

# The Effect of a Movement Games Program on Developing the Movement Skills of Children with Hemiplegia

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## **Abstract**

This study aimed to design a movement games program in order to develop the movement skills of children with hemiplegia. As well as identifying the impact of the movement games program in developing the movement skills of hemiplegic children. The experimental method was used with the one-group strategy in comparing between the pre- and post-measurement which agree to the nature of this study. The population of the study consisted of hemiplegia children. The study sample consisted of (12) children, (6) males and (6) females with paraplegia, who belong to the Noor Al-Taqqqa Center for Special Education, and they were chosen by the intentional method. The researcher designed and built a movement games program dedicated to developing movement skills for children with paraplegia. Duration of (10) weeks, (3) units per week, each unit lasts (50) minutes. The program contains (56) movement games suitable for all movement skills intended for paraplegics. The movement skills test scale study was used, where its validity and reliability were verified, and the data was statistically processed using (SPSS). The researcher concluded that there is a positive effect of the proposed motion games program in developing the movement skills of children with paraplegia. In her current study, the researcher recommends the necessity of using the proposed motion games training program for paraplegics, because it develops all aspects of the movement difficulties of this class.

**Keywords:** Movement Games Program, Movement Skills, Paraplegics.

## **1. Introduction**

The incidence of strokes has recently spread, causing hemiplegia in those affected. The National Stroke Association reported that hemiplegia affects 9 out of every 10 stroke survivors to varying degrees. A stroke is a serious medical condition that occurs when blood flow stops or decreases. To a part of the brain, it prevents brain tissue from obtaining oxygen and nutrients, so brain cells begin to die. A stroke occurs for two main reasons: "lack of blood flow, where blood flow stops due to the occurrence of a blood clot, which constitutes 85% of cases, and bleeding, where small blood vessels burst." Which nourishes the brain," and a temporary interruption of the blood supply can cause a transient ischemic attack that leads to a temporary stroke that lasts for a few minutes and up to 24 hours (Lie & Eskild, 2010).

Both Al-Muhalhal (2012) and Abu Jamous and Kanaan (2008) have indicated that movement games are an activity that has a special appeal for children (disabled people with paralysis) resulting from strokes because it gives them a feeling of participation, effectiveness, competition, encouragement, satisfaction and happiness, and thus it can be a good medium for teaching them many socially desirable concepts, information, customs and behavioral patterns in an enjoyable and pleasant atmosphere, and the positive values of movement activities in terms of emotional release or venting, getting rid of isolation, withdrawal and aggressive energy, providing children with hemiplegia some skills that enable them to occupy their free time and integration with others, and the development of their self-confidence, which leads to improving their psychological health, and the resulting improvement in the level of synergy, muscle flexibility, and movement skills of the body parts of the paralyzed person.

Since play accompanied by movement activities is one of the fields that help build the child's personality, by giving him opportunities to express himself, his abilities, and his creativity. It is also a field rich in activities that satisfy the child's urgent need for movement, contemplation, thinking, and creativity, which he acquires through practicing physical movement, psychological, and physiological fitness. Play provides the child with experiences and information in an automatic manner, in addition to the fact that physical and movement education is a type of general education that seeks to achieve integrated and balanced growth socially, mentally, psychologically and physically, through movement activity using the gaming method (Beckman, 2013).

Interest in childhood is not limited to normal children but also includes children with special needs, including those with paralysis. They are a group that cannot be ignored and left to live on the margins of society, which used to leave them alone or work to place them in institutions of their own (Reddihough, 2011).

Hemiplegia is a neurological condition that leads to the loss of the ability to move one side of the body to varying degrees and is associated with difficulty performing daily activities, due to injury to the parts of the brain that control the movement of the limbs, face and body, leading to the affected person losing the ability to control muscle movement, and the location of a stroke occurs at the site of paralysis in the body, as paralysis occurs on the other side of the body where the brain damage occurred. A stroke in the left side of the brain, which is responsible for controlling language, memory, and speaking, causes weakness in the right side of the body, and in the right side of the brain. The brain causes weakness and paralysis in the left half of the body, which controls behaviours and non-verbal communication (Zimmerman & Bilaniuk, 2016).

From the above, the researcher indicates in her current study that the group of children with hemiplegia is a group that deserves care and attention in developing their movement skills because they are linked to physical, mental and psychological health, maturity and growth. Movement game programs that are codified in a sound scientific manner are the best ways to develop the movement skills of children with hemiplegia, so the researcher was required to conduct this type of study to reach a set of conclusions and recommendations on this topic.

