

Relationship Between Gender and Motor Skills in Preschoolers

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Background: Motor skills play an important role in daily skills and learning of children. Hence, any disorders in their motor skills cause weaknesses and problems in learning and social skills.

Objectives: The current study aimed to compare motor skills between preschool girls and boys in Semnan city, Iran. Results can be used by preschool education authorities to prioritize and focus on learning programs.

Patients and Methods: The current descriptive-analytical study was conducted on 91 children (51 girls and 40 boys), with the mean age of 6.4 (SD ± 0.2). Multi-stage sampling method was employed on preschoolers in Semnan city, Iran; and data was analyzed using the Lincoln-Oseretsky motor development scale.

Results: Results of the current study showed no significant difference between balance skills and coordination of arm and leg movements in preschool girls and boys, but significant difference was observed between the catcher throwing skills ($P < 0.001$), objects balance ($P < 0.001$), jumping skills ($P < 0.001$), speed and hands fundamental movement skills ($P < 0.001$), eye-hand coordination ($P < 0.001$) and general motor skills ($P < 0.002$).

Conclusions: Results of the current study showed that at preschool stage girls had higher performance compared to boys in fine motor skills and at preschool stage boys had significantly higher performance compared to girls in gross motor skills. Hence, it seems to be necessary to train preschool authorities in teaching fine and gross motor skills, considering the gender.

Keywords: Scales; Motor Skills; Gender; Students

1. Background

Today, physical and mobility problems, especially early years, is increasing due to changing people lifestyle, residing in small flats, lack of playgrounds and sport areas, popularity of computer games and etc. Considerable statistical data about students' motor and skeletal abnormalities, which mainly result from motor poverty and physical abnormalities, will have serious consequences in daily activities, educational attainment and social growth of the children in future (1). Researchers believe that behavioral responses of children are through motions and muscles, and children can understand themselves and the world around through these behavioral movements; these motor experiences will build their learning infrastructure (2). On the other hand, motor skills play an important role in children's learning, and improve the growth of other important learning skills such as educational and social ones (3). Hence, any disorders in the motor skills procedures cause weaknesses and problems in learning, and acquisition of personal skills in children (4). Hasanati et al. have categorized motor skills into two groups: fine motor skills including directional, separate, precise and skilled movements which small and fine muscles need to do. Also, gross motor skills performed by large muscles cause general movements, stability, and balance (5). Researchers believe that motor

and cognitive skills are associated; children always sync their movements with the information received from their senses to learn how to catch objects in the air, move on the surfaces with maximum balance (6). Although no specific age has been introduced for the development of children motor skills, most of the researchers believe that children mostly gain advanced levels of these skills in preschool years or at the age of six (7). Therefore, proper planning and programming for motor skills during childhood, especially before entering school, may transform their evolutionary process. If all personal growth aspects are considered in preschool training, they play a more effective role in the growth and development of children. Hence, development of basic motor skills in children, which is considered as a part of these trainings, should be evaluated more than ever to determine its effect on the process of growth and development (8). Since children with motor disorders have also problems in their motor skills, they do not participate in sport and physical activities that lead to loss of physical readiness, social isolation, and finally loss of motor skills (9). Today, considering the growing trend of medical sciences and health care, different disorders are diagnosed faster and more accurately, and immediate treatment is implemented by the specialists; therefore if motor skills are

analyzed and evaluated in the early years, it can lead to faster treatment of probable disorders and improvement of therapeutic planning (10).

2. Objectives

Hence, evaluation of motor skills in both genders and clearer distinction of fine and gross motor skills subcategories may help educational authorities to find the weak and strong points and provide targeted programs more than ever.

3. Patients and Methods

The current study was a descriptive-analytical survey which quantitatively compared different motor skills of preschoolers in Semnan, Iran.

3.1. Sampling Methods

Multi-stage sampling method was used for the current study. To implement this method Semnan city was divided into four districts, and a school providing preschool courses was randomly selected from each. Then, 91 preschoolers (51 girls and 40 boys) with the mean age of 6.4 ± 0.2 years were systematically selected.

3.2. Data Collection

The Lincoln-Oseretsky motor development scale (LOMDS), which generally evaluates motor abilities of the children, was employed as data collection tool. Validity and reliability of this test were approved after standardization and reported as 0.99 and 0.88 respectively; the test assesses fine and gross motor skills and their combination quantitatively (11). The aforementioned scale contains 36 subtests which evaluates the following abilities of children between 6 and 14 years old, Balance skills including going backward, toe touching, standing on one foot, standing with two feet along together, standing on one toe, standing on one foot with closed eyes, and standing on toes. Material balance including balance a rod in horizontal position, balance a rod in vertical position. Eye-hand coordination including cutting concentric circles, drawing lines, tracking mazes, touching nose, putting matches in the box, and putting coins in the box. Hand skills including moving fingers, opening and closing hands alternatively, hitting by pencil, touching fingertips with thumb, punctuating, wrapping, drawing circle in the air, moving coins and matches, sorting matches, and opening and closing hands. Jumping skill including jumping over ropes, and jumping and rotating in the air. Hand-foot coordination including wrapping in moving, hitting harmonically with feet and fingers, making rhythm with feet and fingers, jumping and touching heels, hitting the ground with feet, and jumping and clamping. Throw and catch movements which include catching and throwing the ball. This test is conducted individually and takes one

and half hours. Thirty six subtests of this scale was implemented in two groups of girls and boys separately in a private predetermined room, and the results were scored from zero to three based on the scale direction; then the scores were calculated and recorded.

