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THE EFFECT OF A FUNCTIONAL MOTOR THERAPY PROGRAM ON SOME MOTOR SKILLS IN CHILDREN WITH DOWN SYNDROME

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Abstract: The study aims to identify the effect of the proposed program on some motor skills of children with Down syndrome. The community includes children with Down syndrome in the third grade of primary school at the Intellectual Education School in Arish, North Sinai Governorate during the academic year 2022/2023, and their number is (22) children. The researchers selected the research sample intentionally, and their number is (22) children with Down syndrome who are capable of learning. (5) children were drawn as a sample for the exploratory study to calculate the scientific coefficients of the tests and measurements used. Thus, the basic research sample became (17) children, representing the experimental group under study.

The results indicated that:

- The proposed motor dexterity program for the experimental group contributed positively to increasing the level of all motor abilities, random behaviors, and visual cognitive achievement.
- The proposed motor dexterity program for the experimental group had a greater impact on the level of motor abilities, the amount of random behavior, and the visual cognitive achievement under investigation than the traditional program followed using the command method for the control group.

The percentages of improvement in the dimensional measurements for the experimental group were better than the control group in motor abilities, random behaviors, and visual cognitive achievement.

Keywords: *Functional Motor Therapy, Motor Skills, Down Syndrome*

Introduction

Man is God's vicegerent on earth, with him you live and with him you die, therefore man was and still is the essence of this universe and the secret of its existence, and for this reason advanced countries have tended to care for the individual and his health during the different stages of his growth, especially for members of special groups, as man while practicing various life and sports activities and events is exposed to many pressures and disabilities that lead to difficulty practicing life in a normal way. Any scientific development must be based on accurate and modern scientific foundations and studying and solving the problems and obstacles that may face development in the sports field, especially the problems of various disabilities and rehabilitation and sports

exercises that suit special groups, especially those with Down Syndrome. Motor and functional rehabilitation is one of the most important pillars in the comprehensive and integrated rehabilitation process for people with Down syndrome from the community through its various branches, which are divided into "motor therapy, occupational therapy, rehabilitation". The job is defined according to the World Federation of Occupational Therapists (WFOT):

It is the daily life activities that people do individually or within the family or community to perform their duties and occupy their time so that their lives become purposeful and meaningful. The job includes things that a person needs, wants and expects to do.

Definition of the job according to the American Occupational Therapy Association (AOTA):

It is every familiar, beloved work that we do that has value and meaning. The job does not necessarily have to be a job. It is used in treatment to make the patient more independent and adaptable to his life. The job (activity) may be a means to achieve the therapeutic goal, and its performance may be the goal.

Definition of the job according to the Canadian Organization of Occupational Therapists (CAQ1): It is everything that people do during their lives, where everyone in society performs a set of functions that are important to their health and well-being. The job describes the person in terms of who he is? How does he feel about himself? According to the Occupational Therapy Practice Framework (OTPF), the term "functioning" refers to the activities of daily living that people engage in. Functioning occurs within context, is influenced by the interaction of factors related to the patient, performance skills, and performance patterns, occurs over time, has a purpose, meaning, and utility that the patient perceives, and can be observed by others (such as preparing a meal), or is known only to the person performing it (such as learning by reading a book).

According to the Occupational Therapy Practice Framework, functioning is classified into eight groups:

Activities of daily living, instrumental activities of daily living, education, work, play, recreation, rest and sleep, and social participation.