Through the researcher's experience as a physical therapist in rehabilitation centers in Karak Governorate, she noticed that there are no movement games provided to children with hemiplegia in particular, as the nature of the games provided is not appropriate for the skills required to be developed in children, and is also not appropriate with the characteristics and nature of children, and she indicates the researcher pointed out the need to provide enjoyable and useful programs in a simple manner that encourages their application and is compatible with the characteristics of the childhood stage, which is directly related to play under what is called play therapy. Addressing the paralyzed child as a player playing a game may have a positive effect than addressing him as a patient practicing a therapeutic program, and this in turn called for the researcher to conduct this current study, and through reviewing previous studies in the field of movement games and their impact on the movement skills of children with hemiplegia, a need for further research emerged due to the lack of information available in this field, in addition to the lack of rehabilitation programs directed at this group that practices using natural activity appropriate for the nature of childhood within the programs provided by the government and private agencies concerned with this category of Jordanian society.

## **2. Research Objective**

This study aimed to identify:

1. Designing a movement games program aimed at developing movement skills for children with hemiplegia.
2. Identifying the effect of the movement games program in developing the movement skills of children with hemiplegia.

## **3. Study Hypothesis**

The current research seeks to test the following hypothesis:

H01: There are statistically significant differences at the level ( $\alpha \leq 0.05$ ) between the pre-measurement and the post-measurement for the experimental group (people with hemiplegia apply the movement games program) in movement skills in favor of the post-measurement.

## **4. Literature Review**

Movement games are known as those games that have a positive and effective effect on all body systems. They improve the functional ability of internal organs, such as breathing and circulation, as well as develop muscular and physical ability, straighten stature, and work to improve various movement skills. In addition, they are games that require movement effort by children and work to stimulate them, develop the balance of their movements, strengthen their muscles, and acquire some movement skills.

Also, movement games are movement activities and activities that are based on physical or movement activity such as representative games, movement stories, and non-guided free exercises, and the large number of participants in them often characterizes this type.

Hence, it raises the healthy level and develops different movement capabilities and skills, physical qualities and voluntary and moral features (Naifel et al., 2009).

The method of movement games is of great importance in achieving combined goals for developing attributes and physical and motor skills and at the same time developing the child's technical skills in order to create a kinetic memory in the future among those goals: developing and improving the attributes and physical and motor skills, improving the skill of children, and developing psychological qualities in children such as determination, perseverance, self-confidence, the introduction of the fun and pleasure factor into the souls of children, and the acquisition of children with educational qualities such as the sense of the value of teamwork, cooperation, obedience, and responsibility (Almagableh, 2020).

Skill can be defined as a pattern of proficient performance directed towards completing a task or a specific simple or complex task. A mastery skill grows with learning and is measured by accuracy and speed. It is also known as having the ability to reach final results with the highest confidence, with the least possible physical effort, and in the shortest time (Mufti, 2002). Al-Dulaimi (2010) states that skill is nothing but the stability of movement, its mechanism, and its successful use in different situations.

Movement is defined as activity and is the basic form of life. In its content, it is a noticeable physical response to a stimulus, whether internal or external. The most important thing that distinguishes it is the wide diversity of its forms and methods of performance. Movement is also a method of education, ancient and modern, as it helps in acquiring cognitive aspects, forming concepts, and solving problems (Clersida, 2014).

Basic movement skills are defined as some aspects of movement achievement that appear in the early stages of physical maturity, such as: crawling, walking, running, rolling, jumping, throwing, climbing, and hanging. Because these movement patterns appear in humans initially, they are called basic or main movement skills (Almagableh, 2020).

Acquiring movement skills has benefits and advantages of great dimensions, for example, movement skills provide the opportunity to enjoy leisure time and recreational activities, movement skills develop self-concept and gain self-confidence, movement skills provide work energy and help to acquire physical fitness, movement skills have become a requirement for employment. Skilled in industry and in increasing production movement skill helps create a social atmosphere and a distinct social status. Movement skill enables the individual to defend himself and increase the chances of safety (Russo et al., 2009).

On the other hand, hemiplegia resulting from a stroke occurs in the right or left half of the body, that is, the longitudinal half of the body. The patient suffers from total or partial weakness, and sometimes the injury to the brain is not complete, and the paralysis in the body is partial. The brain, as it is known, is divided into two parts, right and left. Each of the two sections is responsible for the opposite half of the body, meaning that the left hemisphere of the brain is responsible for the right half of the body and vice versa. Hemiplegia will appear in the left half of the body if damage occurs to the right hemisphere of the brain (Beckman, 2013).

