THE EFFECT OF SPARK EXERCISE PROGRAM ON GROSS AND FINE MOTOR SKILLS OF 6-8 YEAR OLD BOYS WITH MENTAL RETARDATION

EL EFECTO DEL PROGRAMA DE EJERCICIO SPARK EN LAS HABILIDADES MOTORAS GRUESAS Y FINAS DE NIÑOS DE 6 A 8 AÑOS CON DISCAPACIDAD MENTAL

Mir Hamid Salehian[1]*; Maghsoud Dehghani[1]; Roya Hosseinzadeh Peyghan[1]; Parinaz Ghanati[2]*.

1. Department of Physical Education, Tabriz branch, Islamic Azad University, Tabriz, Iran.
2. Department of Motor behavior, Tehran University, Iran.

*Corresponding author: Mir Hamid Salehian, Email address: m_salehian@iaut.ac.ir

Información del artículo:
Artículo original
DOI: https://doi.org/10.33975/riuq.vol35n2.1195
Recibido: 15 marzo 2023; Aceptado: 8 agosto 2023

ABSTRACT

It has been shown that children with mental disabilities have weaker basic motor skills than healthy children. The main aim of this study was to determine the effect of eight weeks of Spark training program on the fine and gross motor skills of 6 to 8-year-old male students with trainable mental disabilities. This research is applied research and quasi-experimental research. By selecting the subjects from among the exceptional schools, 30 people were selected for the research. In the next stage, out of these 30 people, a pre-test was performed and 15 people in the Spark group and 15 people in the control group were randomly selected. The experimental group performed a training program selected by the Spark group for 24 sessions and 60 minutes in each session. During this time, the control group resumed its normal activities. The results showed that: Eight weeks of Spark training program has a significant effect on the fine motor skills of 6 to 8-year-old male students with trainable mental disabilities. The eight-week Spark training program has a significant effect on the gross motor skills of 6- to 8-year-old male students with trainable mental disabilities. Spark exercise programs can have a significant positive effect on the gross and fine motor skills of mentally retarded children.

Keywords: Spark Training Program; Fine Motor Skills; Large; Trainable Mental Disability.

Cómo citar: Salehian, Mir Hamid., Dehghani, Maghsoud., Hosseinzadeh Peyghan, Roya., & Ghanati, Parinaz. (2023). The effect of spark exercise program on gross and fine motor skills of 6-8 year old boys with mental retardation. *Revista de Investigaciones Universidad del Quindío*, 35(2), 75-87. https://doi.org/10.33975/riuq.vol35n2.1195

RESUMEN

Se ha demostrado que los niños con discapacidades mentales tienen habilidades motoras básicas más débiles que los niños sanos. El objetivo principal de este estudio fue determinar el efecto de ocho semanas de programa de entrenamiento Spark en las habilidades motoras finas y gruesas de estudiantes varones de 6 a 8 años con discapacidades mentales entrenables. Esta investigación es una investigación aplicada y una investigación cuasiexperimental. Se seleccionaron 30 personas para la investigación, eligiendo a los sujetos entre las escuelas especiales. En la siguiente etapa, de estas 30 personas, se realizó una prueba previa y se seleccionaron al azar 15 personas para el grupo Spark y 15 personas para el grupo de control. El grupo experimental realizó un programa de entrenamiento seleccionado por el grupo Spark durante 24 sesiones, con una duración de 60 minutos en cada sesión. Durante este tiempo, el grupo de control continuó con sus actividades normales. Los resultados mostraron que: Ocho semanas de programa de entrenamiento Spark tienen un efecto significativo en las habilidades motoras finas de estudiantes varones de 6 a 8 años con discapacidades mentales entrenables. El programa de entrenamiento Spark de ocho semanas tiene un efecto significativo en las habilidades motoras gruesas de estudiantes varones de 6 a 8 años con discapacidades mentales entrenables. Los programas de ejercicio Spark pueden tener un efecto positivo significativo en las habilidades motoras gruesas y finas de los niños con discapacidad mental.

Palabras clave: Programa de Entrenamiento Spark; Habilidades Motoras Finas; Grandes; Discapacidad Mental Entrenable.

INTRODUCTION

Despite the advancement of science and global health, mental disorders are still one of the main problems facing human beings. The highest percentage of mental disorders in the world is allocated to people with mental disabilities. Research has shown that these people are not only mentally different from their peers but also physically inferior. For example, it has been shown that people with intellectual disabilities achieve low levels of preparation for standardized tests, especially in measurements of cardiovascular endurance, body composition, muscle strength and endurance, and coordination (Dana & Christodoulides, 2020). Also, based on the background literature, it has been shown that children with mental disabilities have weaker basic motor skills than healthy children (Emarati et al., 2011). Basic motor skills called building blocks for the development of most complex motor skills and special skills (Rahmati et al., 2010).