The basic principle for rehabilitating those with the syndrome without taking into account all its aspects due to its various causes and multiple forms, and this is especially important in rehabilitating them for normal activities and others due to their multiplicity, and functional and motor rehabilitation requires understanding the nature of the injury and a complete understanding of it and its interactions according to each profession, and the extent of the awareness of the treating team of that, and in order for motor and functional rehabilitation to become more effective, it must continue for various periods throughout the day, and this falls on the shoulders of the exercise specialist, the motor and functional rehabilitation specialist, the treating team and the injured person himself, and the treating medical team and the patient must understand this in order to achieve the goals of the program set, and to achieve this, the injured person is encouraged to improve and increase his level of acceptance of the program, with the use of a variety of content of sports exercises and rehabilitation programs, and helps in removing the stress resulting from work requiring excessive repetition of movement, and this includes the evaluation of the members of the treating team, the psychologist, the exercise specialist, the motor and functional rehabilitation specialist, the therapeutic massage specialist and the physical therapy specialist, due to their practical and scientific experience with these cases according to the instructions of the specialist doctor. Motor and functional rehabilitation programs play one of the main pillars of motor education programs that contribute to achieving their goals, as they help children manage their bodies in motor situations efficiently, harmoniously and accurately, in an effective and influential way during continuous adaptation to new situations. This type of activity faces challenges that push them to repeat the attempt, which works to improve motor abilities and skills and coordination between them in what is called motor dexterity. On the other hand, motor fluency games constitute a good field for acquiring voluntary traits such as courage and self-confidence through the repeated attempts that the child performs in exchange for the challenge of motor duties that he encounters in play through motor dexterity programs.

Down syndrome children from (6-9) years are considered one of the most important stages in a person's life, as this stage is distinguished by its importance in developing mental abilities, psychological characteristics and

moral values in children. Therefore, this stage has received wide attention in various societies, and despite the different trends towards the educational processes that take place in it, the agreement is clear that it has a great impact in subsequent stages. Motor activity is one of the best tools for learning about the psychological, mental and cultural makeup of children. The child, through his exploration of the world around him through motor activity, also explores himself, and through play he interacts with everything in his environment from people, things and actions, which leads to the development of his concepts. Random behavior in children is defined as a pattern of behavior that appears random and has no specific purpose. It is worth noting that frequent periods of random behavior in a child may lead to physical, cognitive, or emotional disturbance. Therefore, this child must be monitored to determine the underlying causes of random activity and thus treat it. Random behaviors can also be divided into desirable and undesirable actions or movements, in other words, positive and negative behaviors, through three axes: (motor activity - educational values - social behaviors). Examples of random behaviors during the motor activity axis include excessive motor activity and sudden movements. Random behaviors during the educational values axis include honesty, the opposite of lying, trustworthiness, the opposite of betrayal, and so on. Random behaviors during the social behavior axis include cooperation, the opposite of selfishness, taking responsibility, the opposite of relying on others, leadership, the opposite of dependency, and others.

Motor education as an educational system depends mainly on achieving behavioral, motor, cognitive and emotional goals through managing the educational process for early age groups. The countries of the civilized world are interested in developing all areas of life, and at the forefront of them is development in order to care for the upbringing of their children, as caring for childhood is one of their most important goals. The child is the future of the entire nation and preparing him requires an effort of research and study to become an individual capable of production and development.

It is also not possible to bring about a change in the learner's behavior without creating an appropriate educational environment, and this can only be achieved through the use of educational technology, which works with its various means to create that environment, through which the learner can have his educational experience by learning how to use all sources of knowledge and modern technological means that help him to reach the information himself. By observing children with Down syndrome, researchers found some spontaneous, innate behaviors and actions that some children suddenly display, which may sometimes cause some harm to the child himself or to other children. It is extremely difficult for educators in nurseries or parents to overcome random behaviors from children, which are often negative behaviors.

