

# The Effect of Motor Perceptual Games on Attention Problem and Spatial Visual Performance of Educable Mentally Retarded Girls

SALEHIAN MH\*, SADEGHI AS, HOSSEINZADEH PR

*Department of Physical Education, Tabriz branch, Islamic Azad University, Tabriz, Iran*

*Received: 06 July 2023 / Accepted: 25 July 2023*

## ABSTRAK

*Tujuan kajian ini adalah untuk menentukan kesan persepsi pergerakan terhadap masalah perhatian, keupayaan dan kelajuan pemprosesan kognitif serta ruang penglihatan dalam kalangan perempuan terencat akal yang boleh dididik. Penyelidikan ini adalah kuasi-eksperimen. Reka bentuk penyelidikan termasuk ujian sebelum dan ujian selepas dengan kumpulan kawalan berdasarkan pemboleh ubah tak bersandar. Statistik populasi ialah di kalangan perempuan terencat akal yang boleh dididik. Seramai 30 peserta dipilih secara rawak dari sekolah luar biasa di Tabriz dan dibahagi secara rawak kepada kumpulan uji kaji dan kawalan. Alat pengukuran dalam kajian ini ialah Connors Child and Adolescent Psychological Questionnaire. Kebolehpercayaan soal selidik ini dilaporkan sebanyak 0.79 melalui kaedah Cronbach's alpha. Ujian keupayaan membaca dan ruang penglihatan dilakukan bagi kedua-dua kumpulan sebagai kajian sebelum. Sesi latihan persepsi pergerakan telah dilakukan dalam 16 sesi selama 45 minit sepanjang tempoh 8 minggu untuk kumpulan uji kaji. Statistik inferens analisis kovarians digunakan untuk perbandingan kumpulan melalui perisian SPSS21 dengan nilai signifikan 0.05. Hasil kajian menunjukkan persepsi pergerakan mempunyai kesan positif yang signifikan dalam mengurangkan masalah perhatian, meningkatkan keupayaan dan kelajuan pemprosesan kognitif serta meningkatkan ruang penglihatan dalam kalangan perempuan terencat akal yang boleh dididik.*

*Kata kunci: Masalah perhatian; pemprosesan kognitif; persepsi pergerakan*

**Address for correspondence and reprint requests:** Salehian Mir Hamid. Department of Physical Education, Tabriz branch, Islamic Azad University, Tabriz, Iran. Tel: +00989144174072 Email: m\_salehian@iaut.ac.ir

## ABSTRACT

The purpose of this study was to determine the effect of perceptual motor games on attention problems, ability and speed of cognitive processing and visual-spatial of educable mentally retarded girls. The study was a quasi-experiment. The research design included pre-test and post-test with control group with independent variable. The statistical population included educable mentally retarded girls. Thirty participants were randomly selected from the girls of exceptional schools in Tabriz and were randomly divided into experimental and control groups. The research measurement tool was the Connors Child and Adolescent Psychological Questionnaire. The reliability of the questionnaire was reported to be 0.79 by Cronbach's alpha method. Reading performance test and spatio-visual performance test were performed for both groups as a pre-test. Perceptual motor game training sessions were performed in 16 sessions of 45 minutes for 8 weeks for the experimental group. Inferential statistics of covariance analysis were used for groups' comparison using SPSS21 software at significant level of 0.05. The results showed that perceptual motor games had a significant positive effect in reducing the attention problems, improving the ability and speed of cognitive processing and improving visual-spatial performance in educable mental retarded girls.

Keywords: Attention problems; cognitive-motor games; cognitive processing

---

## INTRODUCTION

Attention deficit disorder is one of the psychological disorders to which most psychologists and psychiatrists have paid attention. In the guide to diagnosis and statistics of mental illness from Psychiatry Association, Attention Deficit Hyperactivity Disorder (ADHD) is mentioned as an inappropriate attention lacking during growth (inattention) with intensification of impulses, which is one of the most common problems among children with learning disabilities. This causes their efficiency decrease in school (Sabzi et al. 2021). This disorder is one of the most common causes among children to refer to psychology

and psychiatric centers and affects approximately 3-5% of primary school children (Salehian & Sadeghi 2020).

