

The basic motor skills in sports activity and it's relationship with attention deficit hyperactivity disorder (ADHD)

المهارات الحركية الأساسية في الأنشطة الرياضية وعلاقتها باضطراب نقص الانتباه مع فرط النشاط.

KARIMA NACERBEY¹, SIDALI, BENABDERRAHMANE²

¹ University of BOUIRA, Algeria, k.nacerbey@univ-bouira.dz

Laboratory of modern science in physical and sports activities

² University of BOUIRA, Algeria, benabdsidali@gmail.com

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Abstract: ADHD is one of the developmental behavioral disorders prevalent in the child's psychological nervous system, in which the child tends to lose attention and concentration, as well as excessive and unbalanced movement and impulse without thinking, and this is evident in many areas of life Including motor activities, as this disorder is likely to be related to the basic motor skills of the child, including transitional, non-transitional or dealing with the tool, This study aimed to identify the relationship between ADHD and Fundamental motor skills, the study was conducted on a sample of 35 students of primary school, using the descriptive correlational method, It was concluded that there is an inverse correlation between the dimensions of the scale of ADHD and some Fundamental motor skills.

Keywords: Fundamental motor skills; sports activity; attention deficit hyperactivity disorder.

المخلص: ان اضطراب نقص الانتباه مع فرط النشاط هو من أحد الاضطرابات السلوكية النمائية المنتشرة في المجال العصبي النفسي للطفل، يميل فيه الطفل الى فقدان الانتباه والتركيز، اضافة الى الحركة المفرطة وغير موزونة والاندفاع بدون أي تفكير، وهذا يظهر جليا في عديد من مجالات الحياة ومنها الأنشطة الحركية، اذ من المرجح ان يكون لهذا الاضطراب علاقة بالمهارات الحركية الأساسية للطفل (الانتقالية، غير الانتقالية او التعامل مع الاداة) وخاصة اثناء ممارسة الأنشطة البدنية والرياضية. ومنه

تهدف الدراسة إلى معرفة العلاقة بين هذه الأخيرة واضطراب ADHD، ومنه تم إجراء الدراسة على عينة متكونة من 35 تلميذ في المدارس الابتدائية، مستعملين المنهج الوصفي الارتباطي، ولقد تم التوصل إلى أن هناك علاقة ارتباطية عكسية بين كل من اضطراب نقص الانتباه المصحوب بالنشاط الزائد وبعض المهارات الحركية الأساسية. الكلمات المفتاحية: المهارات الحركية الأساسية، الأنشطة الرياضية، اضطراب نقص الانتباه المصحوب بالنشاط الزائد.

- **Theoretical chapter:**

1- Introduction and problematic of the study:

Attention-Deficit/Hyperactivity Disorder is a neurobehavioral condition characterized by excessive restlessness, inattention, distraction ,and impulsivity. It is usually first identified when children are school-aged, although it also can be diagnosed in people of all age groups. In an average classroom of 30 children, research suggests that at least one will have ADHD. (American Academy,2013, p1)

Cases and diagnoses of ADHD have been increasing dramatically in the past several years. The American Psychiatric Association (APA) says that 5 percent of American children have ADHD. But the Centers for Disease Control and Prevention (CDC) puts the number at more than double that. The CDC says that 11 percent of American children, ages 4 to 17, had the attention disorder as of 2011. That is an increase of 42 percent between 2003 and 2011. (J. Legg, 2018, <https://www.healthline.com/health/adhd/facts-statistics-infographic>)

Brain imaging studies have revealed that, in youth with ADHD, the brain matures in a normal pattern but is delayed, on average, by about 3 years. The delay is most pronounced in brain regions involved in thinking, paying attention, and planning. More recent studies have found that the outermost layer of the brain, the cortex, shows delayed maturation overall, and a brain structure important for proper communications between the two halves of the brain

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shows an abnormal growth pattern. These delays and abnormalities may underlie the hallmark symptoms of ADHD and help to explain how the disorder may develop. (National Institute of Mental Health, p1)

There are many signs and symptoms of ADHD. Some are rather subtle, while others are quite obvious. For example, if your child has poor behavioral skills, academic difficulties, or problems with motor skills..(Timothy J., 2016, <https://www.healthline.com/health/adhd/handwriting>)

