784	0.234
		+	3	0.50	1.5		
	Excelled moves	-	1	0.75	2.0	0.675	0.126
		+	4	0.50	1.5		
Skill	Front summersault	-	1	2.00	2.0	0.824	0.145
		+	4	0.50	2.0		
	Back summersault	-	2	0.75	1.5	0.788	0.166
		+	3	0.50	1.5		
	Side Somersault	-	1	1.00	1.0	0.684	0.172
		+	4	0.50	2.0		
	Stand on the head	-	1	1.50	3.0	0.715	0.153
		+	4	0.50	2.0		
Hyperactivity		-	3	0.50	2.0	0.444	0.193
		+	2	1.00	1.5		

Table 2: Difference significance between the mean ranks for pre- and post- measurement for the experimental group (n1=n1=5)

Variables	Tests	The direction of the reference	The number of levels	Average level	Total	Z	P
Cognitive motor	Hanging with bent arms	-	3	2.00	6.0	-2.44*	0.002
		+	2	1.00	2.0		
	45m running	-	3	2.50	7.5	-2.64*	0.004
		+	2	2.25	4.5		
	270m running and walking	-	3	2.00	6.0	-2.26*	0.005
		+	2	1.50	3.0		
	Sit-up for 30 seconds	-	3	1.00	3.0	-2.87*	0.009
		+	2	0.50	1.0		
	Wide jump from stance	-	4	2.50	10.0	-2.80*	0.012
		+	1	3.00	3.0		
	Throw a soft ball to	-	4	2.50	10.0	-2.29*	0.009
		+	1	2.00	2.0		
	Long sit	-	1	1.50	1.5	-2.54*	0.011
		+	4	2.00	8.0		
	Hooping	-	3	3.50	10.5	-2.34*	0.005
		+	2	1.00	2.0		
	Jumping on one foot	-	4	3.50	14.0	-2.32*	0.003
		+	1	1.00	1.0		
	Excelled moves	-	3	3.50	11.0	-2.66*	0.011
		+	2	0.50	1.0		
Skill	Front summersault	-	4	3.50	10.5	-2.41*	0.021
		+	1	1.00	1.0		
	Back summersault	-	3	3.50	11.0	-2.27*	0.019
		+	2	1.00	2.0		
	Side Somersault	-	1	1.00	1.0	-2.79*	0.001
		+	4	1.50	6.0		
	Stand on the head	-	1	1.50	1.5	-2.73*	0.005
		+	4	2.00	8.0		
Hyperactivity		-	3	1.50	4.5	-2.45*	0.003
		+	2	1.00	2.0		

Table 3: Difference significance between the post- measurements for the experimental and control groups

		The control group N=5		The experimental group N=5			
Variables	Tests	Average level	Total	Average level	Total	U	P
Cognitive motor	Hanging with bent arms	5.86	26.30	7.93	38.15	-2.350	0.012
	45m running	5.37	26.85	8.37	41.85	-2.440	0.014
	270m running and walking	7.28	36.40	6.36	46.80	-2.590	0.004
	Sit-up for 30 seconds	2.89	14.45	6.88	34.40	-2.870	0.001
	Wide jump from stance	3.69	18.25	6.00	30.00	-2.450	0.016
	Throw a soft ball to	4.82	24.10	9.50	47.50	-2.480	0.006
	Long sit	4.56	22.80	8.50	42.50	-2.440	0.006
	Hooping	5.27	26.35	9.50	47.50	-2.360	0.005
	Jumping on one foot	201.	10.05	6.50	32.50	-2.740	0.002
	Excelled moves	3.89	19.45	7.00	35.00	-2.280	0.001
Skill	front summersault	2.34	11.70	5.75	28.75	-2.870	0.008
	back summersault	4.28	21.40	8.36	41.65	-2.940	0.006
	Side Somersault	3.50	17.50	4.00	20.00	-2.830	0.001
	Stand on the head	3.00	15.00	3.50	17.50	-2.780	0.002
Hyperactivity		3.87	6.35	5.86	26.30	-2.670	0.008

increased the children's motivation towards learning and decreased their hyperactivity. Competition according to performance level respects individual differences among those children and this gives them an opportunity to achieve their bets potentials. This is consistent with studies indicating the positive effects of sports on motor abilities for individuals with disabilities [17, 21, 23, 24, 26, 29]. This is also consistent with studies indicating that such programs have positive effects on communication skills and decreasing hyperactivity of children with Down syndrome [9, 20, 30].

Table 3 indicates statistically significant differences between the post- measurements of the experimental and control group in favor of the experimental group. This is, of course, due to the recommended program as both groups scored the same in pre-measurements and the significant improvement in post-tests appeared only in the experimental group. The recommended program improved the motor perceptual abilities and skills abilities of the experimental group and decreased their hyperactivity.

Several studies indicated that using such programs with children with Down syndrome lead to similar results in reducing hyperactivity and increasing motor abilities of those children. These studies also indicated that the use of such programs gives those children to acquire behavioral habits that help reducing hyperactivities [11, 21, 22, 26, 31-37].

CONCLUSION

- The recommended program using gymnastic competitive situations had a positive effect on improving motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome.
- There are no statistically significant differences between the means of pre- and post- measurements for the control group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of post-measurement.
- There are statistically significant differences between the means of pre- and post- measurements for the experimental group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of post-measurement.
- There are statistically significant differences between the means of post- measurements for the experimental and control group in motor perceptual abilities, skills abilities and hyperactivity in children with Down syndrome in favor of the experimental group.

Recommendations

- Using the recommended program with competitive situations to train children with Down syndrome as it has a positive effect on their motor p[perceptual abilities and skills abilities besides decreasing hyperactivity.
- Preparing regular seminars for specialists dealing with children with Down syndrome.
- Establishing special sports centers for children with Down syndrome according to competitive situations.
- Providing children with Down syndrome with the opportunity to practice sports in normal life settings 9schools - clubs …etc).
- Using hyperactivity of those children in providing them gymnastic skills.
- Providing more of these programs to children with Down syndrome.

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