Hemiplegia is defined as a neurological condition that leads to the loss of the ability to move one side of the body to varying degrees, and is associated with difficulty performing daily activities, due to injury to the parts of the brain that control the movement of the limbs, face and body, leading to the affected person losing the ability to control muscle movement (Russo et al., 2009).

### 5. Research methodology

The experimental approach was used with a one-group strategy and comparison between the pre-measurement and the post-measurement, due to its suitability to the nature of this study.

#### 5.1 Research Respondents

The study population included all 40 children with hemiplegia attending the Noor Al-Taka Centre for Special Education.

#### 5.2 Sample of the Research

The study sample consisted of (12) children. (6) Males (6) females, among those with hemiplegia. They were chosen intentionally, and Table No. (1) Shows the characteristics of the study sample.

Table 1. The research sample distribution according to their demographic factors

Variable	Number	Mean	SD	skewness		kurtosis	
				Value	Standard error	Value	Standard error
Age (year)	12	9.5833	2.35327	.502		.637	
Height(cm)	12	32.3333	9.61375	.249		.637	
Weight (kg)	12	135.5833	13.65456	.182		.637	

#### 5.3 Study Instrument

##### Movement games program designed by the researcher.

The researcher designed and built a motor games program dedicated to developing motor skills for children with hemiplegia.

##### Program specifications:

1. The program contains (56) various motor games that cover and serve all motor skills for people with hemiplegia.
2. The duration of the program is (10) weeks; each week consisted of (3) game days, and each day included giving (3/4) movement games, and the duration of the training session was (50) minutes.

3. The movement games in the program were graduated from (easy to most difficult) and from (least complex to most). In general, they are simple games that take into account the individual differences between patients.
4. Security and safety factors are very necessary for this group, as there is a constant presence of the researcher and her assistant around the children while they are playing, monitoring anything that might cause them harm.
5. There are (5) minutes of simple stretching and warm-up exercises before starting the games in order to prepare the children's muscles.
6. There are rest periods, breaks, and the distribution of some juices and chocolate between some of the movement games in the program, but they are not mentioned in the program directly, but rather are left to the researcher when she needs it and feels the levels of fatigue among the study sample.

### **Movement Skills Test.**

Movement skills tests were arrived at by referring to previous studies and learning about the tests that measure motor skills. The researcher adopted the opinions of experts and arbitrators by presenting these tests and asking the experts to put a score in front of these tests, and it was agreed upon by a percentage of (80%).

### **Validity of the study instrument**

The validity of the study test was confirmed by reviewing studies that used these tests as a study (Abdullah, 2016) and it was presented to a group of specialists in the field, where their observations were taken, and the test was adopted, which achieved an agreement rate of 80% or more.

### **Reliability of study tests**

The method of application and reapplication was used on the entire study sample with a time difference of 48 hours, and by calculating the Spearman correlation coefficient, and Table No (2) shows the results of this.

Table 2. Spearman correlation coefficient for study reliability

No.	Paragraphs	Reliability Coefficient
1.	Can walk in a straight line.	1.00
2.	Can climb the stairs on your own.	0.78
3.	Goes down the stairs alone.	0.78
4.	Can run in a straight line.	0.78
5.	Can stand on one leg for (7) seconds.	0.82
6.	Can jump with both legs forward three consecutive steps.	0.78
7.	Can jump with one leg forward three consecutive steps.	0.84
8.	Can roll the ball in his hand for a distance of (3) metres.	0.84
9.	Can roll the ball 6 meters between his feet.	0.84
10.	Can climb up and down the ladder fixed to the wall.	0.82
11.	Can walk between cones without dropping them.	0.78

Table (2) indicates that the value of the reliability coefficient (Spearman's correlation coefficient) ranged from 0.78 to 1.00, which indicates the stability of these tests and their suitability for the purposes of the study.

### **Tools and devices used in the study**

A group of various tools was used in this study, which are a medical scale to measure weight, a meter to measure height, a form to record data, plastic rings and collars of various sizes, plastic cones of various sizes, ropes of various sizes and lengths, plastic and cardboard boxes of various shapes, balls (footballs, basket, hand, tennis), medicine balls weighing 1 kg or less, small balls of various sizes, balloons, whistle, wooden floor boards, stickers and paper clips, gifts and incentives, a Swedish chair, chalk, a ladder mounted on the wall, a handmade basket and goal, spoons, plastic boxes and chairs, colorful jackets, rubber floors.