There are two components of children movement ability that needed to be developed including fundamental and fine motor skills aspects. Fundamental motor skills is a movement used big muscles such as walking, running, two legs jumping, and hopping the obstacles. On the other hand, fine motor skills is a movement used small muscles such as cutting, sticking, tearing, drawing, coloring, writingand arranging the blocks. Each child has different motor ability. (A Komaini, R Mardela, 2018, p1)

Motor skills include locomotion (running, walking, jumping, hopping), manipulation (throwing, kicking, catching, bouncing), and stability (bending, twisting, rolling, dodging), Mastery of a range of motor skills, combined with good overall physical fitness, is critical to the healthy development of a child and forms the basis of their athletic competence, To perform a task or movement, our brain sends signals to our motor units (individual nerves and collections of muscle fibers) at precise intervals to orchestrate the contraction of muscles throughout our body, Learning a motor skill is like writing a computer program to a disk – the program, imprinted on the brain, plays back as a motor reflex. The method of imprinting a motor skill "program" on the brain is repetition (i.e., "practice, practice, practice"). (Great play, 2015, <https://www.greatplay.com/articles/how-children-learn-motor-skills>)

“Motor skills” describe your child’s ability to perform movements with their body. Gross motor skills are large movements, such as running. Fine motor skills are small movements, such as writing. Researchers in the journal *Research in Developmental Disabilities* report that more than half of children with ADHD have problems with gross and fine motor skills.

Study in the journal *CNS & Neurological Disorders* examined the effects of medication and motor skills training on children with ADHD. Children who received motor skills training alone, or in combination with medication, showed improvements in their gross and fine motor skills. In contrast, those who received medication alone showed no improvements. (Timothy J., 2016, <https://www.healthline.com/health/adhd/handwriting>)

At the same time, Dr. James McGuire, a developmental and behavioral pediatrician at Elliot Health System in Manchester, New Hampshire, makes clear that while there may be associations between motor skill delays or coordination difficulties and ADHD, it is not a matter of “cause and effect.” Motor skill delays are not a part of an ADHD diagnosis, he explains, urging people not to jump to hasty conclusions. In addition, he adds, “there are some ADHD kids with superior motor skills who are really good at sports, and there are those with motor skill delays and coordination difficulties,” reinforcing that there is not a one-size-fits-all standard in this situation. “You have to look at each child individually,” he says. “You can’t assume ADHD and motor skills challenges go together, it can also be the other way around: That it’s not motor skill delays that intensify ADHD symptoms, but instead ADHD symptoms that can interfere with motor skills and coordination efforts. For example, because ADHD children may have trouble paying attention, McGuire says, there might be more coordination challenges that develop indirectly. (Jennifer Lea Reynolds, 2017,

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<https://health.usnews.com/health-care/patient-advice/articles/2017-09-20/the-role-developmental-motor-skills-play-in-your-childs-adhd>

Based on the above the need to conduct this study arose to identify the relationship between ADHD and Fundamental motor skills.

1.1- Study questions:

- **The general question:** What type of relationship is there between Fundamental motor skills and ADHD?

- **Partial questions:**

- What type of relationship is there between Transitional skills and ADHD?

- What type of relationship is there between Non-transition skills and ADHD?

- What type of relationship is there between Skills of dealing with the tool and ADHD?

1.2-Hypotheses:

- **General Hypothesis:** There is an inverse relationship between Fundamental motor skills and ADHD.

- **Partial Hypotheses:**

- There is an inverse relationship between Transitional skills and ADHD.

- There is an inverse relationship between Non-transition skills and ADHD.

- There is an inverse relationship between Skills of dealing with the tool and ADHD.

1.3- objectives and significance of the study:

The study aimed to identify the type of relationship between attention deficit hyperactivity disorder and physical kinetic aspect which is represented in our study on Fundamental motor skills, where it is no secret that this disorder has many repercussions on the child who is characterized by hyperactivity and lack of attention and impulsivity and this may affect his motor skills both in terms of

lack of focus in the performance or randomness, it would be fair to say that the basic reasons of this disorder is linked to a Brain dysfunction which causes lack of attention and concentration and hyperactivity which affects the movement of the child, particularly in his motor skills, Hence our study gained importance to determine the link between this disorder (attention deficit with hyperactivity) and basic motor skills and its reflection on them.

