

Game Therapy Effect on Improving Motor Skills in Children with Down Syndrome

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ABSTRACT

Playing has a direct impact on children's learning and intellectual growth. This fact has attracted the attention of the scientific experts to the extent that the science of game therapy has been created. It should be considered that the results obtained in this study can help significantly in the training of children with down syndrome, teachers and parents will learn game therapy methods and can use the techniques to improve the children's motor skills; the purpose of the present study is to improve the effectiveness of game-therapy on motor skills of children with Down syndrome. Due to the nature and purpose, this study is an applied one which has been done in semi-experimental method with pre-test and post-test. The present research community consists of all children with Down syndrome in Birjand in 2015 which was announced to be 18 children. Sampling was simple; so that from these children, 9 were randomly selected for experimental group. The experimental group received 12 sessions of game therapy. In order to collect data, Lincoln - oseretsky test was used to assess cognitive - motor function in children. The results showed that game therapy was effective in improving children's motor skills, there was no statistically significant difference between the effect of game therapy on motor skills of boys and girls.

KEY WORDS: Game therapy, motor skills, children with Down syndrome.

INTRODUCTION

One of the most important issues in one society is paying full attention to the children and it is also considered to be the best investment for the future of the community as well. Today, in all human societies exceptional children, especially mentally disable children are receiving more attention. Taking serious care of physically and mentally handicapped children entails substantial investment by governments especially in the field of rehabilitation and vocational education and professional training. Nowadays one of the most important activities of the society is to prevent the birth of children with disabilities. In this regard, scientists' valuable researches have predicted most genetic disorders and hereditary diseases. Considering the issue of inheritance, genetic counseling, testing and evaluations before marriage and during pregnancy, we can prevent the birth of a significant number of children with disabilities (Afrooz, 2004).

Down syndrome is the most common congenital chromosomal disorder which always causes different degrees of intellectual disability (Linsey, 2001) as well as physical and social disabilities. Children with Down syndrome are often socially isolated and deficiency in adaptive behavior and social skills are obvious in their behavior. Social skills are taught using a variety of intervention strategies and programs related to the skills (Frey et al., 2013). Gross and fine motor skills in children are of high importance in order to preserve the independence and the development of other abilities such as self-help, playing, social and academic skills and generally compliance with the environment. These skills are most important in Down syndrome and they play significant role in improving the performance and growth. A remarkable feature of the infants with Down syndrome is motor skills (Smith, 2001).

Fine motor skills of the human hand including: the use of the fingers and thumb in gripping used in activities such as picking up small objects, using scissors, writing, painting, pulling and ting shoe laces and so on (Alton, 2005). Development of fine motor skills depends on the reflexes and voluntary movements, such as the intentional grasping of objects and dropping them (the Erhardet, 1982).

Deficiencies compensation in children with mental disabilities is practiced by using different methods, For example, job training, social skills and real-life activities that require social interaction (Murray and Duran, 2013). To form support groups, some places will be developed where people can practice their social skills (Jantz, 2011). For teaching social skills through experimental model, thinking and exploring the surroundings, games and activities are provided (Aljadeff Abergel et al., 2012).

Games communicate children's innermost thoughts with the outside world and let them bring foreign objects under their control. Games allow children to show the experiences, thoughts, feelings and aspirations that are threatening to them. The game is a correct way to treat children; because children often face difficulties

in expressing feelings verbally. Through games, children can reduce the barriers and show their feelings easier (Wethinton et al., 2008).

Game therapy is an active approach that can be used individually or in groups. In a way that allows children to reveal their conscious and unconscious emotions through games (Mehrddad, 2011).

Stating the problem

Gross and fine motor skills are formed with delay and inefficiency in children with Down syndrome due to reasons like excessive joint mobility, lack of body awareness, weakness in muscle reactions, difficulty in bilateral coordination, distressed action, delay in physical development, short bones, delayed growth and mature reflections, delay in the response of particular anatomical conditions and physiological characteristics of hands (Short arm length, having 23 instead of 27 bones, joint mobility at low amplitude, short fingers, lines and arcs abnormal delay in holding skills) low responsiveness to tactile stimulation and infirmity in touching objects (Parham and Mallioux, 2005).

One of the ways that may be effective to improve motor skills of children with Down syndrome is game therapy.

