

Effects of Selected Exercises on Elementary School Third Grade Girl Students' Motor Development

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Abstract

Purpose: The aim of this study was to examine the influence of selected exercises on motor development in elementary school third grade girl students in Ahvaz City, Iran.

Methods: The present study was semi-experimental, performed as field and using experimental and control groups. The statistical population included all third grade girl students of elementary schools of Ahvaz city (10,500 subjects). Forty of whom were randomly selected (cluster stage) and then were divided randomly into two experimental (N=20, Mean age=8.9±0.49) and control (N=20, Mean age=8.9±0.48) groups. Experimental group was given training for eight weeks, 3 sessions per week and each session lasting 45 minutes. To measure motor development, the Test of Gross Motor Development, edition2 (TGMD-2; 2002) was applied. Statistical analysis was performed using independent t-test and paired t-test.

Results: The results showed statistically significant differences between control and experimental groups regarding locomotion skills (8.433, $P<0.05$), manipulation skills (10.951, $P<0.001$) and overall motor development (13.203, $P<0.001$). In fact, selected exercises impacted on the motor development of subjects and led to their motor development progress.

Conclusions: The selected exercises can be used as an appropriate plan to improve motor skill development in third grade of elementary school.

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INTRODUCTION

Regular participation in physical activity is associated with substantial health benefits for children and adolescents including increased bone mass, maintenance of healthy weight, reduction in high

blood pressure among hypertensive adolescents and improved psychosocial behaviors^[1].

There are a number of factors positively associated with physical activity in youth including self-efficacy in one's ability to overcome barriers to physical activity, perceptions of physical or sport competence,

having positive attitudes toward physical education, enjoying physical activity, and parent, sibling and peer support. An additional determinant of physical activity among children and adolescents may be the level of mastery of the movement skills that are foundations for the skills used in common forms of adult physical activity. Children with poor motor proficiency may subsequently choose a more sedentary lifestyle to avoid these movement difficulties^[2].

Motor development may act as a 'control parameter' for further development, in that some motor abilities may be prerequisite for the acquisition or practice of other developmental functions such as perceptual or cognitive ability^[3].

On the other hand, one of the reasons for the fact that we value physical activity is the health benefit associated with a physically active lifestyle. Other reasons are the developmental need to explore and master our environment, to express ourselves through movement and to feel satisfaction resulting from successful movement. Physical activity also provides an opportunity for affiliation^[4].

Since fundamental movement skills are considered prerequisite to, or foundation of, the specific skills used in popular forms of adult physical activity, it is reasonable to assume that there may be a relationship between an individual's participation in physical activity and his/her mastery of fundamental movement skills. Fostering enjoyment of, and participation in, physical activity during childhood and adolescents may contribute to an increased prevalence of participation in the adult population^[1].

Regarding the importance of movement and activity in children's motor development, particularly in elementary schools, motor development and the factors affect it have been investigated in different forms by researchers. With regard to previous researches and importance of effect of physical activity on gross motor development, the aim of the present study was to examine the influence of selected exercises on motor development in elementary school third grade girl students in Ahwaz City. Here questions are raised whether selected exercises affect gross motor skills development in third grade students and if there are any differences between motor development of students who take exercises and those who do not.

METHODS AND SUBJECTS

Setting and participants:

This study was conducted in Ahvaz, Iran, during 2008-2009. The study took place in elementary schools in a middle class including 9-year-old girls. This study was semi-experimental and its statistical population composed of all elementary school third grade girl students of Ahvaz city (N=10500). Statistical sample of this study included 40 students who were randomly (cluster - stage) selected and then were divided into two groups of experimental (n=20) and control (n=20).

Instrumentation:

To measure motor development, the test of gross motor development edition-2 (TGMD-2)^[10] was selected. This test evaluates 6 locomotion skills i.e. running, galloping, skipping, striding, horizontal jumping, slipping, and manipulation skills i.e. strike a static ball, dribbling, receiving, striking with foot, throwing over the head and rolling under the hand. The test has been translated by Sports Medicine Research Center of Tehran University of Medical Sciences. Reliability of this scale was 0.76 for locomotion scale, 0.62 for manipulation scale and 0.71 for motor efficiency and all scales displayed acceptable reliabilities (internal consistencies) for research purposes.