People with the disorder may not be able to pay close attention to detail or may be careless in doing homework, working with other activities. Often, they have erratic activities and tasks are performed carelessly and without sufficient thought. Maintaining attention in play and homework is often difficult for these people and they can hardly concentrate on completing homework (Dana et al. 2018). Based on the pattern of symptoms, three distinct forms of the disorder can be identified: often inattentive form, hyperactive/impulsive form, and combined form (Salehian & Sadeghi 2020).

According to Dana et al. (2019), attention deficit in these children is due to the problems during interaction of inhibition and executive functions. This interaction of behavior is controlled by internally represented information (especially spatial visualisation of rules and self-motivation). Interference control, which Salehian and Sadeghi (2020) believed that it is constant attention and plays an important role in the continuity and strength of purposeful behavior. Accordingly, attention deficit is a secondary consequence that occurs as a result of impaired executive functions and causes damage to behavioral inhibition and poor control, hindering efficient self-government; Impairment of executive functions. For example, short-term memory impairment impairs behavior organisation and time perception. The age of onset of the disorder is determined before the age of five to seven, but it is still difficult to determine at this age, because research findings have shown that sometimes the disorder may be diagnosed after these ages (Salehian & Sadeghi 2020).

Attention deficit disorder is usually described by three basic behaviors: inattention, hyperactivity, and impulsivity. From a neuropsychological perspective, executive functions are among the functions that involve in frontal lobe of an individual. Various studies have shown that people with attention deficit disorder have difficulty with most of the abilities related to executive functions (Dana & Christodoulides 2020).

Salehian and Sadeghi (2020) examined the relationship between

visual perception by advanced perceptual-visual perception test showed that there was a significant relationship between cognitive deficits and the ability to read and the perceptive dimensions of the field shape, perception of the shape stability and understanding spatial relationships. Thus, children with reading disorders are not able to focus on the stimulus, but are misled by the background stimulus, and it is difficult for them to differentiate between the two. These children also have difficulty in recognising any shape, regardless of size, gender, or color. The existence of such a problem makes it to be difficult for them to acquire the skill of recognising a word, regardless of whether it is large or small, printed or non-printed.

Visual-spatial structure is a kind of central cognitive ability. There are many distinct differences between people in the ability to perform visual-spatial tasks. For example, some people can draw very well and some can not draw well, some people can copy complex patterns accurately and quickly, some can copy correctly but slowly, and some can only copy simple patterns (Dehghanmaneshi 2010).

Visual-spatial processing is a process that takes place in the right hemisphere of the brain and allows the recognition of the state of objects and shapes in relation to each other and communication with the observer. This skill helps the child to recognise the sequence of letters and numbers in a word or the sequence of words in a sentence. Visual perception plays a major role in academic learning,

especially in reading. Students have difficulty in completing assignments that require visual distinction between letters and words in doing tasks that include numbers, geometric designs, and pictures. Instructors deal directly with the concepts of visual perception, concepts such as visual tracking, convergence, divergence of image perception and visual sequence memory, spatial relationships are called object perception in space. The child must express the object, or a letter of words, numbers or images and the spatial relationship of that object with the objects that surround it (Salehian et al. 2023; Hosseinzadeh Peyghan et al. 2022).

Visual-spatial processing defects affect how visual information is stored in memory. Problems in visual-spatial processing and clear vision make it difficult for them to perform these simple tasks. These problems are not due to failure to understand the task or lack of knowledge to complete the tasks, but rather, the problem of these children is their special inability to process visual-spatial and visual-motor information (Salehian & Sadeghi 2020).

In today's world, sports are no longer seen as entertainment; rather, the role of exercise in human mental health is accepted by all. This is because exercise is used as a therapeutic approach in the treatment of many disorders and disabilities, especially in children. One of the most valid programs is perceptual-motor training programs, which are based on the level of development and have many other elements. Increasing physical, spatial, directional, and temporal awareness

as a mean of guiding the child toward motor control improves the ability to perform movements (Baniasadi & Ghanati 2021).