2- The significant terminology of the research:

2.1- Attention-Deficit/Hyperactivity Disorder:

*** What is ADHD?**

ADHD is a neurobehavioral condition with symptoms that include excessive restlessness, poor attention, and impulsive acts. Estimates show that between 3 and 7 percent of school-aged children and about 4 percent of adults have ADHD. (American Psychiatric Association, 2004).

The predominant features of this disorder include:

1- Impaired response inhibition, impulse control, or the capacity to delay gratification. This is often noted in the individual's inability to stop and think before acting; to wait one's turn while playing games, conversing with others, or having to wait in line; to interrupt their responding quickly when it becomes evident that their actions are no longer effective; to resist distractions while concentrating or working; to work for larger, longer-term rewards rather than opting for smaller, more immediate ones; and inhibiting the dominant or immediate reaction to an event, as the situation may demand.

2- Excessive task-irrelevant activity or activity that is poorly regulated to the demands of a situation. Individuals with ADHD in many cases are noted to be excessively fidgety, restless, and "on the go." They display excessive movement not required to complete a task, such as wriggling their feet and legs, tapping

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things, rocking while seated, or shifting their posture or position while performing relatively boring tasks. Younger children with the disorder may show excessive running, climbing, and other gross motor activity. While this tend to decline with age, even teenagers with ADHD are more restless and fidgety than their peers. In adults with the disorder, this restlessness may be more subjective than outwardly observable, although with some adults they remain outwardly restless as well and report a new to always be busy or doing something and being unable to sit still.

3- Poor sustained attention or persistence of effort to tasks. This problem often arises when the individual is assigned boring, tedious, protracted, or repetitive activities that lack intrinsic appeal to the person. They often fail to show the same level of persistence, "stick-to-it-tiveness," motivation, and will-power of others their age when uninteresting yet important tasks must be performed. They often report becoming easily bored with such tasks and consequently shift from one uncompleted activity to another without completing these activities. Loss of concentration during tedious, boring, or protracted tasks is commonplace, as is an inability to return to their task on which they were working should they be unexpectedly interrupted. Thus, they are easily distracted during periods when concentration is important to the task at hand. They may also have problems with completing routine assignments without direct supervision, being unable to stay on task during independent work. (Fact Sheet : Attention Deficit Hyperactivity Disorder (ADHD) Topics)

2.2- Fundamental motor skills:

Fundamental movement skills are a specific set of skills that involve different body parts such as feet, legs, trunk, head, arms and hands. These skills are the "building blocks" for more complex and specialised skills that kids will need

throughout their lives to competently participate in different games, sports and recreational activities. (Good Habits for Life, <https://goodhabitsforlife.act.gov.au/Kids-at-play/fundamental-movement-skills-fms-1>)

Fundamental motor skills are common motor activities with specific observable patterns. Most skills used in sports and movement activities are advanced versions of fundamental motor skills. For example, throwing in softball and cricket, the baseball pitch, javelin throw, tennis serve and netball shoulder pass are all advanced forms of the overhand throw. The presence of all or part of the overhand throw can be detected in the patterns used in these sport specific motor skills. Similar relationships can be detected among other fundamental motor skills and specific sport skills and movements.

Children normally develop motor skills in a sequential manner. Fundamental motor skills comprise one level in the continuum of motor skill acquisition. Children at the fundamental motor skill stage are building upon previously learned movements and preparing for the acquisition of more advanced skills. (Department of Education Victoria, 1996, p4), They include:

- **Locomotor skills** such as running, jumping, hopping, galloping, rolling, leaping and dodging, horizontal jump, slide.
- **Manipulative skills** such as throwing, catching, kicking, striking and trapping, dribble, overhand throw, and underhand roll.
- **Stability skills** such as balance, twisting, turning and bending.