Intervention program:

Program included an eight-week period of selected exercises. The length of each session was 45 minutes. Sessions took place three days a week according to a specific lesson plan. Each session consisted of three parts: heating, selected exercises and cooling.

Procedures:

This study has been confirmed by research council of Chamran University and utilized a pretest and posttest applying design.

Statistical methods:

Both descriptive and inference statistics were performed using SPSS version 14. To organize and summarize, classification of raw scores and to describe sample characteristics, descriptive statistics (frequency, mean, standard deviation, drawing diagrams and

Table 1: Pre- and posttest standard scores and percentile ranking of motor development test, locomotion test and manipulation test

Test	Groups	Pretest Mean (SD)	Posttest Mean (SD)
Motor Development	Control (N=20)	70.4 (8.04)	72.5 (7.30)
	Experimental (N=20)	65.2 (10.63)	106.3 (7.59)
Locomotion skills	Control (N=20)	3.2 (1.32)	4.4 (1.66)
	Experimental (N=20)	3.3 (1.98)	9.5 (1.19)
Manipulation skills	Control (N=20)	6.9 (2.35)	6.4 (2.28)
	Experimental (N=20)	5.05 (2.28)	12.6 (1.66)

tables) and to analyze data independent t-test and paired t-test were applied. $P < 0.05$ was considered statistically significant.

RESULTS

Results related to pre- and posttest standard scores, percentile ranking of motor development test, locomotion test, and manipulation test are shown in Table 1. As shown in Table 1, motor development (motor efficiency), locomotion and manipulation skills development are affected by practice in the experimental group. There is no significant difference

between two groups in terms of pretest motor development (motor efficiency) ($t = -1.76$, $P = 0.08$).

In order to evaluate homogeneity of both experimental and control groups in terms of motor development (motor efficiency) following the pretest, independent t-test was performed. Results of paired t-test related to experimental group for motor development, locomotion skills development, and manipulation skills development are presented in Table 2. Motor development changed significantly in pre and posttest experimental group. In other words, selected training program has had significant impact on motor development. It has had significant impacts on locomotion and manipulation skills development as well.

As shown in Table 3, a significant difference was observed between two experimental and control groups

Table 2: Results of paired t-test related to experimental group for motor development, locomotion skills development, and manipulation skills development

Test	Groups	Pretest Mean (SD)	Mean Difference	t	P value
Motor Development	Pretest Examination (N=20)	65.2 (10.63)	-41.100	-17.75	0.001
	Posttest Examination (N=20)	106.3 (7.59)			
Locomotion skills	Pretest Examination (N=20)	3.3 (1.98)	-6.150	-16.86	0.001
	Posttest Examination (N=20)	9.5 (1.19)			
Manipulation skills	Pretest Examination (N=20)	5.0 (2.28)	-7.75	-12.58	0.001
	Posttest Examination (N=20)	12.6 (1.66)			

Table 3: Results related to status of independent “t” test to compare motor development, locomotion skills and manipulation skills development in experimental and control groups

Test	Groups	Pretest Mean (SD)	Mean Difference	t	P value
Motor Development	Control (N=20)	2.10 (8.20)	39	13.20	0.001
	Examination (N=20)	41.10 (10.35)			
Locomotion skills	Control (N=20)	1.25 (1.63)	-4.9	8.43	0.001
	Examination (N=20)	6.15 (2.02)			
Manipulation skills	Control (N=20)	-0.55 (1.93)	-8.1	10.95	0.001
	Examination (N=20)	7.55 (2.68)			

in posttest motor development. Furthermore, significant differences were reported between two experimental and control groups in posttest locomotion and manipulation skills development.

DISCUSSION

Fundamental motor skills are foundation and basic of sport advanced skills. In addition to the influences of the skills on sport and specialized skills development, they can cause people to be more efficient in daily life movements.