Research has shown that children with mental disabilities scored lower on all items of specific basic motor skills than their healthy peers, but this varied from item to item. Because these children have cognitive problems, some motor tasks may cause many problems for mentally retarded children that can be related to more use of cognitive information that is necessary for successful performance of the task (Ghamari et al., 2015) It is expected that complex motor tasks have a stronger relationship with children's cognitive function than simple motor tasks (Namdar Tajri et al., 2015).

Various research findings have shown the importance of basic motor skills. Research evidence suggests that basic motor skills allow children to move in space and creates awareness of responding to various stimuli (Kowsari, 2010). Skills that are inappropriately adopted in early childhood may have negative

effects on motor function in later life (Faal Moghanlo et al., 2014). If mastering these skills is a prerequisite for success in special sports activities (Dana & Shams, 2021), children who fail in the basic patterns of these skills, can not participate effectively and successfully in sports activities and motor needs of daily life. Because movement is directly related to cognition and the mind, those with cognitive and mental disabilities will be less able to perform motor tasks than healthy individuals.

The development of basic motor skills in children with mental disabilities is more important because these skills facilitate the cognitive development of children and have positive contributions in the daily lives of these people. Enjoying activities and games during this period can also lead to the development of readiness in later years of life, which in turn can develop an active lifestyle, reduce health risks and increase work capacity so that in the future the need to go to Sanatorium should be reduced (Hashemi et al., 2015).

As we know, exercise and physical education are one of the main pillars of education that include basic and fine skills. In the case of people with various disabilities, today the role of exercise as an important and influential factor seems to be definite. But what needs more research and study is how it works and how to use sports optimally at the best time, place and age to be as effective as possible. The group of the mentally retarded is always considered as a large community of disabled people who happen to have the most correction, and now it remains to be seen what the role of exercise in their return to normal life is. In fact, what should be considered is the development of a regular and cost-effective physical education program according to age and physical condition, so that the mentally retarded child can reach his maximum capacity at the desired age. Although several studies have examined basic motor skills and the positive effects of exercise and physical activity on health and well-being (Hashemi et al., 2015; Salehian & Qadiri, 2019), Little is known about the effect of exercise programs on fine basic motor skills.

One of the new sports programs approved by motor development experts is Spark exercises. Spark exercises include strengthening games, games and sports and have been used in many researches and are an extensive program designed to provide goals such as physical fitness and motor skills for people to enjoy physical activity at high levels of activity. Some research has proven the positive effects of this exercise program on mental and physical health, for example, Arsalani et al. (2019) showed the effectiveness of Spark program on working memory, attention and motor skills of female students with math learning disabilities. Faal Moghanlo et al. (2014) by comparing the effect of Spark exercise program and basketball techniques on the motor skills of large mentally retarded boys concluded that both activities can have a significant effect on learning the motor skills of large boys with mental disabilities.

Shahbazi et al. (2015) conducted a study entitled the effectiveness of perceptual motor exercises in children with attention deficit hyperactivity disorder conducted (ADHD). The results showed a significant difference between pre-test and post-test scores in motor proficiency (total of subtests: running speed and agility, balance, two-way coordination, upper body coordination power, running speed, visual-motor control, skill and upper body speed). They stated that perceptual-motor exercises, by strengthening the infrastructure, perceptual-motor system, improved motor skills in these children. Kowsari (2010) studied the effect of selected physical activities on the development of gross motor skills in children with ADHD and concluded that the selected activities such as Spark

exercise programs have positive effects on children's mental ability. In order to provide a suitable training opportunity for children with ADHD in the experimental group, by creating appropriate time, facilities and equipment on the one hand and having a program whose content was associated with the development of children's motor skills we can improve gross motor skills of ADHD children. With this in mind, by examining the background of the research, the researcher decided to study the effect of the Spark exercise programs on improving the gross and fine motor skills of mentally retarded boys aged 6 to 8 years old in exceptional schools in Tabriz city.

MATERIALS AND METHODS

Design

The present study is a quasi-experimental study. In this method, the researcher tries to approach the experimental research method by identifying and limiting uncontrollable variables.

Participants

The statistical population of this research is all male students with trainable mental disabilities aged 6 to 8 years in Tabriz who study in exceptional public schools with mental disabilities in the 2020-2021 academic year. There are a total of 56 of them. First, the researcher was introduced to the General Department of Education of Tabriz city in a letter from the university and then from this department to the Department of Exceptional Education. Among the volunteer students, 30 were selected based on the score obtained from the list questionnaire after final approval by a psychologist and were randomly divided into two groups of 15 experiments and controls.