The most used solution is negative reinforcement by punishing children for such random behaviors. There is a clear deficiency in positive reinforcement for them, which may be due to the teacher's neglect of methods for modifying random behaviors in the correct scientific way, which aims primarily to develop the educational and moral aspects of children who exhibit such behaviors. Also, the teacher's reaction to such behaviors is sudden and he does not have enough opportunity to make appropriate decisions to modify such behaviors. He often resorts to negative punishment as the fastest way to modify behavior, and therefore he is not lucky in following the appropriate method towards the child. On the other hand, we find that children often neglect acceptable behaviors and actions during certain situations in life, which is what prompted researchers to use the program. The proposal is considered to help the child with Down syndrome to identify different behaviors and the role of motor activity in overcoming the negative ones and supporting and developing the positive ones and its impact on learning some motor and cognitive skills for those working with this group. Thus, this article aims to identify the effect of the proposed program on some motor skills of children with Down syndrome.

Methods

Participations

The community includes children with Down syndrome in the third grade of primary school at the Intellectual Education School in Arish, North Sinai Governorate during the academic year 2022/2023, and their number is (22) children. The researchers selected the research sample intentionally, and their number is (22) children

with Down syndrome who are capable of learning. (5) children were drawn as a sample for the exploratory study to calculate the scientific coefficients of the tests and measurements used. Thus, the basic research sample became (17) children, representing the experimental group under study.

Procedures

Data collection tools:

Device for measuring length (in centimeters) and weight in kilograms. This device was calibrated before and during its use.

- Small colored balls - Tennis cubes - Different sized colored cubes - Different length-colored sticks - Different diameter-colored hoops - Various objects of different shapes - Empty containers of different sizes and colors - Plastic bottles - Bags of grains and sand of different weights - Measuring tape - Computers.

Goodenough Intelligence Test:

This test is of the non-verbal, collective type, and it requires the child being examined to draw a picture of a man in a time that does not take more than 10 minutes. This test gives its best results if applied to children between (4-10) years. Muhammad Hassan Alawi Arabized the test and standardized it on children in the Egyptian environment. The validity coefficient was 0.76, and the stability coefficients were between (0.86, 0.94).

Motor ability tests under study:

By reviewing many scientific references in the field of motor performance tests for children, the researcher chose the Hebbelinck & Borms (2007) test battery, which is suitable for children aged (5:13) years, and which is characterized by measuring most of the motor abilities in children at this stage. The five test units are characterized by having good validity and reliability indicators for the abilities they measure. These motor tests are: 20m running - long jump from a standing position - throwing a soft ball to the maximum distance - zigzag running between hurdles - standing on one leg.

Illustrated Cognitive Achievement Test:

The researchers designed the cognitive achievement test to measure the extent of Down syndrome children's achievement of the cognitive aspect under study. The following steps were relied upon in constructing the test:

1- Determining the objective of the test:

This test aims to measure the achievement of the children in the research sample in the cognitive aspects related to motor abilities and the behavioral aspects they include, provided that this test is consistent with the level of Down syndrome children, considering that the cognitive test is formulated in a visual form that can be measured, and the child can respond to its vocabulary.

2- Preparing the main axes of the test:

The main axes of the cognitive test were identified, which are related to motor abilities and the behavioral aspects they include, according to the general objective and behavioral objectives of the cognitive test, as it included (5) axes that the researcher presented to (10) experts in the field of motor education for children to determine the most important axes that are directly related to the research topic, provided that the expert is a faculty member in one of the faculties of physical education, and the years of experience are not less than 15 years.

Identifying and formulating the test vocabulary:

The test questions were formulated according to the conditions and specifications that must be followed and described in a form to determine the extent of their validity, provided that these questions take into account: (clarity of expression - suitability for the level of children - comprehensiveness - scientific accuracy - brevity - extent of measuring the program's objectives), followed by translating these vocabulary into drawn situations

that are presented again to the experts to determine the extent of their suitability for the children with Down syndrome under study.

Preparing the initial image of the test:

The initial image of the test was presented after its preparation to a number of (10) experts in the field of motor education, with the aim of verifying the validity of this image for application, the validity of the illustrated test situations, which numbered (77) illustrated situations, the method of formulating them, and the extent to which they measure the objectives for which they were set. The results of the experts' opinion poll showed their agreement with a percentage of (97.4%) on the situational questions of the illustrated cognitive test, provided that some modifications are made (by deletion, rephrasing, addition) in some questions.

