Original Article

The effect of Perceptual Motor Training on Motor Skills of preschool children

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Objectives: The aim of this study was to determine the effect of perceptual-motor training on motor skills of normal preschool children (aged 4-6 years) in Esfahan city.

Methods: This was a quasi-experimental study with intervention and control groups. Each group included 30 normal preschool children aged 4 to 6 years. They were selected randomly; children of intervention group from one empowering children center and the control group from preschool centers, of Esfahan city in 2013. The intervention group received perceptual- motor training for 15 sessions (each 1 hour) during 2 months. The measurement was Bruninks– Oseretsky test that was implemented as pre- and post-tests. Data analysis was done by SPSS version 18.

Results: The intervention group had significantly higher motor skills (gross and fine motor skills) scores after training, in comparison to control group (p= 0.000).

Discussion: It seems that the perceptual- motor training can improve the motor skills level of preschool children. So it is recommended as a useful method for motivation of motor skills development in preschool centers.

Keywords: perceptual– motor training, motor skills, preschool children

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Introduction

One of the important factors in children development is perceptual-motor abilities, that like other aspects of the human develops in early childhood (1). The acquisition of motor skills require to obtain perceptual skills (2). According to many researches, the effective functioning of perceptual-motor is essential for improving students in all three areas of education and training (cognitive, affective and psychomotor) and also for motor skills development. These capabilities should be developed in the early stages of child's life naturally; this means that these capabilities and features are achieved at age 6 or 7 years, if the child has normal development (3, 4).

In fact, almost every movement is a kind of perceptual-motor skill. Human movement depends on his environment, situation and position. In order to develop perceptual-motor abilities, initial experiences of the movement of children have special importance. Cole in his "pre-school education program," pointed out that the early years of childhood, is an important and appropriate stage to learn motor skills, because:

1) Children's bodies at this stage are more susceptible to learning than adolescents and adults, and therefore it is easier to learn skills.
2) Children at this stage have fewer skills and therefore do not interfere with the learning of new skills.
3) Children at this stage are more curious and eager to learn broader, and make more effort.
4) At this age, children are still growing; form bones and muscles. Skeletal muscles and joints of the hands and feet grow during this period.
5) Most importantly, in this age, learning new habits is more durable.

Thus, according to the energy and dynamic characteristics of the children, if appropriate program is not perform for them, the basic body position and movements such as sitting, standing,

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walking, running and exercise and sport movements fail to obtain properly (5, 6).

Tucker conducted one systematic review, on the levels of physical activity in preschool children in 2008. In his study, after examining the evidence from 39 studies (1986-2007), 10316 patients (5236 males and 5080 females) were recruited from seven countries, he concluded that nearly half of the preschool children did not get enough physical activity, and although at least 60 minutes of physical activity per day is necessary for children, but only 54% of the participants in the studies had enough physical activity. Thus, an effective intervention for promoting physical activity in children is essential (7).

As studies about the relationship between learning of perceptual-motor abilities and motor skills development in preschool children are not enough, we decided to conduct this study to determine the effect of perceptual- motor training on motor skills in preschool children.

Methods

This study was a quasi-experimental with intervention and control groups. The study population was all children 4-6 years of one empowering children's center in Isfahan city. The sampling method was randomly. After providing information to parents about the aims of the research and obtaining consent form, 30 children were assigned to intervention group. Thirty children were also selected randomly from near preschool centers.

The measurement was Bruninks– Oseretsky test that was implemented for pre- and post-tests in both groups. This test assesses motor function of children aged 4-14 years. The complete form of test is composed of eight sub-tests consist of 46 items that assess the motor skills and also separately gross and fine motor skills. The short form of test consists of 14 items and provides a brief review of the adequacy of general movements. The performance of this test requires 45 to 60 minutes.

Each of eight sub-tests of the Bruninks– Oseretsky test is designed to assess a specific aspect of motor development. Four sub-tests assess the gross motor skills, three sub-tests assess fine motor skills and one sub-test assesses both the gross and fine motor skills. These eight sub-tests include: 1: Agility and speed of running (one item). This subtest assesses the running speed during a certain route. 2: Balance (eight items). Three items evaluate the static balance, when the child stands on one leg. 5 items evaluate the balance performance of children at walking. 3: Bilateral coordination (eight items). Seven items evaluate the simultaneous coordination between upper and lower limbs. One item evaluates the upper limb coordination. 4: Strength (three items). This sub-test evaluates the arm, shoulder, abdominal and leg strengths. 5: Upper limb coordination (nine items). Six items evaluate visual pursuit with the movements of the arms and hands. Three items evaluates the accuracy of the arms, hands or fingers movements. 6: Response time (one item). This sub-test measures the ability of rapid motor response to visual stimuli. 7: Visual-motor control (eight items). This subtest evaluates the precise and coordinated movements of the hands in coordination to vision. 8: Speed and agility of upper limb (eight items). This sub-test evaluates the agility of the hands and fingers, and the speed of the arms and hands movements.

Bruninks–Oseretsky test evaluates gross motor, fine motor, and total motor skills. These items are expressed in a standardized score with a mean of 50 and a standard deviation of 10.