With the introduction of activities, games and sports, as a key to life, have opened a new horizon and a fresh perspective on education (Khalahi, 2002). Using sequence of slow and rhythmic and sometimes fast and coarse movements can be very helpful to improve the spatial image, self-control skills, body image and tranquility, improving perceptual and motor skills, balance, timing and good control of the behavior of children with special needs (Houshvar, 2008).

The golden period of development of the child passes through the game and in the natural process of the game playing, the children first understand and recognize themselves and then the external world and then with interactive and symbolic games with parents and peers enter the community and try out their future roles; self controlling, muscular and neuro controlling and coordination, thinking, problem solving and collaboration, first learned in the games and practiced to internalize (Asghari Nekah, 2010).

Various studies have admitted the effect of therapy by playing with Lego and dolls to improve social skills (Legoff & Sherman, 2006) and it has been confirmed that it can help the children learn (Clarke, 2006); The communication skills of introvert children (Asghari Nekah et al., 2011) increases the learning of children with mental disability (Emadpour, 1999) on adaptive behavior of educable mentally retarded children (Hodjati, 1999) and psychologically damaged children from 3 to 11 years old (Novontny, 2012).

The importance and necessity of study

Due to the prevalence of children with Down syndrome and children's ability to respond well to rehabilitation (due to having good growth potential) it seems very important to deal with these children and have a proper plan to improve physical, psychological and social condition of them; Despite the existence of processing and emotional integration problems in these children and its impact on motor development (Uyanik, 2003; Parham, 2005).

Given that individuals with Down syndrome have different intellectual status and consequently have different abilities, using these potential abilities is essential. Most of these children can reach a high level of independence with rehabilitation programs. Weakness in fine motor skills, although at first looks small, but with the passage of time and the entrance of the person to the community becomes one of the most important problems which simply prevents the child with Down's syndrome from gaining what he deserves. Several studies showed that the degree of weakness and inability in the upper body organs, especially the fine motor skills of the hand, deprives the person from the chance of acquiring sensory information from the environment and the experience of its effect (Molajany, 2006). Accordingly, the need to use more of the outstanding abilities in children with Down syndrome and a rehabilitation program with the correct combination of different therapeutic methods are well known to everybody (Yvanyk, 2003).

Playing games and therapeutic and educational use of games has long been one of the main branches of theoretical and clinical activities and education of children (especially for children with special needs). Muscle nerve growth and conceptual-cognitive development are indebted games that start early and continue (such as rotational movement) with repetition and practice and continues to evolve more complex processes, especially during first years that the brain is forming with an increasing quantity and quality, the necessity of stimulating and rich environment becomes more significant (Asghari Nekah, 2009).

Given that children with Down syndrome face with mobility problems including gripping objects, painting, also this group of children compared with their peers have more limited ability to use their hands and fingers, following these difficulties and disabilities, these children may suffer from dissociability and isolation, low self-esteem, academic and social problems. It seems, game therapy is effective in children's motor skills, because in most of the children games, hands are used the most. Games can be and exercise to train gross and fine motor skills of children. Also the results of this research could significantly help in the training children

with Down syndrome, teachers and parents learn through play therapy and the method used to enhance children's motor skills; therefore, in this study, the following hypotheses are tested:

1. Game therapy has positive effects on motor skills of children with Down syndrome.
2. The effectiveness of Game therapy on motor skills of boys with Down syndrome is different from the girls.

Theoretical Framework

A) Game

The game begins with the birth of the child and immediately after birth adaptive activities appear to adjust with newer environment. Note that game is the most natural tendency of the child to contact and deal with the world around him. Scholars and clerics of Islam have long emphasized the need for the game and believed that children should play their desired future job as a game and find it through playing. (Ahmadvand, 1993).

In today's education, game is known as one of the most effective means of training, because game also serves as a means of nurturing and assists in the training and educating children; game therapy we can be used to treat some mental illness and child behavioral disorders. Game, both as a way of learning and reinforcement learning and social development of the child and as a means of expressing emotions, has a considerable ability to train and build the child and gives him the opportunity of growth and development on the condition that the educators and parents leave the choice of the games to children themselves so that they could gain whatever they need in the form of games and activities (Ahmadvand, 1993).