- Test instructions:

One of the important things for applying the illustrated cognitive test is preparing a list of test instructions in an easy way that suits the level of understanding of children with Down syndrome, and it entails clarifying the goal required of the children. Therefore, the test instructions must be written in a correct and clear language, far from prolongation.

- Final image of the test:

After making the modifications indicated by the experts, the number of illustrated situational questions became (75) individuals, which is the final image of the illustrated cognitive test that is valid for use and application.

Implementation of the proposed motor dexterity program:

The proposed motor dexterity program was implemented on the experimental group, while the control group followed the (commands method), which consists of explanation and model performance, during the period from 10/31 to 12/9/2023 AD.

Post-measurements:

Post-measurements were conducted for the control and experimental research groups during the period from 12/12 to 12/16/2023, with the same pre-measurement conditions applied.

Statistical treatments:

The Statistical Package for Social Sciences (SPSS) was used, which includes the following treatments: arithmetic mean - median - skewness coefficient - standard deviation - correlation coefficient - "t" test - progress ratio equation.

Results.

Table (1)

The significance of the differences between the averages of the post-measurements of the experimental and control groups in motor abilities and pictorial cognitive achievement

Variables	Unite	Experimental group		Control group		T test
		M	Sd	M	Sd	
20m Sprint	Second	8.67	0.572	9.36	0.881	2.787*
Long Jump	Cm	44.65	1.413	41.13	1.460	7.350*
Full Distance Soft Ball Throw	Meter	4.95	0.485	3.90	0.551	6.069*
Zigzag Run Between Hurdles	Second	10.60	0.836	12.03	0.956	4.777*
One Leg Standing	Second	2.79	0.574	2.00	0.634	3.919*
Illustrated Cognitive Achievement	Degree	49.15	3.486	36.50	5.684	7.750*

Table (1) shows that there are statistically significant differences between the averages of the post-measurements of the experimental and control groups in the variables of motor abilities, random behavior, and the pictorial cognitive achievement under study in favor of the experimental group.

Discussion.

The researcher attributes this to the fact that the motor dexterity program provided the opportunity for communication between children in the same age group through motor activity that is available during the