Research method

The basis of the exercise program selected in this study was the Spark exercise program. At the beginning of the research, after a preliminary study of the Spark movement program, the parts of the program were selected that could affect the development of gross and fine motor skills. In the next stage, by selecting the subjects from exceptional schools, 30 people were selected to conduct the research. In the next stage, out of these 30 people, pre-tests were performed and 15 people were randomly selected to the Spark experimental group and 15 people to the control group. At this stage, the selected training program was performed by Spark group for 16 sessions in each session for 45 minutes. During this time, the control group resumed their normal activities. At the end of the twenty-fourth session, a post-test was performed.

Spark exercise program, which is related to the development of children's basic skills, which includes sports, games and active creativity for children. This exercise program includes 45 minutes in each session, which is divided into four parts:

1. The first 15 minutes of the program include warm-up
2. 10 minutes of play including movement skills
3. 10 minutes including manipulation skills
4. Finally, cool for 10 minutes[10]

Research measurement tools

Raven IQ test (Salehian & Qadiri, 2019)

This test was used to measure the IQ of children. Raven IQ test or Raven matrix is a non-verbal group intelligence test and is commonly used in educational settings and is also known as visual intelligence test. This 60-question test is used to assess individuals' abstract reasoning as part of general intelligence. This test is the most common and popular test designed for the age group of 5 years and above. The answers to these 60 questions are 6 to 8 options, and the order of the questions is from easy to difficult. The measurement is also done by Spearman's general intelligence agent. In each case, the subject test is presented in the form of a form and the subject is asked to identify the missing element and complete it.

Bruininks -Oseretsky motor proficiency test (Bruininks & Bruininks, 1977)

The motor scale is the reference norm for large and fine motor skills in children aged 4.5 to 14.5 years. This test helps researchers identify normal children from children with movement disorders. This scale includes 8 subtests that have a long form of 46 and a short form of 14 items. The retest reliability coefficient of this test is 0.87 in the long form and 0.86 in the short form. Its four subtests measure gross motor skills and the other four subtests measure fine motor skills.

According to the aim of this study, which is to compare the effect of Spark exercise program on gross and fine motor skills of mentally retarded boys, the researcher for subtests related to gross skills, which include running and agility subtests, two-way coordination, Balance and strength, and for fine motor skills used running speed, motor vision control, speed and upper limb agility.

Validity and reliability of questionnaires

Raven Progressive Matrix Intelligence Test is one of the valid intelligence tests that has acceptable reliability and validity in order to measure and measure overall intelligence factor (g) (Salehian & Qadiri, 2019). The advanced form of this test is a useful tool for measuring the intelligence of brilliant and prominent people (in terms of intelligence) and students.

Test conditions: The test tool was provided before the start and all items were immediately available. For more accurate results, all subjects should use appropriate sports shoes to perform the tests. During the test, attention was paid to natural interfering factors such as light, sound, temperature and any other factors that may affect the test.

Test time: Each subject needed approximately three sessions of 25 to 30 minutes on three consecutive days (to assess the subtest related to gross and fine skills). Prior to the normal execution of the test for each subject, the examiner put all the pre-determined instruments in place to minimize the time of each performance for each subject.

Test methods: The Bruininks -Oseretsky test is relatively easy to perform because most subjects become familiar with these skills easily, except for the two-way coordination subtests, which require

more care and attention. Therefore, the examiner himself will repeat these tests several times so as not to have trouble judging. This test can be done individually or by several people and also in one or more sessions. Subjects performed speed and agility sub-tests as well as muscle strength sub-tests on one day and balance and coordination sub-tests on the second day and fine motor skills sub-tests of running speed, motor vision control, speed and upper limb agility. On the third day to neutralize fatigue from strenuous activity.

Statistical analysis methods

Descriptive and inferential statistics were used to statistically analyze the obtained raw data. Descriptive statistics were used to calculate central indices and the dispersion of quantitative scales and to draw graphs and tables, and inferential statistics were used to test hypotheses. To test this hypothesis, multivariate analysis of covariance (MANCOVA) was used using SPSS21 software.

RESULTS

According to the significance level of t-test which is greater than 0.05 for all variables, it is concluded that the control and experimental groups are the same in terms of height, weight and IQ.

