The impact of Handball Techniques on improving gross motor skills in educable mentally retarded children

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Abstract

Mentally retarded children are those who have less mobility because of mental conditions, especially in comparison with healthy subjects, and that is why they suffer from physical-motor weakness. The purpose of this study was to assess the impact of handball techniques on improving gross motor skills of educable mentally retarded children. In this study, the 86 educable mentally retarded students who were enrolled under the supervision of special schools in Babol city, 24 children with a mean age of 8 to 13 years and a mean IQ of 62.9 were selected purposefully based on the pre-test and divided into control and experimental groups (N=12). The measuring instrument used in this study was Bruininks – Oseretsky Test of Proficiency. Motor program was handball selected techniques that were administered in 18 sessions on subjects. The normal distribution of data was evaluated by using the K-S test and the dependent and independent t-test was used to compare the means. Results of this study showed that 18 Handball-techniques-training sessions have significant differences in all variables in the experimental group. Changes in the experimental group consisted of speed and agility (P=0.001), balance (P=0.002), power (P=0.001) and bilateral coordination (P=0.000), respectively. Based on the results of this study it can be claimed that participation in the Handball techniques program improves gross motor skills in educable mentally retarded children.

Key words: Bruininks – Oseretsky Test of Proficiency, educable mentally, gross motor skills, mental retardation

Introduction

According to most experts, physical education programs for children with cognitive - motor deficiency must have a coherent structure which is commensurate with their needs and problems (Nelson et al., 1988). Characteristics of children with sensory-motor disorders is that they have often problem in performance of gross motor skills, perception of space, time, and orientation and other motor skills (eg, fine motor skills) (Yarmohamadian, 2010). These problems cause these children have poor movement, perform movements awkwardly and be physically weak (Pahlavanian, 2004; Teimouri and Ghorabi, 2000).

Mental retardation is a common developmental disorder and a chronic disease throughout life and it is estimated that about 5.7 million Americans are infected with the disease. Mentally retarded individuals tend to be isolated and rarely participate in group working and team sports and this inactivity and isolation substantially increased risk of chronic disease as well (Duristine et al., 2009). Statistical Yearbook of Exceptional Education Department have listed the total number Special children studying in Iran 70,736 people during 1999-2009 that among them 39,039 individuals are educable mentally retarded children (Kashef, 2010). Traditionally, children with the IQ of less than 70 are classified among mentally retarded persons. Diagnostic and Statistical
Manual of Mental Disorders (Dastjerdi and Behdad, 2000), and mental retardation Association of America (Rafei, 2004), have listed these disorders in five categories. In this list children with the IQs of 85-70 children are classified as borderline intellectual functioning or slow learners, and children with the IQ 50-69 as mildly mentally retarded. These 2 class of children are represented as moderate mentally retarded. Children with the IQs of 20-34 are classified as severe mentally retarded and finally children with IQs under 20 as profoundly mentally retarded. Mental disorders, despite the progress of science and global health, still remain one of the main issues of human. Research has shown that people with intellectual disability, not only are mentally different from their peers, but also are physically at lower levels (Frey et al., 2008). Mental disability can affect the learning and performance of physical activity, especially cognitive delays that can affect reaction time, basic motor learning patterns, physical fitness and complex motor skills development (Westendorp et al., 2011); Also, children with intellectual disability are weaker than healthy children in basic motor skills (Frey and Chow, 2006).

Almost all of the research done in the field of children with intellectual disability have shown that these children are further behind their age in motor skill development (Rimmer and Kelly, 2003; Graham and Reid, 2000). A study in which the motor abilities of people with intellectual disability compared with healthy subjects, found that because of some lack of capacity, people with intellectual disability have several problems in motor abilities such as Running, jumping, throwing, balance, awareness of time and space, lateral movement, exercise and daily living activities (Whorton et al., 1994); It has been found that children with intellectual disability earn lower scores in all the specific basic motor skills than their peers (Houwen et al., 2010).