It should be noted that perceptual motor activities refer to a group of exercises that are designed to improve children's perceptual abilities by physical activity and exercises. Activities such as physical awareness exercises, orientation awareness, spatial and temporal awareness are among these exercises (Rahbanfard 2018). Considering that the physical activity is an important factor in the overall development of the child, including motor development and athletic talents, it plays an important role and has attracted the researcher to study in this issue. Therefore, this study investigated the effect of a selected physical activity on reducing attention problems, improving the speed of cognitive processing and spatial visual function of educable mental retardation girls to help the emotional, intellectual, social and physical development of the children.

## MATERIALS AND METHODS

Due to the fact that the interfering factors during the research were not under the control of the researcher, the present study adopted quasi-experimental design.

Table 1 showed the research design included pre-test and post-test with control group and intervention (8 weeks perceptual-motor training program) on some motor and cognitive factors of children with mental disabilities.

TABLE 1: The design of the research

Groups	Pre-test	Independent variable	Post-test
Exp.	T <sub>1</sub>	Perceptual-motor training	T <sub>2</sub>
Control	T <sub>1</sub>	-	T <sub>2</sub>

## Statistical Society

The statistical population included 46 educable mentally retarded girls who attended the special schools of Tabriz in the academic year 2020-2021.

## Participants

Thirty students based on scores obtained from the questionnaire, after final approval by a psychologist, were selected and randomly divided into two groups of 15 experimental and control ones. Criteria for inclusion in this study were no medication, good in physical health and no neurosurgery.

## Research Measurement Tools

A consent form was provided for the participant's agreement to participate in the trainings. Personal Questionnaire was used to collect information of the subject's pre-test and post-test. Connors Child and Adolescent Psychological Questionnaire was developed by Connors (1998) to assess the neuropsychological problems of children aged 5 to 12 years. This questionnaire measured attention problems, sensory motor function, language function, executive functions, memory and learning function, cognitive ability and speed of

processing, visual and spatial function academic performance: reading, writing, mathematics in 4 ranges (not observed to severe) were evaluated in Likert rating. In this study attention problems with 14 items, ability and speed of cognitive processing with 7 items and spatial visual function with 5 items were measured in the scale of four from 1=not observed, 2=mild, 3=moderate and 4=severe.

## Reliability of the Questionnaire

Abedi (2007) had translated and standardised this questionnaire in Iran. He reported the construct reliability of this questionnaire to be 0.79 by Cronbach's alpha method (Abedi 2007).

## Data Collection Method

After selecting the samples reading performance test and visual-spatial performance test were performed for both groups as a pre-test and the perceptual motor games were performed in 16 sessions of 45 minutes for 8 weeks in the experimental group but no training and intervention was performed in the control group. Finally, after 8 weeks of training sessions; the same test for measuring post-test reading and visual-spatial performance of students was measured and compared between the two groups to assess the effectiveness of perceptual motor games training on memory and learning speed.

## Exercise Protocol

This program was set for 16 sessions and its duration was 45 minutes per day and 2 training sessions per week. Due to the motor and cognitive problems that the children have developmental coordination disorders including static and dynamic balance, coordinated and simultaneous movements, identifying different directions, weakness in body posture or height. For this purpose, the implementation of perceptual motor program was considered.

sessions in 45 minutes per day and 2 sessions per week.

Table 3 showed all variables had a normal distribution (significant level greater than 0.05).

### Perceptual Motor Games

### Statistical Analysis Methods

Inferential analysis of covariance was used for intra-group and inter-groups comparisons using SPSS21 software at significance level of 0.05.