motor dexterity program, which departed from the old traditional method followed in various traditional educational curricula. Motor dexterity also means education through movement, which is a method of learning through experience and activity. This helped provide feedback that helps the child imagine and know the motor performance, in addition to facilitating the retention of information from the details of the motor performance for the longest possible period in the memory, and thus this leads to an increase and improvement in the level of motor abilities. In this regard, Makarem Abu Harjah and others (2001) indicate that the use of educational technology leads to an increase in the retention of the effect of the information that students learn and its consolidation in their minds, which is reflected in the learning process in a positive way. This is consistent with the results of the study of Mervat Farid (2001), Ahmed Abdel-Azim (2002), Hussein Hamouda (2002), Clersida Garicia (2002), Ashlesha, & Roland, (2004) , Farida Ibrahim Othman (2004) , Hala Fayez (2005), Nadia Ali Abdel-Moati (2007) that the dexterity and motor education program works to improve motor abilities and the ability to focus and instinctive discovery, which helps to increase cognitive memory abilities in children. The researcher attributes this to the fact that the motor dexterity program has an effective and influential role in reducing children's random behaviors through the content of the proposed program, which includes acting exercises such as imitating animals, tying people, and imitating trees, exercises to know dimensions, sizes, and weights, exercises to perceive colors and shapes, exercises to perceive directions, exercises to improve motor coordination, exploratory exercises for the body and the surrounding environment, introductory games, and motor stories. All this content contributed significantly to the child's acquisition of many good behaviors that shaped his personality and helped reduce their random behaviors. The method of learning using motor dexterity that the child performs effectively led to him obtaining behavioral information on his own and thus recognizing many correct behavioral situations in a pictorial framework without the child's imagination. Rather, the imagination is left to the child to link these behaviors to other behavioral situations in life and activate them through practicing motor activity during the proposed program. Therefore, linking behavior to movement had the greatest impact in refining random behaviors in children during the experimental group under study. As shown in the results of Table (1), there are statistically significant differences between the averages of the pre- and post-measurements in the illustrated cognitive test in favor of the post-measurements. The researcher attributes this to the fact that the motor dexterity program has an effective and influential role in learning movement through various activities that are characterized by stimulating and challenging the child's cognitive abilities. The child also learns about some of the different formations related to motor activity and some of the laws associated with motor activities during the motor dexterity program, which indicates that the proposed program has an effective role in providing children with Down syndrome with many educational goals through practicing aspects of motor activity, whether those goals are cognitive, motor, or emotional. In addition to that, there are motor goals to develop basic natural movements, motor fluency, motor exploration, sports movements, motor perception, innovative thinking, and others, as well as emotional goals that are related to acquiring many moral and social values, self-denial, happiness during sports practice, and high sportsmanship. Zimmer (2005) believes that the primary goal of motor education during this stage should be to meet the needs and capabilities of children, and the motor goal is to develop and enhance children's abilities in general and help them develop in various aspects of their personality. This is consistent with the results of the study of Zainab Musa (2000), Saad Nasser El-Din (2004), Nazmi Awda (2006), and Khaled Ibrahim (2007), which indicate that the most common behavioral problems among children are hyperactivity and attention deficit, as well as the emergence of some difficulties of an emotional nature among children that are related to the characteristics of this age group, such as mood swings and the search for care. The researcher also attributes this to the long period of time that it took to implement the traditional program followed by the members of the control group using the commands method, which affected the modification of the child's behavior through practice and training, which led to adaptation to different situations during the physical education lesson. The traditional method (the commands method) cannot be ignored, as it depends on verbal explanation and performing the practical model of the motor abilities under study. The regularity of the

children in practicing throughout the period of implementing the educational program, as well as the children learning collectively, led to arousing the children's motivation to compete to highlight the superiority of each of them over the other, which made them perform the motor abilities in the best possible way.

This is consistent with the results of the study of Toskic, Popvic (2002), Wang, Joanne (2003), Zachopoulou, & et al (2006), Erk katrin (2009), whose results confirmed that the command method, which relies on verbal explanation and performance of the practical model, led to students' comprehension of motor skills and learning them in a positive way.

As for the random behavior scale for children in the control group, the researcher attributes this to the fact that regular motor activity had a positive effect on children's random behaviors, which resulted in reducing and refining the random behaviors under study. In addition, the command method is characterized by the teacher's constant guidance, supervision and interaction with children, which helped children to follow proper behaviors and avoid random actions that may harm themselves and others. This is consistent with the results of the study of Saad Nasser El-Din (2004), Nazmi Awda Abu Mustafa (2006) , Spaulding, & et al (2008), which indicated that physical activity programs help improve health and psychological conditions and the types of behavior they include, such as aggressive, introverted, social, and others. As for the illustrated cognitive achievement test under study, the researcher believes that this result is due to the fact that the method of commands followed in the explanation has a positive effect on cognitive achievement, as it presented knowledge and information related to the motor abilities available during the physical education lesson, and this helped to form a clear picture of the motor activity followed, based on the fact that the educational environment constantly helps children to have a certain amount of knowledge, which represents the basis before the actual practice process during the physical education lesson, as knowledge comes before practice. This is consistent with the results of the study of Zachopoulou, et al (2006) , Awatif Ibrahim and Badour Abdullah (2015) , which confirmed that the use of sports activity programs has the ability to increase innovation and imagination and acquire a lot of useful information through the various exercises that are applied to children, and thus has a positive impact on the level of cognitive achievement of children. The researcher attributes this to the fact that the content of the motor education program allows dealing with children individually, as the child progresses according to his own speed, thus considering individual differences between children during the learning process. The content of the motor education program also gives the child the opportunity to visualize the correct motor abilities, especially the abilities that are performed in a comprehensive manner and at high speed. The motor activity can also be repeated more than once, thus fixing the skill in the child's mind and standing on the fine details of the motor performance and making the learning process easy and interesting, which has a great impact on learning the motor abilities and situational behaviors under study in a good way and reaching the best possible level during the learning period, while the command method (verbal explanation and model performance) cannot provide this advantage, as there are children who cannot see the activity model correctly, which may affect their learning correctly. The researchers also believe that this result is also due to the positive impact of the contents of the motor dexterity program, which contributed effectively to considering children's tendencies and needs towards play and working to stimulate all their senses in the educational process as well as giving them a positive role during learning, which helps increase their motivation to learn. This is consistent with what Abdel Hamid Gharib Sharaf (2008) indicated that the use of educational media works on the student's control of the operating system and his active and effective interaction with the content of the educational program according to his own speed and special abilities.