Game is a natural means for a child to express his "self". Alfred Adler, the famous psychologist says, "never look at the game as a way to kill time." Or Gary Landers, states that "game for children, is equal to talk for an adult. Games and toys are children's words." Unfortunately, there is no single and comprehensive definition for game. The only definition that is often cited is that of Ericsson, which says: "Game is one's performance, an attempt to harmonize the processes of physical and social self (Landers Translated by Arian, 1990)."

Children use their intellectual and physical power while playing and they perceive games as a part of their normal life and they enjoy it. Children's games are not only for fun, but it can be considered the most serious thing the children do, because it is an evaluable activity. Game is an enjoyable and fun effort and activity necessary for all aspects of child's growth. Young children cannot express their opinions and ideas easily with words, so they usually express themselves through the games (Parsa, 1988).

Game is a natural way of learning. Children experience and test through playing games. The child results and learns; games nurture the creativity and innovation power as well as concentration in children and help them discover the relation between objects and whatever around them. Children (of 3 years or below) learn colors and sounds through individual games and in the games with the machines they become familiar with the way they work and force that run them. Playing puzzles children learn about minor and general relations and they learn about floating and unfloating objects through playing by water. In group games children will know about rules and social norms such as: sense of cooperation, following the order. Children express their feelings through games, talents flourish and their fears will appear. Game will grow children's personality. Through games, negative and positive characteristics of children will be discovered and recognize their problems and then proceed to the treatment and correction of behavioral problems (Piaget translated by Tofigh, 1992).

B) Game therapy

Game therapy is a technique to help troubled children to solve their own problems in their own hands and at the same time, indicative of the fact that game for children is a natural way to know themselves and act based on this cognition. In this approach, the children will be given the opportunity of expressing their uncomfortable feelings and problems through games and display them. Just like those treatment for grownups through which they express their problems by talking (Exline Translated by Hajjarian, 2006).

Since the language growth of children happens later than their cognition growth, they get aware of what happens around them by playing games and communicate with it. In game therapy dolls are considered as child's vocabulary and game is child's tongue. In fact, game therapy for children is just like counseling for grownups. Symbolic performance of games is important because they help children to express what goes on inside them. Emotionally, important experiences can be easier and safer stated in symbolic way with dolls. Using dolls enables children to transfer their anxieties, fantasy and guilt to the dolls and objects rather than people. In this process children are safe against their feelings and reactions, because the game enables them to separate themselves from traumatic events and experiences. So the children don't break themselves by their actions because these practices are in their imagination. Through games, frightening or traumatic experiences might be played symbolically and the results may be changed through the activity. Children move towards the inner solution and thus are better able to deal or cope with their problems. The game process also allows the children to consider new possibilities which might not be possible in reality, explore unfamiliar things and

increase their understanding of the emotional experience and knowledge. The important function of game is the possibility that might be ungovernable in reality. Accordingly, the situations can be handled through a symbolic expression and this causes children to have the opportunity to learn coping skills (Lander, 2002).

C) Motor skills

The motor skills have played a crucial role in training and prepare the ground for other important things to learn such as education and social skills (Baranek, 2002). After the advent of efficiency of the motor system, the perceptual system also grows. Piaget's emphasizes on early sensory motor learning as the components of complex cognitive and perceptual building (Faryar and Rakhshan, 1999). In fact, the most basic behavioral responses of children is of motion or muscle behaviors (Perron, 1997).

The term perceptual motor implies interpretation and response of a person to a stimulus. The motor experiences gained in early years, form the main base of conceptual development of individuals. Studies have shown that early trainings have a positive effect in later life trainings. From the very beginning perception is affected by the movement, and in turn motor skill also affects the perception (piek et al., 2006).

Motor skills can be divided into several parts:

A) Motor learning, motor learning is relatively permanent changes in behavior that can be achieved through experience and exercise. In other words, motor learning is a set of processes along with exercise or experience that leads to relatively stable changes in the ability to perform skilled movements. Texts related to motor learning include various terms that synonymous with motor learning. Three very common words are: mental - motor learning , perceptual - motor learning and sensory - motor learning (Rahmani Nia, 2005).

B) Motor performance; motor f performance compared to motor learning, motor performance indicator is a score or are scores that a person gets on a test or a period of training. An evident behavior a person displays while performing a motor skill (Rahmani Nia, 2005).