Table 2 showed perceptual motor program was considered for 16

### RESULTS

Kolmogorov-Smirnov test was used to evaluate the normality of the

TABLE 2: Performing perceptual motor games in the training package

	Content training session on perceptual motor games	Time
1	Familiarity with the method, purpose legislation and the need for intervention for parents, familiarisation of the child with the coach and playroom	45 minutes
2	Walk on the board, keep your balance, jump, leap and cross the hurdle	45 minutes
3	Move the pencil between two lines that gradually become narrower. Find the differences and similarities between the two shapes	45 minutes
4	Picking dominoes, using codes, picking colored beads like a therapist	45 minutes
5	Games similarities and differences, touching objects with your eyes closed and recognising and drawing them	45 minutes
6	Puzzle games, role from the background, visual completion (completion of the figure)	45 minutes
7	Tangram game, space relations game, game with directions (left, right, up and down)	45 minutes
8	See and Tell games and storytelling based on book pictures, Lee Lee play and role from the background	45 minutes
9	Telegram games, scissoring around shapes, identifying the path of mazes	45 minutes
10	Colored mosaic games, opening and closing small to large bolts and nuts	45 minutes
11	Darts throwing games, detect objects based on sound, separate images according to the beginning and end sound	45 minutes
12	Tangram games, find the differences and similarities of the two shapes	45 minutes
13	Spinning the beads according to the pattern, point game, direction game	45 minutes
14	Puzzle games, see and tell games and storytelling based on book pictures	45 minutes
15	Tangram games, visual completion (complete the figure)	45 minutes
16	Identify similar objects, find hidden images, identify maze paths	45 minutes

TABLE 3: Results of Kolmogorov-Smirnov test to check the normality of the distribution of variables

Factors	N	Z	Sig.
Pre-test attention problems	30	.428	.993
Post-test attention problems	30	.541	.932
Pre-test ability and speed of cognitive processing	30	.672	.758
Post-test ability and speed of cognitive processing	30	.565	.906
Pre-test spatial visual function	30	.765	.603
Post-test spatial visual function	30	.993	.277

distribution of variables. According to the obtained significance levels, it was concluded that all variables had a normal distribution (significance level greater than 0.05).

According to the Table 4, the group effect was significant at the level of 99% probability ( $p=0.001$ , Eta squared = 67,  $F = 54.39$ ). That was, after adjusting the pre-test scores, the scores of post-test attention problems in the control group and the experimental group had

a significant difference.

According to the Table 5, the adjusted means indicate that the scores of attention problems in the experimental group ( $m=23.38$ ) were significantly lower than the control group ( $m=26.35$ ). Therefore, it was concluded that perceptual motor games had a significant positive effect on reducing the attention problems of educable mentally retarded girls.

According to the Table 6, the group

TABLE 4: Results of differences in attention problems in the post-test between the experimental and control groups

Source of change	SS	df	MS	F	P	$\eta^2$
The effect of pre-test	752.09	1	752.09	631.25	.001	.95
Group effect	64.80	1	64.80	54.39	.001	.66
Error	32.17	27	1.19			
Total		30				

TABLE 5: The adjusted mean of attention problems in two groups

Group	N	adjusted mean	standard error
Experimental	15	23.38	0.283
Control	15	26.35	0.283

effect was significant at the level of 99% probability ( $p=0.001$ ,  $\eta^2= 0.63$ ,  $F=45.67$ ). That was, after adjusting the pre-test scores, the ability scores and the speed of cognitive processing in the post-test in the control group and the experimental group had a significant



TABLE 6: Results of difference between the ability and speed of cognitive processing in the post-test between two groups

Source of change	SS	df	MS	F	P	$\eta^2$
The effect of pre-test	144.67	1	144.67	366.63	.001	.93
Group effect	18.02	1	18.02	45.66	.001	.62
Error	10.65	27	.39			
Total		30				

differences.

According to the Table 7, the adjusted means indicated that the scores of ability and speed of cognitive processing in the experimental group (m=13.99) were significantly lower than the control group (m=15.55). Therefore, it was concluded that perceptual motor

TABLE 7: The adjusted mean of cognitive processing ability and speed

Group	N	adjusted mean	standard error
Experimental	15	13.98	0.163
Control	15	15.54	0.163

games had a significant positive effect on improving the ability and speed of cognitive processing of educable mentally retarded girls.