## **Exploratory study**

The researcher conducted a preliminary (exploratory) study on some (4) children with hemiplegia outside the sample, with the aim of identifying:

1. The validity of the study tool.
2. Discovering potential obstacles that the researcher may face while implementing the study.
3. Establish an appropriate time and place plan when starting to apply the test to children with hemiplegia.
4. Identify the appropriate statistical analysis for each measure of the current study.

## **5.4 Statistical Techniques**

For the analysis of the study, data will be analyzed with Statistical Package for the Social Sciences software (SPSS. 25), through:

1. Torsion coefficient
2. Kurtosis coefficient
3. Arithmetic averages
4. Standard deviations
5. Spearman correlation coefficient
6. Wilcoxon test

## **6. Findings and Discussion**

This section shows the results of the data analysis process and the discussion of these results according to the study hypotheses and previous studies.

Study hypothesis: There are statistically significant differences at the level ( $\alpha \leq 0.05$ ) between the pre-measurement and the post-measurement of the experimental group (people with hemiplegia applying the motor games program) in motor skills in favor of the post-measurement.

To verify the study hypothesis, arithmetic means and standard deviations were used for the pre- and post-measurements and Table (3) shows the results.



Table 3. Averages of performance of members of the research sample (n=12) in the research variables for the pre- and post-measurements

No.	Paragraphs	Measurement	Mean	SD
1	Can run in a straight line	Pre	.0000	.00000
	Can stand on one leg for (7) seconds	Post	1.0000	.00000
2	Can jump with both legs forward three consecutive steps	Pre	.0000	.00000
	Can jump with one leg forward three consecutive steps	Post	.3333	.49237
3	Can roll the ball in his hand for a distance of (3) metres	Pre	.0833	.28868
	Can roll the ball 6 meters between his feet	Post	.6667	.49237
4	Can climb up and down the ladder fixed to the wall	Pre	.0833	.28868
		Post	.1667	.38925
5	Can run in a straight line	Pre	.3333	.49237
	Can stand on one leg for (7) seconds	Post	.9167	.28868
6	Can jump with both legs forward three consecutive steps	Pre	.3333	.49237
	Can jump with one leg forward three consecutive steps	Post	.8333	.38925
7	Can roll the ball in his hand for a distance of (3) metres	Pre	.1667	.38925
	Can roll the ball 6 meters between his feet	Post	.5833	.51493
8	Can climb up and down the ladder fixed to the wall	Pre	.0833	.28868
		Post	1.0000	.00000

Table (3) shows apparent differences in the performance of the research sample members in all motor skills between the pre- and post-measurements. To determine the importance and significance of this improvement, the Wilcoxon test was used, and Table (4) shows this.

Table 4. The value of the Wilcoxon Signed Ranks Test and the level of significance between the pre-and post-measurements in the study variables

Movement skills	Rank indication	number	Average rank	Total ranks	z value	Sig
Can walk in a straight line.	negative	0	.00	.00	-3.000	.003*
	positive	9				
	Draw	3	5.00	45.00		
	Total	12				
Can climb the stairs on your own.	negative	0	.00	.00	-3.162	.002*
	positive	10				
	Draw	2	5.50	55.00		
	Total	12				
Goes down the stairs alone.	negative	0	.00	.00	-3.000	.003*
	positive	9				
	Draw	3	5.00	45.00		
	Total	12				
Can run in a straight line.	negative	0	.00	.00	-3.464	.001*
	positive	12				
	Draw	0	6.50	78.00		
	Total	12				
Can stand on one leg for (7) seconds.	negative	0	.00	.00	-2.000	.046*
	positive	4				
	Draw	8	2.50	10.00		
	Total	12				
Can jump with both legs forward three consecutive steps.	negative	0	.00	.00		.008*
	positive	7				
	Draw	5	4.00	28.00		
	Total	12				
Can jump with one leg forward three consecutive steps.	negative	1	2.00	2.00	-.577	.564
	positive	2				
	Draw	9	2.00	4.00		
	Total	12				
Can roll the ball in his hand for a distance of (3) metres.	negative	0	.00	.00	-2.646	.008*
	positive	7				
	Draw	5	4.00	28.00		
	Total	12				