3.3. Statistical Analysis Method

To analyze data SPSS software was employed. Also, to normalize the data Kolmogorov-Smirnov test was used which due to lack of normal condition, Mann-Whitney test was applied to discover significant changes between groups.

4. Results

Results of the current study showed no significant difference in balance and hand-foot skills between preschool girls and boys, but significant difference was observed in their throw and catch movements ($P < 0.001$), material balance ($P < 0.001$), jumping skills ($P < 0.001$), hand skills ($P < 0.001$), and eye-hand coordination ($P < 0.001$). In general, there was a significant difference in motor skills between girl and boy preschoolers ($P < 0.002$) (Table 1).

Statistical analysis revealed significant differences in eye-hand coordination and hand skills between girls and boys and the score of girls was significantly higher than that of boys; eye-hand coordination between girls and boys was also significant and the scores of boys were generally higher than those of girls. Also, significant differences were observed in jumping skills, throw and catch movements, and material balance between girls and boys and the scores of boys were remarkably higher than those of girls.

Table 1. Scores of different Skills of Girls and Boys Preschoolers

	Cases, No.	mean \pm SD	Min-Max	P Value
Throwing and Catching Skills				< 0.001
Girls	51	3 \pm 1.8	0-7	
Boys	40	6.9 \pm 1.9	2-10	
Material Balance				< 0.001
Girls	51	6.9 \pm 2.1	0-12	
Boys	40	5 \pm 1.6	2-9	
Jumping Skills				< 0.001
Girls	51	6.1 \pm 3.5	0-16	
Boys	40	9.0 \pm 2.3	3-16	
Hand Skills				< 0.001
Girls	51	29.0 \pm 4.2	18-35	
Boys	40	22.0 \pm 6.3	11-32	
Eye-Hand Coordination				< 0.001
Girls	51	14.0 \pm 3.8	5-23	
Boys	40	9.1 \pm 3.0	0-18	

5. Discussion

To conclude from significant differences in the tested motor skills, subtests of each skill have been evaluated. In eye-hand coordination including cutting concentric circles, drawing vertical line between the lines, and tracking mazes subtests; and hand skills including moving fingers, opening and closing hands alternatively and hitting by pencil subtests, which are all from fine motor skills, the performance of girls was significantly higher than that of boys. On the other hand, in jumping skills including jumping over ropes, and jumping and 180° rotation in the air subtests; throw and catch movement including throwing and catching the ball subtests; and material balance including balance a rod in horizontal position, balance a rod in vertical position subtests, which are all from gross motor skills, the performance of boys was significantly higher than that of girls. With more evaluation in the details of the tests and the observed differences, it is concluded that girls had higher performance than boys in fine motor skills and the difference was significant; while more evaluations showed that boys had higher performance than girls in gross motor skills and the difference was significant. Therefore, results showed that girls at the preschool stage had significantly higher performance than boys in fine motor skills, and in contrast boys at preschool stage had significantly higher performance than girls in gross motor skills. The results of the current study did not support those of similar studies on motor skills differences between girls and boys. The study conducted by Dalvand et al. on 180 girl and boy students based on Peabody Developmental Motor Scale showed no significant difference between fine and gross motor skills of both genders (12). Incompatibility between the results of the aforementioned and the current studies may result from different age ranges of the understudied population, but the following studies support the results of the current study:

Hassan in a study conducted on Emirati children, along with providing children motor skills data sheet through Bruininks-Oseretsky test of motor proficiency, concluded that there is a direct relationship between age and motor skills, and the performance of girls is significantly higher than that of boys in fine motor skills which need eye-hand coordination (13). To describe motor skills differences between girls and boys, Parsa believes that: "in games, boys are generally more powerful than girls and mostly tend toward lively games which are also called gross motor skills; in contrast, girls usually like symbolic and pacific games and show interest in fine movements" (14). Vaez-musavi et al. have evaluated physical growth and motor development of 1200 guidance school students in Tehran, Iran. To measure physical growth, the body size measuring method, and to measure motor development Bruininks-Oseretsky test of motor proficiency were employed. The results showed that boys had significantly better gross movements than girls, and in contrast girls had significantly better fine movements than boys (15). However the results of the current study showed that girls had high per-

formance than boys in motor skills. In this regard, Slowne says: "It seems that girls are really better at motor skills than boys at the age of six to 13 years, and the performance of boys is higher at the age of seven to 11 years" (16). Heath et al. evaluated 230 students and the results showed that 15% of preschoolers had motor problems among which 5% had severe and 10% had moderate problems. Also, the disability rate of boys to girls was three to one regarding the motor skills (17). Considering the results of the current study and other studies, it seems that trainings and helps of preschool trainers and authorities in fine and gross motor skills (considering the gender) can be effective in the development and improvement of weaknesses and deficiencies of the mentioned motor skills. It is important to consider the development of motor skills on the arrival of the children to school because it can affect their learning ability. In this regard, in the study on gross movements of the preschoolers concluded that motor skills programs significantly improve the growth and development of motor skills in children and teaches them what has to be tested (17). In the study on the level of fine and gross motor skills performances in preschoolers, it's concluded that higher performance depends on the level of daily muscle recruitment, and early education may improve motor skills and the level of learning among these children (18). Hence, since motor skills affect learning ability of children at school age, and considering the weaknesses and strengths of girls and boys in different motor skills trainers and, if necessary, rehabilitation experts can use the results of the current study to determine educational priorities or retrieve different motor skills weaknesses of their targeted children.

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Authors' Contributions

Ali Akbar Pahlevanian (corresponding author), Zahra Ahmadizadeh (Data Collector).

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