The most essential for primary school children to learn: Catch, Kick, Run, Vertical Jump, Overhand Throw, Ball Bounce, Leap, Dodge, Punt, Forehand Strike, Two-hand Side-arm Strike. (Physiopedia, https://www.physiopedia.com/Fundamental_motor_skills_and_Sports_specific_skills)

- **Ability to learn motor skills:** When the child is 6-8 years old, most of the neural structures draw near the level of adult maturity, as most basic motor patterns can be performed by the child, and motor education programs support the development of the original motor skills. So the educational guidance by specialists and the provision of logical sequence of motor tasks as well as allocating time to practice is an important component of successful learning programs. And due to the use of these skills in sports activities by pairing them or modifying the original motor patterns, this reflects the importance of learning and early practice as an important input when the child is engaged in sports activities. (Mohamed Majidi, Youssef Bouabdellah, 2015, p. 448)

3- The art condition and similar studies:

- Pan CY, Tsai CL, Chu CH (2009)-“Fundamental movement skills in children diagnosed with autism spectrum disorders and attention deficit hyperactivity disorder”:

The purpose of this study was to compare the movement skills of children with autism spectrum disorders (ASD), attention deficit hyperactivity disorder (ADHD), and those without disabilities. Ninety-one children (ASD, n = 28; ADHD, n = 29; control, n = 34), ages 6-10 years, were of average IQ participated. After controlling for age, both ASD and ADHD groups scored significantly lower than controls ($p's < .05$) on overall gross motor development as well as locomotor and object control subtests, and the ASD group performed more poorly than the ADHD group ($p's < .01$) on both subtests. Of the children with ASD and ADHD, only 16% had clinical levels of impairment. Potential underlying factors are discussed, with suggestions for future research.

- William J. Harvey, Greg Reid (1997)-“Motor Performance of Children with Attention-Deficit Hyperactivity Disorder: A Preliminary Investigation”:

The purpose of this study was to describe the fundamental gross motor skills and

fitness conditions of children with attention-deficit hyperactivity disorder (ADHD). Nineteen children, ages 7 to 12, participated. Gross motor performance was measured by the Test of Gross Motor Development (Ulrich, 1985). Fitness variables were measured by selected items from the Canada Fitness Survey (Fitness Canada, 1985), the CAHPER Fitness-Performance II Test (CAHPER, 1980), and the 20 m Shuttle Run Test (Leger, Lambert, Goulet, Rowan, & Dinelle, 1984). Percentile scores provided individual and group profiles of performance. It was concluded that fundamental gross motor performance and physical fitness Of children with ADHD are substantially below average.

- The practical chapter:

1- Followed Methodologie:

1.1-Research methodology: The study was targeted to identify the relationship between attention deficit disorder with hyperactivity (ADHD) and Fundamental motor skills. Thus, the descriptive correlational method was used.

1.2- Populationand study sample: The study population consisted of primary school pupils showing symptoms of attention deficit hyperactivity disorder in Bouira state in Algeria. As for the sample the subjects selected consisted of the pupils showing symptoms of attention deficit hyperactivity disorder who were enrolled in the primary school of Ghani Ali-Kadiria They were selected in a purposive way, after being observed by the teachers for 06 consecutive months (September 2018-February 2019) as an initial diagnosis of the symptoms of the disorder, and then the final diagnosis by the scale of attention deficit disorder and hyperactivity .The final sample included 35 pupils who received high scores in the scale.

1.3-study variables: based on the title of the study and in light of the hypotheses we can determine the study variables as follows:

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A-the independent variable: in our study the independent variable is **Fundamental motor skills.**

B-dependent variable: in our study the dependent variable is **attention deficit hyperactivity disorder.**

1.4-Tools of the study: The researcher should determine the optimal tool that fit his research for there is no particular tool can be better than the other tools, and Based on this, choosing the tool process depends on several factors, including the nature of the research and its objective and in order to achieve this objective and to ascertain the hypotheses of the study and what it takes to reach the results, the researcher chose the following tools:

a- ADHD diagnosis test :

- **introduction to the test:** attention deficit hyperactivity disorder test, designed by Madjedi Mohamed Adosoki (2005), it includes 66 questions.

- **Psychometric test properties:**

- **validity:**

* **Construct-related validity (face validity):** By asking a panel of 5 experts to assess how well the test questions correlate with the particular ability or characteristic that the test sets out to measure and after the attention deficit hyperactivity disorder test has been previewed by the experts the test was validated for the purpose of study.