Table 1. Frequency distribution of subjects' height, weight and IQ

VARIABLE	GROUPS	M	STD. DEV.	F	D	SIG.
Height	Experimental	134.15	11.9		28	
	Control	133.95	11.6	0.006	28	0.006
Weight	Experimental	34.86	12.2		28	
	Control	34.19	12.1	0.078	28	0.068
IQ	Experimental	73.47	3.14		28	
	Control	74.20	3.23	9.132	28	0.534

According to the table 2, it can be seen that in all gross motor skills (running speed and agility, balance, two-way coordination, strength) the group effect is significant at the level of 99% probability ($p < 0.01$). That is, after adjusting the pre-test scores, the amount of gross motor skills (running speed and agility, balance, two-way coordination, strength) in the post-test in the control group and the experimental group have a significant difference. On the other hand, the adjusted means indicate that the level of gross motor skills (running speed and agility, balance, two-way coordination, strength) in the experimental group is significantly higher than the control group. Therefore, it is concluded that the eight-week Spark training program has a significant positive effect on improving gross motor skills (running speed and agility, balance, two-way coordination, strength) of 6- to 8-year-old trainable mental disability male students.

Table 2. Results of univariate analysis of covariance to compare gross motor skills (running speed and agility, balance, two-way coordination, strength) in the control and experimental groups.

SOURCES OF CHANGES	THE DEPENDENT VARIABLE	TS	DF	MS	F	SIG.	ETA SQURE
Group	Running speed and post-test agility	5.973	1	5.73	44.51	0.001	0.65
	Post-test balance	13.862	1	13.862	32.381	0.001	0.574

SOURCES OF CHANGES	THE DEPENDENT VARIABLE	TS	DF	MS	F	SIG.	ETA SQURE
	Bilateral post-test coordination	9.952	1	9.952	38.315	0.001	0.615
	Post-test power	1426	1	1426	33.726	0.001	0.584
Error	Running speed and post-test agility	3.221	24	0.134			
	Post-test balance	10.274	24	0.428			
	Bilateral post-test coordination	6.234	24	0.428			
	Post-test power	6.234	24	0.26			
	The dependent variable	1014.7	24	32.281			

According to the table 3, it can be seen that in all fine motor skills (running speed, visual control, speed and upper limb agility) the effect of the group is significant at the level of 99% probability ($p < 0.01$). That is, after adjusting the pre-test scores, the amount of fine motor skills (running speed, motor control, speed and upper limb agility) in the post-test in the control group and the experimental group have a significant difference. On the other hand, the adjusted means indicate that the level of fine motor skills (running speed, motor vision control, speed and upper limb agility) in the experimental group is significantly higher than the control group. Therefore, it is concluded that eight weeks of Spark training program has a significant positive effect on improving fine motor skills (running speed, motor vision control, speed and upper limb agility) of 6 to 8 year old male students with trainable mental disability.

Table 3. Results of univariate analysis of covariance to compare fine motor skills (running speed, motor visual control, speed and upper limb agility) in the control and experimental groups

SOURCES OF CHANGES	THE DEPENDENT VARIABLE	TS	DF	MS	F	SIG.	ETA SQURE
Group	Post-test running speed	33.248	1	33.248	20.14	0.001	0.446
	Post-test motor vision control	192.7	1	192.7	27.525	0.001	0.524
	Speed and agility of the upper extremities after the test	181.01	1	181.01	27.525	0.001	0.524
Error	Post-test running speed	41.27	25	1.651	49.977	0.001	0.662
	Post-test motor vision control	175.03	25	1.651			
	Speed and agility of the upper extremities after the test	92.393	25	3.696			

DISCUSSION

The results showed that the eight-week Spark training program had a significant effect on the gross motor skills of 6- to 8-year-old trainable male students with mental disabilities. These results are consistent with the findings of Emarati et al. (2011), Faal Moghanlo et al. (2014), Ghorbanzadeh et al. (2015). The development of gross skills to factors such as running speed, and agility in a short

time, occurs following an increase in strength, upper limb coordination, running speed and flexibility (Dana et al., 2019). Emarati et al. (2011) studied the effect of selected school games on the perceptual-motor development and social development of girls aged 8 to 9 years and showed that selected school games have a significant effect on running speed and agility compared to normal activities. On the other hand, the results of this study are inconsistent with the findings of Melanorozi (2009) and Faal Moghanlo et al. (2014), Arsalani et al. (2019), Melanorozi (2009) also investigated the effect of preschool education on the development of basic skills of 4- to 6-year-old boys. The results showed that these trainings did not affect the movement skills of these children.

Findings of Namdar Tajri et al. (2015) in examining the effect of physical training intervention on motor skills of 7 to 10 year old boys with developmental coordination disorder showed that the experimental group did not change significantly in the subscale of running speed and agility after the intervention. Faal Moghanlo et al. (2014) also investigated the effect of Spark exercise program on improving motor skills in trainable mentally retarded boys. The results showed that the mean of pre-test and post-test in the sub-test of running speed and agility of the experimental group were not significant. According to these researchers, it can be said that the growth of running speed and agility requires a proper exercise program and a sufficient number of training sessions.