In people with intellectual disability it is important to maintain muscle strength and endurance and dynamic balance for achieving a better life and functional independence. Ability to maintain independent living for people with intellectual disability is an important factor (Kajbaf et al., 2000). Motor and exercise programs which are fit to structural and psychological features of human, especially in childhood and adolescence provide physical and mental health, and prepare people for a better life in community (Ghasemi et al., 2012). So by participating in a appropriate exercise program, young people will have the opportunity to be strengthened physically and have an active and healthy life. And this shows the importance of physical activity and physical education among individuals (Lee et al., 2007). Educable mentally retarded children compared to normal children are in their lower levels of muscular strength, endurance, agility, running speed, reaction time and balance (Lee et al., 2007). Several studies have been conducted in the field of basic motor skills of children with intellectual disability and the role of exercise in improving their programs. Moghanlou et al (2013), assessed the effect of SPARC motor program on improving gross motor skills in educable mentally retarded children. And reported that the motor program had significant changes in the balance, strength and coordination of bilateral (Moghanlou et al., 2013). Ghasemi et al (2012) examined the effect of 8-week rhythmic exercises on motor and perceptual skills and IQ of children with intellectual disability. And reported that the subscale of perceptual-motor skills including a static balance, dynamic balance, hand-eye coordination and hand and foot coordination, agility, fine and gross motor skills, rhythmic movements showed a significant improvement after eight weeks (Ghasemi et al., 2012). Rahbanfard (1998) examined the influence of a special program for six weeks on the perceptual-motor abilities of mentally retarded students in Tehran and stated that the particular motor program impacts coordination, balance, static and speed (Rahbanfard, 1998). Kubilay et al (2011) studied the effects of balance and postural training on the performance of children with intellectual disability. The results showed that muscular strength, muscular endurance, coordination, balance and motor performance improved in the treatment group after 8 weeks (Kubilay et al., 2011).

Evidence has shown desirable effects of regular physical activity on different people but in none of these studies has addressed the impact of handball techniques on children with intellectual disability. Therefore, given the obvious effect of exercise in enhance the quality of human life, the aim of this study was to examine the effectiveness of handball techniques on gross motor skills of educable mentally retarded children.

Materials and Methods

It is a quasi-experimental study using pretest-posttest experimental plot with control group. Purposive and available sampling was used and 24 students were selected among 86, 8-13 year old students from special schools of Babol. It should be noted about the sampling method and the number of the experimental and control groups that sample size 12 was considered to be statistically equal to 0.8 in alpha 0.02 and beta 0.05 because of the large effect size (Thomas et al., 2011). The main criteria for selecting participants in the study was IQ that the main indicators of these children to distinguish from one another. Also given the necessary of full participants' understanding of physical exercise and that over 50% of people are educable mentally retarded (Kashef, 2010), selection was conducted among the educable mentally retarded children. After initial screening, subjects who were in the range of 50 to 70 based on IQ scores were Matched and devided into both control and experimental groups (n = 12) groups. By Psychiatric Association America categorization, mentally retarded
children with IQ of 50 and 70 are in category of educable or mild (American Psychiatric Association, 2000; Bharati, 2012). In this study inclusion criteria were IQ between 50 and 70, the age range between 8 and 13 years old, and the absence genetic diseases, cardiovascular, nervous, organic, orthopedic, etc. Exclusion criteria was absence from regular exercise. In order to observe the ethics of research, process and objectives were explained for school officials and teachers and parents of the students and they were explained that it is a research study and they are allowed not to participate if they do not intend to.