Can roll the ball 6 meters between his feet.	negative	0	.00	.00	-2.449	.014*
	positive	6				
	Draw	6	3.50	21.00		
	Total	12				
Can climb up and down the ladder fixed to the wall.	negative	0	.00	.00	-2.236	.025*
	positive	5				
	Draw	7	3.00	15.00		
	Total	12				
Can walk between cones without dropping them.	negative	0	.00	.00	-3.317	.001*
	positive	11				
	Draw	1	6.00	66.00		
	Total	12				

Table (4) shows, based on the results of the Wilcoxon test and the level of significance accompanying it, that there are statistically significant differences between the pre- and post-measurements and in favor of the post-measurement for the members of the study sample in the variables (can walk with balance in a straight line, can climb the stairs alone without assistance, descend the stairs alone Without assistance, he can run in a straight line, he can stand on one leg for (7) seconds, he can jump with both legs forward three consecutive steps, he can roll the ball in his hand for a distance of (3) meters, he can roll the ball between his feet (6) meters, he can climb and descend the ladder fixed to the wall, he can walk between cones without dropping them), which indicates the positive impact of the proposed program on the study sample of people with hemiplegia in these skills.

Table (4) also shows, based on the results of the Wilcoxon test and the level of significance accompanying it, that there are no statistically significant differences between the pre-and post-measurements of the study sample members in the variable (can jump with one leg forward three consecutive steps), which indicates that there is no impact of the proposed program on The study sample consisted of people with hemiplegia.

## Conclusion

The proposed program contributes to developing the physical and muscular abilities of people with paralysis, which contributes to increasing the ability to master and learn motor skills, as moving inactive or weak muscles helps increase blood circulation, stimulate nerve pathways and increase the flexibility of muscles and joints, which also contributes to activating the role of muscles in contributing to fulfilling the requirements of motor skills, and also contributing to exerting more effort and focus when practicing the program, which contributed to developing their motor abilities faster.

The study reached the following results:

There is a positive impact of the proposed motor games program on the study sample of people with hemiplegia in developing motor skills.

There are statistically significant differences between the pre-and post-measurements and in favor of the post-measurement for the study sample individuals in variables (can walk with balance in a straight line, can go up the stairs alone without assistance, go down the stairs alone without assistance, can run in a straight line, can stand on one leg for a period of time )7) seconds, he can jump with both legs forward three successive steps, he can roll the ball in his hand for a distance of (3) meters, he can roll the ball between his feet (6) meters, he can climb and descend the ladder fixed to the wall, he can walk between suppression without dropping it. There are no statistically significant differences between the pre-and post-measurements for the study sample members in the variable (can jump with one leg forward for three consecutive steps).

The result of the existence of statistically significant differences between the pre-and post-measurement, in favor of the post-measurement for the study sample members, in the previous motor skills variables, which indicated the positive impact of the proposed program on the study sample of people with hemiplegia, can be attributed to the fact that the motor games used in the program were specially designed for the group of people with hemiplegia, and it took into account the type, characteristics and nature of the motor disability for this group, so motor games were chosen and designed that develop their motor shortcomings and weaknesses in an interesting and enjoyable way for them through play.

The researcher also attributes the positive impact of the proposed program on the study sample of people with hemiplegia in developing and developing their motor skill abilities. However, the program also focused in its components on basic motor skills such as (walking, grabbing, throwing, and climbing), which were basic axes in the game components which were chosen in the program, as they formed a basic basis for starting the progression to the more difficult motor abilities at the end of the program, such as (running, jumping, jumping, balance, and motor control of the limbs and body). The researcher also attributes that the element of fun and suspense, in addition to the encouraging incentives, increased motivation the study sample sought to exert more effort and focus when practicing the program, which contributed to developing their motor abilities faster in the previous variables of motor skills.

In light of the results and conclusions of the study, the researcher recommends the following:

1. Using the proposed movement games training program for people with hemiplegia; because it develops all aspects of the motor difficulties of this category.
2. It is necessary to focus on group movement games and their motivational and encouraging elements because of their significant impact on developing movement skills properly and quickly among people with hemiplegia.
3. Conduct similar studies related to the construction and design of movement games, especially for disabled individuals who use a wheelchair, because this category needs a physical games program that takes into account the nature of the disability and the characteristics of the wheelchair.
4. Developing the program in terms of adding movement games that contain movement skills that serve and help develop the skill of jumping on one foot.

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