In the equilibrium subtest, which was measured as static equilibrium, the results of comparing the means of static equilibrium in pre-test and post-test showed that the mean of equilibrium in the experimental group increased significantly. In addition, the results of comparing static balance changes between groups showed that the experimental group had significantly more progress than the control group. The results of this study are consistent with the results of Salehian and Qadiri (2019), Sabzi et al. (2021) examined the effect of water treadmill exercise on children with ADHD. By the end of the exercise intervention, it had significantly positive effect. These researchers considered the implementation of perceptual-motor program necessary for the development of children.

The results of this study are inconsistent with the findings of Emarati et al. (2011) The reason for the discrepancy between the present study and the findings of Emarati et al. (2011) is the promotion of this aspect of perceptual-motor development, which requires specific exercises or training time of more than 6 weeks. In the strength subtest, the training program had a significant effect on strength. There was a significant difference between the mean power changes of control and experimental groups. Other results of this research are consistent with the findings of Kowsari (2010), Arsalani et al. (2019). The researchers concluded that doing a creative exercise program has a significant positive effect on the subjects' different skills. The main factor was the type of exercise program selected for these subjects who used strength training to improve strength in these subjects. These findings are inconsistent with the findings of Dortaj and Asemi (2013). Dortaj and Asemi (2013) examined the effect of selected motor program on perceptual-motor ability and academic achievement of second grade students and reported that physical exercise had no significant effect on strength. The reason for this discrepancy can be considered the inadequacy of the training program; Because the perceptual-motor training program has the greatest impact on coordination and movement control of the limbs and does not have much effect on physical strength. Therefore, differences in the shape and intensity of exercises or measurement content may cause this discrepancy (Dana & Shams, 2021). The results of the present study are not consistent with the results of Dana et al.[1] The reason for this discrepancy can be considered the duration of the exercise program; Because the subjects of the monk's study performed a special movement program

in 12 sessions. Considering that the time spent in physical activity is significantly effective in gaining a higher score in basic motor skills, this contradiction is obvious.

In the upper limb coordination subtest, which was measured by two tests: receiving the ball thrown with both hands and throwing the ball to the target with the superior hand. The results of comparing the mean of this subtest showed that the mean obtained in this subtest had a significant increase in the experimental group. In addition, the mean of the changes in the experimental and control groups was also significant. On the other hand, the results of the present study are consistent with the results of Kowsari (2010) and Arsalani et al. (2019). Kowsari (2010) investigated the effect of selected physical exercises on the development of gross motor skills in children with ADHD. Statistical findings indicated that the mean of pretest and posttest of the experimental group in the upper extremity coordination subtest was significant. The results showed that the scores below the upper limb coordination test were not significantly different between the experimental and control groups. The main reason for the discrepancy between the results of the present study can be considered as the selected exercise program. Differences in the shape and intensity of exercises or the content of the measurement may cause this discrepancy (Dana & Shams, 2021). Also, the level of IQ of the studied people (mental retardation) is another reason for the inconsistent results. Given that IQ plays a significant role in the effectiveness of exercise (Salehian & Qadiri, 2019), this discrepancy seems obvious because children with IQ have a higher IQ than mentally retarded children.

To explain this, it can be said that research on the overall value of play and exercise was first introduced many years ago; But today we have realized the special value of these skills for reading, responding to stress, writing, attention, memory and sensory development. Interestingly, the part of the brain that processes movement is the part that processes learning. Surprisingly, there is not just one motor center in the brain; Movement and learning have a constant interaction, and in fact, the part of the brain that is involved in almost all learning, the cerebellum, is activated depending on the type of physical exercise. Therefore, with a little thought about this statement, it seems that thinking and thought, in other words, mental activities can not be separated from the basic activities and motor abilities (Behmard et al., 2012).

The results showed that the eight-week Spark training program had a significant effect on the fine motor skills of 6- to 8-year-old male students with trainable mental disabilities. In the running velocity subtest, the results of comparing the mean running velocities in pre-test and post-test showed that the mean running velocity in the experimental group increased significantly. The results of the present study is alongside with the results of Dana and Shams (2021), Ghasempour et al. (2013), Eghlidi et al. (2013), Ghorbanzadeh et al. (2015), and Arsalani et al. (2019). Dana and Shams (2021) investigated the effect of exercise program on motor skills of children with Down syndrome. These researchers achieved positive results from improving the running speed on the subjects. Ghasempour et al. (2013) investigated the effect of sensory-motor integration exercises on fine motor skills of trainable mentally retarded children. The results showed that the mean of pre-test and post-test of the experimental group in the sub-test of running speed was significant. Eghlidi et al. (2013) compared sustained attention to auditory and visual stimuli in children with learning disabilities and healthy peers. The results showed that there was a significant difference between the mean speed of auditory stimulus running and vision. The results of this group showed that children with learning disabilities are better to use visual stimuli in treatment and educational sessions. According to these researchers

and the results of this study, it can be said that games, exercises and physical activity can increase the speed of running.