C) Motor control, investigates the reflective and voluntary mechanisms that control human movements - means processes that form movement. This focus on control mechanisms is known as motor control in skilled behavior (Rahmani Nia, 1384).

D) Down syndrome or Trisomy 21

The syndrome is named after an English physician named Jan Lange Dundun, who first described the syndrome in 1866. People with Down syndrome have lower than average intellectual ability and typically suffer from mild to moderate mental disability. A small number of people with Down syndrome have severe mental disabilities. Average incidence of this syndrome has been reported to be between one in 600 to one in 1,000; this rate is less in young mothers and increases with increase in mother's age. However, about two-third of people with Down syndrome are born to mothers under 35 years (Afrooz, 2004).

Down syndrome is one of the most common congenital chromosomal disorders that is always associated with different degrees of mental retardation. This impairment almost equally exists in all nations and among all peoples from different classes. The physical, mental and emotional effects of chromosomal disorder in Down syndrome can be seen in different stages of growth in children with this syndrome. Undoubtedly the child's family and friends are also affected by this phenomenon in different ways. The disease appears due to an extra chromosome 21 (full or partial). In other words, children with Down syndrome have 47 chromosomes in every cell instead of 46 chromosomes; so in genetic terms Down syndrome is known as Trisomy 21. The symptoms of the disease include major and minor defects in the structure or function of organs. Among the major symptoms that can be seen in almost all patients are learning difficulties and developmental delay (Afrooz, 2004).

Development of motor skills in children with Down syndrome is typically like growth pattern in normal children, but this growth will be slightly delayed. Compared to their peers these children do these skills with lower quality, however there is also varying amplitude between them. The main problems are more noticeable in the early years of childhood. Over time, these problems reduce and as time goes by many of these children are able to achieve an acceptable level of agility and skills so that they can use them in their daily lives. In general, children with Down syndrome due to impaired brain growth and muscle relaxation don't show much physical activity during early years like other children do, so they need more motivation to do it. The whole motor skills grow with practice. So when these children follow a particular motor sequence, the normal route (route of communication between the brain and the muscles) will repeatedly be strengthened and can do better moves. Also the more the muscles are used the stronger they become. Therefore considering appropriate additional training along with encouragement from very young age, it is essential for the development of motor skills in children with Down syndrome (Winduz, 2004).

Research Methods

Considering the nature and purpose of this research, it is an applied study which has been performed in quasi-experimental pre-test - post-test.

The research community in the present study consists of all children with Down syndrome in Birjand in 2014 including 18 children based on statistics. Gross and fine motor skills of these people were measured using Lincoln - oseretsky.

Sampling in this study is simple sampling method; means among the children, 9 were randomly selected for experimental group. The experimental group received 12 sessions of game therapy. The sessions included: learning about and playing with balls and different kinds of instruments, playing with colored cubes, string beads, folding papers, cutting papers and pasting it in the notebook and painting with fingers (Gharaee and Fath Abadi, 2013; Abbasi and Hadian, 2011). After finishing sessions and completing the questionnaires, two groups were compared.

In order to collect data from this test Lincoln - Oseretsky method was used to assess cognitive - motor function of children. Modified form of the scale consists of six sub-scales and 49 subtests each of which evaluates various aspects of cognitive - motor abilities of children. Subtests of this scale are scored from zero to three. Perpetuity coefficient for the entire range of girls has been reported to be 0.80 (Lansuny et al., 1988). This scale has been standardized in Iran and the Persian and Iranian standards version of this scale have been used in numerous studies (Wuang et al., 2009). Hemayat Talab (2005) has reported perpetuity coefficient of the questionnaire as 0.87 in his study.

Data Analysis: This study examined the following hypotheses:

First hypothesis: Game therapy has positive impacts on motor skills of children with Down Syndrome.

Table 1: Mean and standard deviation of scores of motor skills of research sample

Index	No	Average	Standard deviation	The mean difference	Degrees of freedom	T square	Significance level
Experiment	9	38	69/4	56/8	1	4/56	0.000
Control	9	44/29	43/8				

According to Table 1 there is a significant difference between the experimental and control group. According to the calculated T and 0.001 level of significance we conclude that game therapy was effective on improving motor skills in children with Down syndrome.

Second hypothesis: effectiveness of Game therapy on motor skills of boys is different than girls with Down syndrome.