* **Internal consistency:** The correlation coefficients were calculated between the score of each statement and the total score, and its values ranged from 0.69 to 0.98.

* **divergent validity:** Scale degrees for the exploratory research were arranged in descending order and thirty percent were selected from the top category and thirty percent from the lower, then the differences between the two groups was

calculated by (t) test the T value was (-9.589) hence we notice that there are differences between the top and lower groups at the Statistical significance (0.05), for the significance level Sig (0.00) is less than (0.05).

- **reliability:**

* **Cronbach's alpha:** Alpha values ranged between 0.72-0.93, which proves the reliability of the test.

* **Split-Half reliability:** reliability was calculated by means of a half-split method by applying the test only once, and then dividing the test components into two (even paragraphs together and odd paragraphs together) and then calculating the test reliability for the half of the test, whose values ranged from 0.61 to 0.91, but this value represents the reliability value of half of the test in order to get the value of the total test We made correction by Spearman-Brown equation and the overall test result was 0.64 to 0.88, which is a high reliability for the test.

* **Test-retest reliability:** We applied the test and reapplied it at a time interval of 15 days, and then Pearson correlation coefficient was calculated between the results of the first test and the second test, the results of the test and the retest showed that Pearson correlation coefficient ranged between 0.81 to 0.95. And the statistical significance of the correlation coefficients values was statistically significant at 0.01 and 0.05, indicating a high degree of reliability.

b- basic motor skills tests:

The researchers selected a range of basic motor skills tests and was displayed on a panel of experts, (6 experts) Where the percentage of agreement on the selected tests is 75% and more, and the technical skills Tests of the basic motor skills selected by the experts are: 20 meter sprint test, standing vertical jump test, Long jump of stability, Partridge on spots (numbered circles), standing on one leg

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test, Seated Forward Bend, Bend- stretch and rotate the spine, Medicine ball throw test, Kick the ball test, Pass the football on the wall.

- Psychometric test properties:

*** test validity and reliability:** in order to determine the reliability of the test, the retest method for basic motor skills was selected on the same sample from the research community outside the study sample The data were statistically treated by calculating the simple correlation coefficient between the first and second applications. The correlation degree was from 0.72 to 0.89, and the Intrinsic Validity was from 0.85 to 0.94.

*** test Objectivity:** The results of the tests were recorded from two judges of the working group and the correlation coefficient between the first judgment estimate and the second judgment estimate is an objectivity coefficient.

1-5- Statistical methods: Data were processed according to the following statistical methods: Pearson correlation coefficient, Cronbach's alpha, Spearman-Brown Formula, (T)Test .

2- Exposure, analyses and result exam :

2-1- There is an inverse relationship between Transitional skills and ADHD.

Table (01): correlation coefficients between Transitional skills and ADHD.

	R				R table	Significance level	Statistical significance
	20 m Sprint Test	Standing Vertical jump test	Long jump of stability	Partridge on spots (numbered circles)			
adhd	0.51	-0.69	-0.76	-0.49	0.325	0.05	Statistically function



Figure (01) the graph of values of correlation coefficients between Transitional skills and ADHD.

It is clear from Table (01) and figure (01) that The correlation coefficients between Transitional skills and ADHD were estimated in the following order: 0.51, -0.69, -0.76, -0.49, which is a statistically significant at the significance level 0.05, Which confirms the existence of a statistically significant relationship between Transitional skills and ADHD, and this direct positive relationship (in 20 m Sprint Test) is statistically explained that the greater Transitional skills increases ADHD increase, but actually the test of 20 m Sprint used in the study As its numerical values increase the Transitional skills performance will be weak, hence we deduce from test that by an increase of ADHD, the accuracy of the performance of Transitional skills, but by reference to the type of relationship between The two variables we find it a negative relationship and unlike this result is explained in adhd test as: the numerical value indicates that the smaller the numerical value or the total summation of this test, the greater the disorder in the adhd will be and the more the numerical value is, it indicates that the child does not suffer from adhd.

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Deduction: Based on the above, according to the results obtained, and in addition to the related studies results, it can be said that the first hypothesis of the research, which states, "**There is an inverse relationship between Transitional skills and ADHD**" has been accepted.

2-2-There is an inverse relationship between Non-transition skills and ADHD.