Akbari et al investigated the influence of local and native plays on 7-9-year old boys' locomotion skills development. According to their study, local and native plays have more influences on locomotion skills development than common activities^[5]. Sheikh et al found that elementary school selected plays affect motor development (dynamic and static balance, coordination, speed, agility and movement accuracy) in elementary school third grade girls^[6]. Pike et al in a study of the relation between fine and gross motor abilities in children (boy and girl) showed that the level of motor ability is correlated with school activities. Besides, further school activities cause better fine motor skills^[7]. Wrotniak found that children who were physically active were higher in terms of motor abilities, motor mastery, running speed, agility and motor skills than children who didn't have physical

activity^[2]. Graf et al investigated the effects of school common program on BMI and motor abilities of children with age ranging from 5.5 to 9 years. Horizontal Jump and 6 minutes running were measured to assess pre- and posttest motor abilities. The results showed that there was not any difference between control and experimental groups in BMI. However, the number of horizontal Jumps and running distance increased significantly in the experimental group^[8]. Van Beurden et al showed that selected training program increased motor skills development in third grade students^[9].

Research findings show that exercises, playing and physical activities affect motor development (motor efficiency) of school students. Therefore, the results of this study based on selected trainings are in accordance with the findings of previous studies^[2,5-9]. Different trainings have been used to investigate the effects of training on motor development in aforementioned studies. With regard to the previous studies, impact of training on motor development is important and should be considered by relevant authorities in schools (especially for physical education lesson).

According to previous findings, it should be indicated that education should be considered in preschool and school age to develop fundamental skills. If school-age children do not acquire advanced stages, their sport skills in older ages will be difficult, in addition to motor problems created at the same age^[5].

Findings show that training affects motor development against maturation theory stating the growth process is controlled by internal factors

(genetic) but not external factors (environmental). Therefore, hereditary factors are ultimately responsible for controlling growth. The maturational perspective explains developmental change as a function of maturational process that controls or dictates motor development. According to the assumptions of this theory, motor development is an internal or innate process driven by a biological time clock^[11]. Besides, behaviorism is a mechanistic theory which describes observed behavior as a predictable response to experience.

Although biology sets limits on what people do, behaviorists view the environment much more influential. They hold that human beings learn about the world at all ages in the way similar to other organisms: by reacting to conditions or aspects of their environment that they find pleasing, painful or threatening^[12]. While the pretest indicated that the subjects were not fully developed in the fundamental skills, subjects' age can be one of the causes of delay in motor development. Another reason can be lack of sufficient opportunities for students, lack of necessary facilities and enough training based on scientific scheduling according to students' age in school, and planning for physical education lesson. Since the interaction of both genetic and environmental factors influence motor development, to create enough opportunities for children and students in physical education lessons in primary schools, to produce scientific training programs according to their age, and to provide simple, enough and required facilities to attract students to physical activity, playing and training is essential.

It is noticeable that to develop fundamental motor skills in children, our primary schools should develop written programs, appropriate training and employing physical education teachers in physical education hours especially in the first three years. Moreover, existence of space, enough facilities and increasing hours of physical education lessons in primary schools not only can help motor development of children in fundamental motor skills, but also can increase students' interest in life activities which are basic for health and fitness and also provide a strong infrastructure for championship sports in the country. School administrators who create and implement sound adapted physical education

programs must ensure that the resources at their disposal adequately meet the needs of the pupils they serve.

First, they must identify pupils who should receive adapted physical education programs and then, they must implement programs in an appropriate setting. Appropriate and innovative instructional strategies and challenging activities should be provided for all students with unique needs. Administrators must ensure that programs fit to student schedules, meet mandated time requirements, provide sport opportunities, are conducted in accessible facilities, and are appropriately funded^[13].

One of limitations of this study was the fact that only girls participated in this study and this study did not survey effects of selected exercise program on fundamental motor skills in boys. Besides, it is likely that the research subjects performed similar activities outside study hours.

CONCLUSION

Our findings indicate that motor skills development is positively associated with physical activity. However, future research is needed to further examine the relation between motor skills development and physical activity. Since the motor skills development is related to physical activity, strategies that increase physical activity in childhood may be an important target to promote increased physical activity and health in youth. These findings can be implicated in elementary school physical education programs.

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Conflict of interests: None

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