The instrument was used to collect data was motor skill test of Bruininks – Oseretsky Test of Proficiency which is a normative reference for gross motor skills and fine motor scale for children ranging from 5.4 to 14.5 years. In 1987 Brvnynkz has developed this test by reforming oseretsky motor skill test. This test helps researchers identify normal children from children with motor impairment. Brvnynkz test - oseretsky has two short and long forms. The test-retest reliability of the test was reported in long form and short form 0.87 and 0.86 respectively. Four subscales measure gross motor skills and four subscales measure fine motor skills (Khalaji and Khajavi, 2002). Given the purpose of this study that is to investigate the effect of handball training techniques in improving gross motor skills of educable mentally retarded children, Researchers used only the subscales related to gross motor skills including subscales of running speed and agility, bilateral coordination, balance and power. Training program that was used in this study, handball training techniques such as passes, dribbling, throwing and shoots. The program was run for 55 minutes and three sections. The first 15 minutes include warm-up, followed by 30 minutes of practicing handball techniques individually and game play and the last 10 minutes include cool down. The experimental group performed exercise program for 18 sessions. At this time, the control group did their usual activities. At the end of the eighteenth session, both groups were assessed. Descriptive and inferential statistics were used for the statistical analysis of raw data. Descriptive statistics was used to calculate measures of central tendency and quantitative scales, and inferential statistics for mean comparison. Dependent and independent t-test, were used to test the hypothesis. All statistical analysis was done by software spss 16.

Results

In this section, demographic information such as age, weight, height and IQ of experimental and control groups are presented in table (Table 1). Considering the p-value obtained from the t-dependence test and comparison with the level of significance considered for the test (p =0.05), it can be seen that there is no significant difference between pre-test and post-test mean scores of control group in subscales of speed and agility, coordination of bilateral, balance and power; While significant differences can be observed in the mean scores of pre-test and posttest in experimental group in subscales of running speed and agility (p =0.001), bilateral cooperation (p=0.000), balance (p=0.002) and power (p =0.001) (table 2).

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>Weight</th>
<th>Height</th>
<th>IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>10.33±1.75</td>
<td>25.6±4.05</td>
<td>127.6±8.85</td>
<td>62.13±6.014</td>
</tr>
<tr>
<td>Control</td>
<td>10.40±1.84</td>
<td>24.15±5.87</td>
<td>126.07±7.87</td>
<td>62.06±5.99</td>
</tr>
</tbody>
</table>
Table 2: The results of pre-test and post-test in both control and experimental groups in four subscales

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Intervention time</th>
<th>M±SD</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running speed and agility</td>
<td>Control</td>
<td>Pre-Test</td>
<td>7.83±1.53</td>
<td>0.586</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>7.75±1.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>Pre-Test</td>
<td>8.83±1.92</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>10.67±2.22</td>
<td></td>
</tr>
<tr>
<td>Bilateral cooperation</td>
<td>Control</td>
<td>Pre-Test</td>
<td>4.75±1.21</td>
<td>0.438</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>4.92±1.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>Pre-Test</td>
<td>4.33±1.07</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>7.25±1.42</td>
<td></td>
</tr>
<tr>
<td>Balance</td>
<td>Control</td>
<td>Pre-Test</td>
<td>14.67±1.23</td>
<td>0.210</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>15.08±1.62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>Pre-Test</td>
<td>14.75±1.13</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>19.42±4.01</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>Control</td>
<td>Pre-Test</td>
<td>20.75±3.20</td>
<td>0.736</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>20.50±3.43</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>Pre-Test</td>
<td>14.57±1.31</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-Test</td>
<td>19.44±4.02</td>
<td></td>
</tr>
</tbody>
</table>

Discussion and Conclusion

The purpose of this study was to assess the impact of handball techniques on improving gross motor skills of educable mentally retarded children. The findings showed that 18 handball techniques training sessions is effective on gross motor skills of educable mentally retarded students. The results of comparing the mean scores of running speed and agility, balance, bilateral coordination and strength showed that in post-test, compared with the pre-test, scores of the control group was not significantly high but the increase in the experimental group was statistically significant.

In subscales of running speed and agility, the results suggest that handball technique training has a significant impact on the running speed and agility skills. The results of this study is consistent with the results of Rahbanfard (Rahbanfard, 1998), (Sheykh et al., 2003), Kothari et al. (Kosary et al., 2011). According to Kowsari et al, exercise and games can increase running speed and agility. Since running is a fundamental part of all training sessions of handball techniques, and it is frequently repeated it can improve speed at the educable mentally retarded students. On the other hand, the results of this study is inconsistent with the results Moghanloo and colleagues (Moghanloo et al., 2013). In this study, no significant differences were found...
between groups in subscales of running speed and agility. The reason for this discrepancy can be attributed to the selection of motor programs.