The results of this study are inconsistent with the results of Emarati et al. (2011) examined the effect of selected elementary school games on cognitive-motor development and social development of girls aged 8 to 9 years and showed that selected elementary school games did not have a significant effect on passing speed compared to normal activities. Probably the reason for this discrepancy can be found in the content of the games and the principle of specificity of the exercise, because in order for children to grow in this aspect of perceptual-motor development, they must be planned and participated in special exercises in a proper movement program that emphasizes this issue. Probably for this reason, the training program of Emarati et al. (2011) could not have a significant effect on the running speed subtest.

In the visual-motor control subtest, which was measured by two tests of drawing a straight line with the superior hand, imitation of a circle with the superior hand, the results of comparing the means of this subtest showed that the average of the visual-motor control subtests There was a significant change in the experimental group. On the other hand, the results of the present study is in consist with the results of Ashrafi et al. (2014) and Hemayattalab et al. (2017). Akbari (2011) also investigated the effect of traditional games on the development of basic rectal skills in 7 to 9 year old boys. The results showed a significant increase in the object control skills of these children. These researchers considered the use of traditional games to be effective in the development and growth of children's control-vision-movement. Ashrafi et al. (2014) investigated the effect of rhythmic exercises on perceptual-motor skills of children with visual impairment. Statistical findings showed that the exercise program could have a significant positive effect on the perceptual-motor skills of these children. Jokar et al. (2014) also investigated the effect of exercise program on improving manipulation skills in children with developmental coordination disorders. Under the influence of this exercise program, these children achieved a significant increase in the development of manipulation and object control skills.

In the sub-test of speed and agility of the upper limb, which was measured by two tests of matching cards with the superior hand and punctuation in the circle with the superior hand. The results of comparing the means of these subtests in pre-test and post-test showed that the mean in the experimental group increased significantly.

The results of the present study are consistent with some findings of Rahmati et al. (2010), Dana and Christodoulides (2020). Arsalani et al. (2019) and Dana et al. (2019) investigated the effect of exercise program on motor skills of children with Down syndrome. The researchers achieved positive results by improving the speed and agility of the upper limbs. Ashrafi et al. (2014) studied the effect of rhythmic exercises on perceptual-motor skills of children with visual impairment. Statistical findings showed that this exercise program could have a significant positive effect on the fine cognitive-motor skills of these children. The results of the present study are inconsistent with the results of the research of Ghasempour et al. (2013) and Rahmati et al. (2010). Ghasempour et al. (2013) examined the sensory-motor integration exercises of fine motor skills of trainable mentally retarded children. The results showed that the mean of pretest and posttest of the experimental group in the subtest of speed and agility of forarm was not significant. One of the reasons for the discrepancy between the research results is the IQ of the subjects. Given that IQ plays an important role in the effectiveness of exercise.

All the results of this research can be considered in the context of dynamic systems theory. The theory of dynamic systems considers the environment as an important factor in the development of motor skills and implies that the factors affecting motor development include motor characteristics with the individual (biological and hereditary factors) and the environment (factors of experience and learning). Factors affect the development of stable motor skills, mobility, fine and fine motor skills and manipulation skills. In the theory of dynamic systems, the basic motor abilities were not genetically limited so that they could not be modified (Gallahue, 1982).

By creating effective factors on the growth rate of fine and large skills, through the selected training program, have a very good effect on the growth of fine and large motor skills of children with disorders. In the questionnaire, personal characteristics of family-related factors and out-of-program training opportunities were controlled, so it can be said that the most likely factor influencing the subjects is creating training opportunities for the test group. The training opportunity depends on regular and purposeful training, so since the experimental group regularly participated in the selected training program for a period of 12 sessions, it can be said that the effect of this regularly selected training program enriches the training opportunity of this group and ultimately,their motor skills have been affected.