According to the Table 8, the group effect was significant at the level of 99% probability ( $p=0.001$ ,  $\eta^2=58$ ,  $F=36.70$ ). That was, after adjusting the

pre-test scores, the amount of visual-spatial performance scores in the post-test in the control group and the experimental group has a significant difference.

According to the Table 9, the adjusted means indicated that the rate of spatial visual performance in the experimental group (m=7.56) was significantly lower than the control group (m=9.18). Therefore, considering that lower scores indicated better status, it was concluded that perceptual motor games had a significant positive effect on improving visual-spatial performance in girls with educable mentally retardation.

## DISCUSSION

The results showed that perceptual motor games had a significant positive effect on reducing the attention problems of educable mentally retarded girls. The results of this

TABLE 8: Results of difference in visual-spatial function in post-test between experimental and control

Source of change	SS	df	MS	F	P	$\eta^2$
The effect of pre-test	108.25	1	108.25	202.79	.001	.883
Group effect	19.58	1	19.58	36.69	.001	.576
Error	14.41	27	.532			
Total	2247	30				



TABLE 9: The adjusted mean of visual spatial performance

Group	N	adjusted mean	standard error
Experimental	15	7.55	0.189
Control	15	9.17	

study are consistent with the findings of Sabzi et al. (2021) and Hashemi and Salehian (2015). In their studies, these researchers also concluded that sensory-motor interventions led to the strengthening of cognitive skills, including increasing the range of attention. Dana et al. (2018). In examining the effectiveness of cognitive-motor training interventions on increasing the attention span of students with learning disabilities, it was shown that cognitive-motor exercises led to increasing attention span of students with learning disabilities.

It can be said that there are several recognisable subsystems in the perceptual-motor system. The functional processes of the nervous system operate on the basis of information provided by subsystems and ultimately lead to skillful and purposeful action. Defects in these subsystems or processes lead to poor motor skills. These subsystems include; sense of motion, visual perception, balance, memory and attention, motor performance system, motor readiness processes, perceptual feedback processes, automatic control and learning process (Magill 2000). It can be said that perceptual-motor exercises strengthen motor performance by enhancing these subsystems. The

results of the present study can also be explained by relying on ecological theories such as dynamic perspective (Dana et al. 2019) and perceptual-action theory (Payne & Issacs 2002). On the other hand, other experts believe that motor skill trainings provide good opportunities to actively absorb various sensory inputs from the environment. In fact, purposeful motor behaviors improve the interaction of the cerebral and cerebellar cortex, and this leads to improved cognitive skills, including attention (Baniyasi et al. 2019). Therefore, according to a comprehensive theoretical explanation and a strong research background, it can be said that sensory-motor interventions increase the attention scope of students with learning disabilities.

The results showed that perceptual motor games have a significant positive effect on improving the ability and speed of cognitive processing of girls with educable mentally retardation. The results of this study were alongside with the findings of Dana et al. (2019) and Hashemi and Salehian (2015). The results of the present study contradicted the findings of the Rahbanfard (2018) and the reason for this can be considered as a different physical activity program had applied to the subjects.

This can be explained by the theories of Gomez-Pinilla (2011) who believed that the vital connection between motor learning and cognitive development was identified. Selective attention to certain stimuli or failure to respond to some of them in a timely manner is often due to our inadequate

pathway capacity or our inability to address all sensory cues at the same time, which results in increased motor skills due to the practice of motor skills. Nerve cells and the formation of new synapses increase the ability to selectively react as repeated use of the neural pathways. In fact, long-term sensory stimulation increases brain synapses and ultimately leads to high-level sensory perception, which in turn reduces reaction time in individuals. Perceptual-motor exercises facilitate neurodegeneration, create new synaptic structures, reduce cognitive impairment (Salehian & Sadeghi, 2020), increase visual perception by increasing visual productivity signal (Coetzee & Pienaar 2013), improve cognitive and neurological health (Norton et al. 2011), increase information processing performance, increase neurotransmitter productivity, behavioral function recovery and emotion regulation (Afshari 2012), which can increase neurophysiological productivity, brain development, improve motor development, increase nervous system function and cognitive function (Velikonja et al. 2010).