Table (02): correlation coefficients between Non-transition skills and ADHD.

	R			R table	Significance level	Statistical significance
	Standing on one leg Test	Seated Forward Bend	Bend, stretch and rotate the spine			
adhd	0.61	0.57	0.80	0.325	0.05	Statistically function



Figure (02) The graph of values of correlation coefficients between Non-transition skills and ADHD.

It is clear from Table (02) and figure (02) that the values of correlation coefficients between Non-transition skills and ADHD ranged between 0.57 and

0.8, which are statistically significant at the significance level of 0.05 indicating a statistically significant relationship between Non-transition skills and ADHD, and as we mentioned in the previous hypothesis, the more the numerical values of adhd The severity of the disorder increased hence we confirm that there is an inverse relationship between ADHD and Non-transition skills, by an increase of the first one the second will decrease.

Deduction: Based on the above, according to the results obtained, and in addition to the related studies results, it can be said that the second hypothesis of the research, which states, "**There is an inverse relationship between Non-transition skills and ADHD**" has been accepted.

2-3-There is an inverse relationship between Skills of dealing with the tool and ADHD.

Table (03): correlation coefficients between Skills of dealing with the tool and ADHD.

	R			R table	Significance level	Statistical significance
	Medicine ball throw test	Kick the ball test	Pass the football on the wall			
adhd	0.43	0.63	0.51	0.325	0.05	Statistically function

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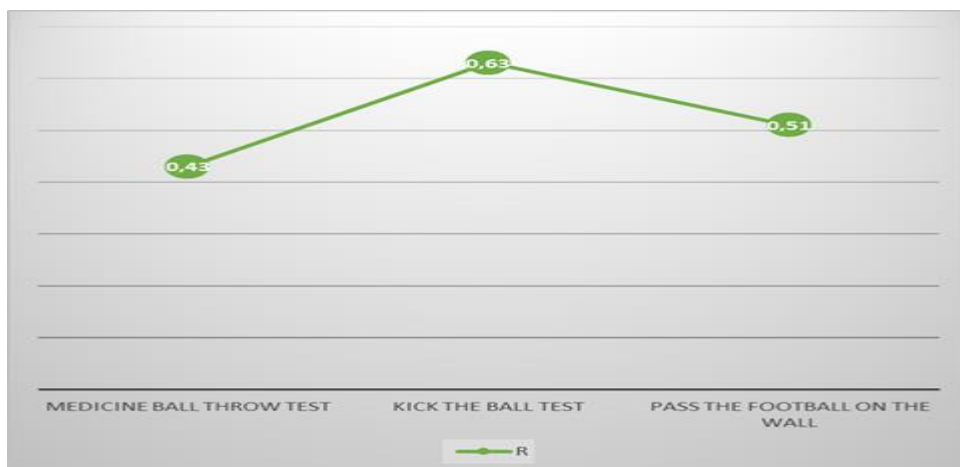


Figure (03) the graph of values of correlation coefficients between Skills of dealing with the tool and ADHD.

It is clear from Table (03) and figure (03) that the values of correlation coefficients between Skills of dealing with the tool and ADHD ranged from 0.43 to 0.63, which are statistically significant values at significance level 0.05. in the same way as the first hypothesis, we found that there is an inverse relationship between Skills of dealing with the tool and ADHD.

Deduction: Based on the above, according to the results obtained, and in addition to the related studies results, it can be said that the third hypothesis, which states, "**There is an inverse relationship between Skills of dealing with the tool and ADHD of children in primary school**" has been accepted.

3- Finding and propositions results

The results of the study indicate that there is a relationship between ADHD and basic motor skills, where the high level of this disorder decreases the performance accuracy of basic motor skills, and this result achieved the goal of the study which was to identify the type of relationship between ADHD And basic motor skills. In addition, the hypotheses were accepted that there was an

inverse relationship between adhd, and some of the basic motor skills (Transitional skills, Non-transition skills, Skills of dealing with the tool) that the study targeted.

the most important recommendations of this study is the design of behavioral programs aimed at reducing the attention deficit disorder hyperactivity, and the design of educational sports programs to develop these basic motor skills of children in primary school, Carry out studies that show the prevalence of the disorder among students.

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