The selected exercise program has created opportunities and equipment for children to give them the opportunity to enrich their motor experiences and to achieve higher motor and cognitive development, an opportunity that parents are usually unable to create and school. Provide adequate facilities, equipment and time for the development of motor and cognitive skills. Parents and educators who are able to provide opportunities to learn motor skills and They are not cognitive as well as manipulative skills, essentially limiting children's developmental talent and success in sports skills, especially in secondary childhood, adolescence, and adulthood (Gallahue, 1982). Regarding the quality of education provided to the experimental group, other important factors that are involved in the superiority of this group over the control group include the important factors of quality of education, variety of programs and motivation. The selected training program is based on the game on the one hand, and on the other hand, every day is different from the previous day and encourages the child to participate in the program. The selected training program includes a large number of skills and the content of this program gross and fine motor skills and cognitive skills are present in different parts of the selected exercise program, and children participate in this program, practicing all motor and cognitive skills in almost every session, and makes the experimental group in all skills, achieve acceptable motor and cognitive growth and development. Also, it can be stated that a 12-session course based on a selected physical activity can result in improved locomotor and manipulative skills in children with neuropsychological learning disorders (Sabzi et al., 2021).

On the other hand, other experts believe that motor skills training provide good opportunities for active absorption of various sensory inputs from the environment. In fact, purposeful motor behaviors improve the interaction of the cerebral cortex and this leads to improved skills (Dana & Shams, 2021).

Scientists believe that the balanced development of motor skills forms the basis of subsequent learning. Some children with learning disabilities, despite their natural intelligence, are much slower in motor development than normal children. It seems that these people have a weak cognitive component in the acquisition of motor skills and the amount of attention and working memory because motor skills,

especially fine motor skills require levels of cognitive activity and therefore some people are slow. They can learn or develop motor activities. Many scientists believe that some mild brain disorders are the main cause of such problems. But whatever the reason, it is absolutely necessary to correct the movement difficulties of these people before starting other skills training (Dana & Christodoulides, 2020).

Some of limitation of this research was the lack of control over the emotional states of the participants during the test, lack of control over issues affecting the personal life of the subjects, Lack of control over genetic affective issues, lack of control over the effects of sleep and nutrition and possible environmental effects.

CONCLUSION

Spark exercise program can have a significant positive effect on the gross and fine motor skills of mentally retarded children.

Conflict of interest: The authors declare the non-existence of conflicts of interest.

Contribution by author: The authors are responsible for all components of this work.

Funding or funds: No financial support was provided.

REFERENCES

Akbari, E. (2011). *Learning Disorder*. Tehran Nazari.

Arsalani, F., Sheikh, M., & HemayatTalab, R. (2019). Effectiveness of Selected Motor Program on Working Memory, Attention, and Motor Skills of Students with Math Learning Disorders. https://www.sid.ir/en/journal/ViewPaper.aspx?id=747558.

Ashrafi, L., Namazizadeh, M., & Davari, F. (2014). The effect of rhythmic exercises on perceptual-motor skills of children with visual impairment. Motor Behaviour, 1(1), 1-4. https://mbj.ssrc.ac.ir/mobile/article_235.html?lang=en

Behmard, F., Esteki, M., Ashayeri, H., & Asadpour, H. (2012). The effect of training large and fine movements on reducing the symptoms of dyslexia. Learn Disabil, 2(2), 25-39. https://journals.sagepub.com/home/ldx

Bruininks, V. L., & Bruininks, R. H. (1977). Motor proficiency of learning disabled and nondisabled students. Perceptual and Motor Skills, 44(3_suppl), 1131-1137. https://journals.sagepub.com/doi/abs/10.2466/pms.1977.44.3c.1131

Dana, A., & Christodoulides, E. (2020). The Effects of a Period of Selected Physical Activity on Improving Manipulative and Locomotors Skills of Children with Neuropsychological Learning Disabilities. Journal of Rehabilitation Sciences and Research, 7(1), 25-30. http://clok.uclan.ac.uk/31852/

Dana, A., Rafiee, S., & Gholami, A. (2019). Motor reaction time and accuracy in patients with multiple sclerosis: effects of an active computerized training program. Neurological Sciences, 40(9), 1849-1854. https://link.springer.com/article/10.1007/s10072-019-03892-6

Dana, A., & Shams, A. (2021). The Effectiveness of the TGFU and SDT Approach on Motor development and achievement Motivation in Children with Attention Deficit Hyperactivity Disorder. Sports Psychology, 5(2), 71-85. https://mbsp.sbu.ac.ir/index.php/IJIHS/about/article_100982.html?lang=en

Dortaj, F., & Asemi, S. (2013). The effect of a selected motor program on perceptual motor ability and academic achievement in borderline second grade elementary school students. https://www.sid.ir/en/journal/ViewPaper.aspx?id=318644