The results showed that perceptual motor games have a significant positive effect on increasing the visual-spatial function of girls with educable mental retardation. The results of this study are alongside with the findings of Dana & Christodoulides (2020). Ebrahimi Thani (2010) studied of the effect of a selected motor program on visual-motor skills of 7-11 years old students with developmental coordination disorder, it was concluded that the implementation

of a motor program is positive on the visual-motor skills of children with developmental coordination disorder. Because Sabzi et al. (2021) had stated that the development of visual-spatial processing in children ultimately led to children understanding more abstract concepts, it can be said that improving visual-spatial perception can lead to cognitive and verbal development in children. In this regard, proponents of the perceptual motor method atonement believe that motor learning is the beginning of learning and higher mental processes after the proper development of the motor and perceptual system and the links are created between movement and perception (Salehian & Sadeghi 2020). Hosseinzadeh Peyghan et al. (2023) transferred severely mentally retarded children to an educational environment and taught them by playing and after two years, their mental age increased 14 months while the children living in an uneducational center grew to 6 months. In this way, these games can be effective in children's subsequent academic achievement. It can be noted that perceptual-motor games, by strengthening children's visual-spatial processing, make the children have more accurate perception of what they see and read, and this is one of the ways to develop perception in children. Children with developmental coordination disorders not only have problems with motor coordination and perception, but also have problems in controlling eye movements and attention. They also have learning difficulties (Coetzee & Pienaar 2013). Chang and Yu (2010)

showed children with developmental coordination disorders need more time to learn and write a new word, in fact, because learning new things increases visual feedback and also prepares. Children with developmental coordination disorders have problems with the integration of their visual and motor systems, receive limited visual feedback, and become slow to write difficult words (Chang & Yu 2010). Lack of visual attention and difficulty in visual processing can lead to dysfunction of reading (Baniasadi & Ghanati 2021) and improving eye movement control skills can lead to improved motor skills of the child as well as academic skills of reading, writing and mathematical ability (Baniasadi & Salehian 2021). It can be said that enhancing the perception and processing of visual-spatial can lead to better visual perceptions and strengthen the writing of these children. We should encourage these children to play group games as much as possible, because playing in a group requires coordinating his/her body movements to perform activities, also coordinating his/her position and conditions with other people.

## CONCLUSION

Motor perceptual games have positive effects on attention problem and visual-spatial performance of educable mentally retarded girls and it is suggested for all schools and institutions.