Table 2: Gender differences in the effectiveness of Game therapy

Index	No	Average	Standard deviation	The mean difference	Degree f of T freedom	Level of Significance
The boy	5	16	5.29	7	7 3/35	09/0
The girl	4	9	35/5			

According to table2, to test this hypothesis two independent sample T-test was used. The results showed that there is no significant difference between the effectiveness of Game therapy on motor skills of girls and boys.

DISCUSSION AND CONCLUSION

Research shows, Game therapy had a positive effect on improving motor skills of children with Down syndrome. Asghari Nekah (2011) stated in the results that games and educational use of that have always been one of the main discussions in the fields of children with special needs. Games, in a way, stimulate the nervous system and make the child active, they create vitality and nerve readiness which cause excitement and interaction of sensory and perceptual parts and decisions making in children.

The results indicate that there was statistically no significant difference between the effectiveness of game therapy on motor skills of girls and boys. The results of the Abbasi and Hadian (2011) on the study of impact of eye-hand coordination activities on hand skills of students with Down syndrome show uneffectiveness of gender in the studying field. Also the research of Najafabadi and Alebrahim (2011) presented that gender plays no role in motor, cognitive, social and education skills in the group that received game therapy which is consistent with current research.

Studies showed that the mean component of the motor skills is more in experimental group except one instance. Thus, the results showed: public coordination static of group 2, control group 3.67, dynamic general coordination in experiment group 0.67, control group- 0.11; dynamic hand coordination in experiment group 0.33, control group 0.11; movement speed in experiment group 3.67, control group -0.22; simultaneous

voluntary movements in experiment group 1.56, control group -0.11 and asynchronously voluntary movements in experiment group 2.67 and control group -0.11.

Developmental coordination disorder is an obvious failure in the development of motor skills in children of pre-school and primary school first appears as difficulty in learning or skills that require motor coordination. This disorder causes loss of performance in all areas of work such as games and educational performance, which itself leads to social performance downfall in the future. That's why therapists are increasingly looking for new ways with better effects for treatment of this disorder. One of these methods is the use of games. The results of the present study also suggest positive effects on motor skills of children with Down syndrome with game therapy.

Games are important for improving social skills, behavioral problems and hyperactivity, educational improvement especially the achievement of motor skills in children with mental retardation. Since children with Down syndrome are weak in eye-hand coordination and hand-holding, it looks like game therapy compensates motor delays in them and makes daily activities and games normal like other children.

Since game therapy in children with Down syndrome is done based on the extent of their ability and physical condition, it seems that there is no significant difference in effectiveness of games on motor skills of boys and girls because the purpose of game therapy is reinforcement of gross and fine motor skills in boys and girls with Down syndrome who are in the same condition regarding abilities in playing games.

Since linguistic growth of children happens later in children with Down syndrome than their cognitive growth, their only way to communicate with their surrounding is game. In game therapy, toys are like children's words and game is their language, an active language. Game therapy is like counseling for adults. Major exciting experiences can lead to secure and peaceful feelings through imaginary symbols and toys. Using toys enables the children to reveal their anxiety, imagination and guilt. In the process of game playing, the child expresses his feeling freely because this method separates them from themselves, their experiences and daily lives. Children show themselves in the games and learn how to deal with different situations.

Therefore in the process of growth, children have needs and problems most of which are not answered or understood by parents the way they should be. So a compatible way of communication with the child should be found. The way adults choose to express their needs is talking about the problems. A method should be selected that would be as effective as talking. Game playing is a method through which a child speaks just like adults. Game is a way through which a child expresses his feelings, expands his relation, reveals his experiences, discloses his dreams and flourishes himself. The problems the children should deal which are not the way the adults imagine.

According to the results, it is recommended:

There should be researches to study motor skills with individual learning, the excitement of learning, the effect of music therapy on special children's social skills. Regarding little study performed in the field of motor skills it is suggested that, like the present study, a more extensive research would be performed so that the results can be generalized in a larger scale. Another suggestion of this research is for families and teachers to be more attentive about the games because it is in the games that the real life forms, paying close attention to the creative thoughts and dynamics of children during games we can get more familiar with their characters, holding educational workshops and making families with Down syndrome children more familiar with motor skills of children and educating them, selecting games and toys to reinforce skills for families are among other suggestions.

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