Eghlidi, J., Karbasi, F., Nejati, V., & Tabatabai, M. (2013). Comparison of sustained attention to auditory

and visual stimuli in children with learning disabilities and healthy counterparts. Res Rehabil Science, 9(3), 435-444. https://jrsr.sums.ac.ir/

Emarati, F., Namazizadeh, M., Mokhtari, P., & Mohammadian, F. (2011). The effect of selected primary school playmates on cognitive-motor development and social development of 8-9 year old girls. Rehabil Research, 7(5), 661-673. https://jrsr.sums.ac.ir/

Faal Moghanlo, H., Hosseini, F. S., & Mikaili Manee, F. (2014). Comparison the impact of spark motor program and basketball techniques on improving gross motor skills in educable intellectually disabled boys. Journal of Ardabil University of Medical Sciences, 14(3), 274-284. http://jarums.arums.ac.ir/article-1-692-en.html&sw=

Gallahue, D. L. (1982). Assessing motor development in young children. Studies in Educational Evaluation, 8(3), 247-252. https://www.sciencedirect.com/science/article/abs/pii/0191491X82900281

Ghamari, N., Rafeei, S., Soltani, R., Ghamari, Z., & Yazdani, F. (2015). The effect of occupational therapy interventions on perceptual motor function and drawing skills of mentally retarded children. The Scientific Journal of Rehabilitation Medicine, 4(1), 7-16. http://www.medrehab.sbmu.ac.ir/article_1100003_en.html

Ghasempour, L., Hosseini, F., & Mohammadzadeh, H. (2013). The effect of sensory-motor integration exercises on the development of fine motor skills of mentally retarded children. Disabil Stud, 3(1), 27-36. https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=734679

Ghorbanzadeh, B., Lotfi, M., Azali Alamdari, K., Bashiri, M., & Ebrahimi, S. (2015). Evaluation of the effectiveness of perceptual-motor training and rhythmic motor program training on motor development in children with trainable mental retardation. Rehabil Research, 3(16), 199-207. https://jrsr.sums.ac.ir/

Hashemi, M., Khameneh, N., & Salehian, M. (2015). Effect of selected games on the development of manipulative skills in 4–6 year-old preschool girls. Med Sport (Roma), 68(1), 49-55. https://link.springer.com/article/10.1007/s40279-017-0723-1.

Hemayattalab, R. M., Ghayour, A., & Sheikh, M. (2017). M. The Effect of SPARC Selected Exercises on the Balance and Coordination of Children with Autism. Journal of Growth and Motor-Sport, 9(28), 36-42. https://jmlm.ut.ac.ir/article_62800.html?lang=en

Jokar, T., Karami, S., Sheikh, M., & Jamshidi, A. (2014). The effect of a training program on improving manipulation skills in children with developmental coordination disorder. Motor Behavior, 2(11), 2-4. https://pubmed.ncbi.nlm.nih.gov/26703915/

Kowsari, S. (2010). The effect of selected physical activity on the development of motor skills in children with attention deficit / hyperactivity disorder, Mater thesis. University of Tehran. https://irandoc.ac.ir/

Melanorozi, S. (2009). A study of preschool education on the development of basic skills of 4- to 6-year-old boys. Mater thesis. Arak University. https://irandoc.ac.ir/

Namdar Tajri, S., Farrokhi, A., & Rostami, R. (2015). The effect of physical exercise intervention on motor skills of 7 to 10 year old boys with developmental coordination disorder. Sport Manage Motor Beh, 11(22), 59-68. https://mbj.ssrc.ac.ir/article_1905_0.html?lang=en.

Rahmati, Z., Aslankhani, M. A., & Farsi, A. (2010). The effect of a special movement program on the motor skills of visually impaired primary school students. Master thesis. Shahid Beheshti University. https://irandoc.ac.ir/.

Sabzi, A. H., Dana, A., Salehian, M. H., & Shaygan Yekta, H. (2021). The Effect of Water Treadmill Exercise on Children with Attention Deficit Hyperactivity Disorder. International Journal of Pediatrics, 9(6), 13671-13681. https://ijp.mums.ac.ir/article_17887.html

Salehian, M. H., & Qadiri, S. (2019). Anticipation of Emotion Regulation and Psychological Well-being on Athletic Performance of Professional and Semi-professional Athletes. Sport Psychology Studies (ie, mutaleat ravanshenasi varzeshi), 8(29), 151-170. https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=752032

Shahbazi, S., Khazaei, A., Aghdasi, M., & Yazdanbakhsh, K. (2015). The effectiveness of perceptual-motor exercises on motor skills of children with ADHD. New Rehabil Quart, 9(52), 51-59. https://icssjournal.ir/article-1-125-en.html.