## REFERENCES

- Abedi, A. 2007. Preliminary standardization and effectiveness of early interventions on rehabilitation of children with disabilities learning the effect of psychological-developmental preschool. *PhD thesis*. University of Esfahan.
- Afshari, J. 2012. The effect of perceptual-motor training on attention in the children with autism spectrum disorders. *Res Autism Spect Disorder* 6(4): 1331-6.
- Baniasadi, T., Ghanati, P. 2021. The association between physical activity and motor function in the elderly. *J Human Insight* 5(3): 8-11.
- Baniasadi, T., Namazizadeh M., Sheikh M. 2019. The effects of balance training and focus of attention on sway in postural and supra-postural tasks in the elderly population. *Motor Behav* 11(36): 89-104.
- Baniasadi, T., Salehian, M.H. 2021. The effect of psychological well-being on athletic performance of professional athletes. *Pak J Med Health Sci* 15(5): 1680-2.
- Chang, S.H., Yu, N.Y. 2010. Characterization of motor control in handwriting difficulties in children with or without developmental coordination disorder. *Dev Med Child Neurol* 52(3): 244-50.
- Coetzee, D., Pienaar, A.E. 2013. The effect of visual therapy on the ocular motor control of seven - to eight - year - old children with Developmental Coordination Disorder (DCD). *Res Dev Disabil* 34(11): 4073-84.
- Conners, C.K., Sitarenios, G., Parker, J.A., Epstein, J.N. 1998. Revision and restandardization of the Conners' teacher rating scale: factor structure, reliability, and criterion validity. *J Ab Child Psych* 26(4): 279-92.
- Dana, A., Rafiee, S., Soltan Ahmadi, T., Sabzi, A.H. 2018. The effect of education based on the developmental physical education on students' attention-deficit/hyperactivity disorder. *Motor Behav* 10(32): 17-34.
- Dana, A., Christodoulides, E. 2020. The effects of a period of selected physical activity on improving manipulative and locomotor skills of children with neuropsychological learning disabilities. *J Rehabil Sci Res* 7(1): 25-30.
- Dana, A., Rafiee, S., Gholami, A. 2019. Motor reaction time and accuracy in patients with multiple sclerosis: effects of an active computerized training program. *Neurol Sci* 40(9): 1849-54.
- Dehghanmaneshi, S. 2010. Evaluation and comparison of visual-spatial abilities of 8-10 year old students with and without attention deficit/hyperactivity disorder. *Master Thesis*. Faculty of Psychology and Educational Sciences, Allameh Tabatabai University

- Ebrahimi Thani, Z. 2010. The effect of a selected motor program on visual-motor skills of 7-11 year old students with developmental coordination disorder. *Master Thesis*. Faculty of Physical Education, Shahid Beheshti University.
- Gomez-Pinilla, F. 2011. The combined effects of exercise and food in preventing neurological and cognitive disorders. *Prev Med* 52(Suppl 1): 75-80.
- Hashemi, M., Salehian, M.H. 2015. Effect of selected games on the development of manipulative skills in 4-6 year-old preschool girls. *Med dello Sport* 68(1): 49-55
- Hosseinzadeh Peyghan, R., Salehian, M.H, Khaje Aflaton Mofrad, S., Shafaeianfard, F. 2022. The effects of model's skill level on learning a basketball skill in children with autism. *J Modern Psych* 2(3): 14-21.
- Hosseinzadeh Peyghan, R., Salehian, M.H., Khajeaflaton Mofrad, S., ShafaeianFard, F. 2023. The effects of model's skill level on learning a basketball skill in children with autism. *J Modern Psych* 2(3): 14-21.
- Magill, A.R. 2000. *Motor learning: Concepts and Applications*, McGraw-Hill Higher Education.
- Norton, D.J., McBain, R.K., Ongür, D., Chen, Y. 2011. Perceptual training strongly improves visual motion perception in schizophrenia, *Brain Cogn* 77(2): 248-56.
- Payne, V.G., Issacs, I.D. 2002. *Human motor development*. New York: Mc Graw Hill.
- Rahbanfard, H. 2018 The effect of special exercise program on perceptual-motor abilities of mentally retarded students 13-10 years old in Tehran (Shadi Exceptional Elementary School). *Master Thesis*. University of Tehran.
- Sabzi, A., Dana, A., Salehian, M.H., Shayghan Yekta, H. 2021. The effect of water treadmill exercise on children with attention deficit hyperactivity disorder. *Inter J Pediatric* 9(6): 13671-81.
- Salehian, M.H., Sadeghi, S. 2020. The effect of motor perceptual games on attention problem and spatial visual performance of Educable mentally retarded girls. *Master Thesis*. Tabriz branch, Iran.
- Salehian, M.H., Hosseinzadeh Peyghan, R., Shafaeifard, F. 2023. The effects of mental imagery and physical practice on learning dart-throwing in children with ADHD. *J Mod Psych* 2(4): 1-7.
- Velikonja, O., Curic, K., Ozura, A., Jazbec, S.S. 2010. Influence of sports climbing and yoga on spasticity, cognitive function, mood and fatigue in patients with multiple sclerosis. *Clin Neurol Neurosurg* 112(7): 597-601.