In subscale of balance which is measured in the form of static and dynamic balance, the results of this study is consistent with results Moghanloo (2013) where it is said that exercise affects balance. The ability to maintain balance is essential for successful completion of almost all daily movements. A new theory that is the basis for investigation of movement and balance is Systems’ Theory. According to this theory, the ability to maintain and control body position in space is the result of a complex interaction between different muscular, skeletal and nervous systems and the importance of each system depends on the purpose of moving and changing environmental conditions. In this model, the central nervous system can be informed of the conditions supporting surface and body's center of gravity using the visual system information, and Stybular and proprioception and represents appropriate motor response as pre-planned movement patterns. On the other hand, studies have shown that people who engage in physical activity are better in balancing than those who do not exercise but the main reason for this is not clear yet (Bressel et al., 2007; David, 2007). The results of this study are inconsistent with the results Rahbanfard (1998), the inconsistency could be in choosing types of motor programs and duration of exercise; because Fisher and colleagues in a study conducted in 2005, concluded that the time spent on physical activity, was significantly effective in higher scores in basic motor skills (Moghanloo et al., 2013). The duration of the exercise in Rahbanfard study was 12 sessions while it is 18 sessions in the present study. Also the type of program selected in this study is different that can be the reasons for inconsistent results. In subscale of bilateral coordination test, the results of this study is consistent with the results Moghanloo, Rahbanfard and Kowsari. In Kowsari's research, selected motor program improved bilateral coordination skills in children with ADHD. In Kowsari's study, subject's scores was higher than subjects' scores in this study in both pretests and posttest. It may be related to the high average IQ of the subject in Kowsari's study.

In subscale of strength, the results of this study is consistent with the results of Moghanloo, Kothari and Carmeli's study (Carmeli et al., 2005). In a research conducted on mild mentally retardee people in 2005, Carmeli concluded that physical exercise can cause the strength of the people. Moghanloo and Kothari also reported positive effect of the spark motor program on the children with intellectual disability and ADHD that is consistent with our results. On the other hand, the results are inconsistent with the results Rbhanfrd based on the results of his research, Rihanfrd suggests that specific motor program training is not effective on educable mentally retarded boys. The reason for this conflict can be attributed to the duration of motor program training. The type of motor program used in the two studies can also be cited as the reasons for inconsistent results.

The results can be seen within the context of dynamic systems theory. Dynamic systems theory considers environment as an effective factor in the development of motor skills. This theory is contrary to the mature view that considers only mature and growth as effective factors in the development of motor skills and implies that factors affecting motor development include special needs of motor task for communicating with the person (biological and genetic factors) and the environment (experience and learning factors) And these factors influence the development of basic motor abilities (Payne and Isaacs, 2002). Geographical location and family atmosphere and the opportunity practice are the factors affecting the development of basic skills. Training opportunities is related to regular and purposeful exercise. Mentally retarded children, do not have the opportunity to exercise; The children spend a lot of time at school and when they come home they have to spend more hours on homework and learning to compensate for their weaknesses; Also, because of cultural weakness, normal children are reluctant to involve these children in games On the other hand families of these children prevent their children to participate in recreational program of other children because of shame or fear. Another problem is the children themselves who have difficulty in learning even simple child's game roles along with normal children (Ardestani, 2009). In general, we can conclude that handball training techniques have greater impact on their gross motor skills mentally retarded boys than the usual school activities. Due to clarifying the role of handball techniques on improving gross motor skills in educable mentally retarded children, it is recommended other sports programs such as native and local games and specialized sports like volleyball be examined on these children so that pros and cons of the program is made more clear compared with each other. It is suggested that these programs to be examined on children with specific problems such as cerebral palsy, hyperactivity and etc. In order to use these results in practice, it is recommended to Departments of education and special schools should provide special physical education programs along with the training programs to promote motor skills so that this vulnerable population will benefit from the advantages of the program as well.

References