The perceptual-motor training was performed during two months (fifteen sessions; one hour per day for 2 week) for intervention group. Perceptual-motor training included the training movements of static and dynamic balances, balance orientation skills, body awareness, understanding shape, determination and sequences of auditory and visual, auditory and visual perception, eye-hand coordination and spatial relationships. Post-test was performed after intervention in 2 groups. Data were analyzed by SPSS version 18, and covariance analysis was used for evaluation of the intervention.

Results

Sixty children in 2 groups (each 30) participated in this study. Two groups were matched in aspect of gender using the chi-square test. There was no significant difference in gender distribution between 2 groups ($p=0.792$).

Two groups were matched in aspect of age, using independent t-test. There was no significant difference between 2 groups in aspect of age ($p=0.567$).The mean ages of children were 5.77 years (±0.43); and 5.70 years (± 0.47) in intervention and control groups respectively. The pre and post-tests showed that the children of intervention group had higher post-test scores than the control group. The total motor skills scores in intervention group were significantly higher than control group in post-test (table 1, $p= 0.000$).

Table 1. Means and standard deviations of total motor skills scores in pre- and post-tests in 2 groups.

Variable	Group	Pre- test		Post- test		PV
		mean	SD	mean	SD	0.000
Total motor skills	Intervention (n=30)	72.77	11.89	90.70	11.60	
	Control (n=30)	69.97	9.41	73.63	9.73	

Table (2) shows that the fine motor skills scores in intervention group were significantly higher than control group in post- test (p= 0.000).

Table 2. Means and standard deviations of fine motor skills scores in pre- and post-tests in 2 groups.

Variable	Group	Pre- test		Post- test		PV
		mean	SD	mean	SD	0.000
Fine motor skills	Intervention (n=30)	26.50	5.38	35.10	5.96	
	Control (n=30)	24.43	5.32	26.23	5.32	

Table (3) shows that the gross motor skills scores in intervention group were significantly higher than control group in post- test (p= 0.000).

Table 3. Means and standard deviations of gross motor skills scores in pre- and post-tests in 2 groups.

Variable	Group	Pre- test		Post- test		PV
		mean	SD	mean	SD	0.000
Gross motor skills	Intervention (n=30)	35.07	5.82	40.23	5.64	
	Control (n=30)	33.93	4. 23	35.40	5.06	

Discussion

This study showed that after perceptual-motor training, intervention group achieved higher scores in motor skills than the control group, which represents the effect of this training on motor skills development. Findings of this study about the effect of perceptual- motor training on fine motor skills are consistent with the findings of Lupu(8), Miquelote et al (9), Mohammadi and sabzi (10), Sheikh et al (11), Reimer et al (12), and Ghodsi (13).

Lupu (23) studied the influence of motor games on motor and mental development of preschool children. He selected 24 children (girls and boys), 5 to 6 years, from a preschool center, (12 children in intervention and 12 children in control groups). The purpose of the study was whether there are significant differences between the intervention group which was exposed during the whole week with motor games, and the control group which was exposed to only one day a week of activities. The results showed that the use of a scientific and systematic method in the game has positive effect on the capacity of movement control and promotes mental and motor skills of children. Therefore, motor activities is necessary for mental and motor development in preschool children (8).

The results of the study about improving overall motor skills are consistent with the findings of the studies of Dortaj and Asemi (14) , Salman et al (15), Shahbazi (16), Aghaei Baliani (17), Piek (18), Geuze (19), Shirvani Broujeni (1) , Rohbanfard (20) Pienaar (21), Asonitou (22), Lupu (23). Dortaj and Asemi examined the effect of selected motor program on cognitive-motor skills and academic achievement in students with slow learning in second grade of primary school. They found that the program has a positive effect on the development of cognitive– motor abilities including dynamic balance, static balance, speed, coordination, accuracy and strength, but there was no significant difference in muscle strength between two groups. There was also a significant effect on academic achievement in intervention group (14).

Shahbazi et al determined the relationship between perceptual-motor abilities and creativity among Iranian students, 12-14 years old. They showed that there was a positive relationship between cognitive-motor abilities and creativity of students; as they can develop their creativity through participation in school physical education programs (16). Pienaar et al investigated the effect of a Kinderkinetics program on components of children's perceptual-motor and cognitive development and they found that the program has a significant effect on improving the fine motor, gross motor, perceptual-motor and total motor abilities in pre-school children (21). The promotion of motor skills development in our study may be due to the motor training; there were many activities that required eye-hand coordination, hand and foot coordination and overall body coordination for doing them. So these activities may be promoted these skills, and finally, helped to the development of motor skills in child.

However the genetic factors, innate determinant of individual potential, and also environmental factors determine the degree of success of an individual to develop these abilities. The first six years of child's life are very critical years; development rate in these years is much higher than the other periods, and basic movement patterns are shaped in this period. So promoting of child movements can affect all aspects of development (physical, cognitive, social and moral, etc.) in this period. Therefore, we have to

provide the appropriate incentives to foster an environment appropriate for a child's full potential (4, 24). The correct and proper instructions in pre-school courses will lead body movements properly so they that will become more organized in later periods.

Conclusion

Early movement experiences will form the main basis for the development of perceptual-motor abilities, and early childhood is the best period to promote these capabilities. This study showed that the positive effect of perceptual-motor training on motor skills development and it seems that the perceptual- motor training can improve the motor skills level of preschool children. So this training is recommended as a useful method for promotion of motor skills development in preschool centers via regular programs.

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