The researcher attributes this to the effectiveness of the motor dexterity program in reducing the random behaviors of the children in the experimental group more than the motor education program using the command method for the children in the control group, in which the teacher focuses on one type of movements without considering the needs of the children during that stage in the rest of the program. The effectiveness of the motor education program appears through reducing impulsiveness, hyperactivity, distraction, and behavioral arousal. This is also due to what the motor education program contains of a variety of introductory

games, representative movements, individual dexterity movements, and dexterity with a colleague, which directly affected attracting children to activities that meet their needs and desires and are consistent with their motor abilities.

Fatima Saber (2016) indicates that motor education programs should include many experiences that contribute to the development of motor awareness, such as balance and somersaults, which makes motor dexterity activities of utmost importance in the child's motor education program. The researcher attributes this to the comprehensiveness and integration of cognitive content in a manner that suits the children in the experimental group, in addition to the use of more than one medium via the computer from which children derive information and knowledge, which helps children retain information and recall it when needed, and the use of more than one sense in learning helps enrich and deepen information and present it in an effective framework, in addition to the elements of suspense and excitement that provide positive interaction between children, while the method of commands using verbal explanation that the children in the control group underwent must accept everything presented to them by the teacher without the slightest positive participation in the process of obtaining knowledge and information. This is consistent with the results of the study of Zainab Al-Samahi (2010), Saad Nasser Al-Din (2004) , Nazmi Awda (2006) , Khaled Ibrahim (2007), Spaulding & et al (2008) , Wafaa Mufrej (2008) , which indicate that what the motor dexterity and motor education program includes of many different skills and activities, including imitating animal movement such as walking and running, control and domination skills, and coordination skills.

Preparatory games help children during this stage to enjoy these motor skills through activities that depend on motivation and directed excitement, which positively helps to quickly acquire the correct behavioral aspects. In addition, the content of the motor education program must meet all the needs and abilities of children, and the motor education program must be flexible and adjustable according to changing circumstances, and its contents must be characterized by a logical arrangement. The researcher attributes the superiority of the experimental group over the control group in all motor abilities and the decrease in random behavior and the increase in the rates of improvement in the illustrated cognitive achievement to the fact that the motor dexterity program has a clear effect on attracting children's attention towards motor activity, including pictures, illustrations and other effects that helped attract children's attention towards sports activities and children exert more effort and exploit their latent energy, which leads to a decrease in the severity of their aggressive behavior to free it towards motor activity. This is also because the motor dexterity program includes attractive factors that help the child stimulate his behavior to imitate the correct behaviors towards different situations.

Conclusion.

The proposed motor dexterity program for the experimental group contributed positively to increasing the level of all motor abilities, random behaviors, and visual cognitive achievement than the traditional program followed using the command method for the control group

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