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Attention deficit hyperactivity disorder and its relation to aggressive behavior among primary school students of both genders in Riyadh, Saudi Arabia

Sultan Mousa Al-Owidha [1,*], Nevien Mohamed Zahran [2]

[1]Department of Psychology, College of Education, King Saud University, Riyadh, Saudi Arabia
[2]Psychology Department, Social College, Prince Naif Arab University for Security Sciences, Riyadh, Saudi Arabia

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ABSTRACT

The current study aimed to examine the correlation type between attention deficit hyperactivity disorders among primary school students of both genders in Riyadh, Saudi Arabia. It also sought to make comparisons between the male and female primary school students regarding attention deficit hyperactivity disorder and aggressive behavior. Further, the present study examined ADHD in children and its relationship to a number of other potentially related variables. The sample of the study consisted of 200 primary school students of both genders whose ages ranged between 9 to 13 years. To achieve the objectives of the study, it relied on the descriptive (correlative/comparative) method, especially the Pearson correlation coefficient and the T-test. The findings of the study show that there were more male children with attention deficit hyperactivity disorder (ADHD) and aggressive behavior than female students. The results of the study confirm the results of other studies. The study recommends that there is a need for early detection of children with developmental and emotional disorders (like children with ADHD). The results of the present study are also consistent with the findings of previous studies that indicated that attention disorder associated with hyperactivity is positively associated with aggressive behavior in children of both sexes. It also proposes to prepare and arrange guidance programs for them and their parents and strive towards achieving optimal treatment of such children in the school environment.

1. Introduction

ADHD is considered one of the important psychological problems, as it is a disorder in the manifestations of behavior in children on the one hand, and its association with learning difficulties on the other. Research studies confirmed that the prevalence of attention disorder accompanied by excessive motor activity has reached 10% among children in American society. ADHD is characterized by a disturbance in the child's motor balance, difficulty staying in one place, and difficulty grasping things like normal children who are similar in age. Their behavior is sometimes aggressive and irritable at other times. This disorder is accompanied by a weak ability to concentrate. Such children are easily attracted to any external stimulus with thinking or deliberation and show impulsive expressions of anger. Children with ADHD are characterized by having increased motor tendencies than others of their age, and they cannot concentrate on anything and suffer from a lack of stamina and patience. ADHD is a common behavioral problem among school-age children, as about three to five percent of school students are affected by this condition, and males are more likely to suffer from this disorder than females.

Some recent studies have shown that about 1 to 2 percent of adults have this behavioral disorder. The hyperactivity disorder that accompanies ADHD has some manifestations as lack of attention, impulsivity, hyperactivity in the child, impulsiveness to engage in a particular activity without thinking, moving from one activity to another, and disturbing order while the other children are disciplined. Other signs include excessive movement, climbing over things, fidgeting, stubbornness, mood swings, a rapid feeling of frustration, and academic underachievement.

* Corresponding Author.
Email Address: salowidha@ksu.edu.sa (S. M. Al-Owidha)
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Corresponding author's ORCID profile:
https://orcid.org/0000-0002-5709-3514

ADHD children have some associations, including the constant desire to sleep in class and frequent conflict with friends (Brook and Boaz, 2005; Li et al., 2009). They also show breathing problems during sleep, especially daytime sleep, with a constant desire to sleep in general (Li et al., 2009). It was also found that they have behavioral and cognitive disorders, and they are less positive and effective in different situations (Luo et al., 2009).

The findings of some previous studies (Bériault et al., 2018; Bagwell et al., 2006; Fryer, 2007; McGillivray and Baker, 2009; Westreich et al., 2013) conducted on these children indicate a high degree of anxiety, mood disorders, and general depression among adolescents of both genders with a history of hyperactivity and attention deficit disorder in childhood. It was also found that children with ADHD have negative causation (non-adaptive/non-consensual), and adopt an external (unhealthy) control orientation.

Moreover, ADHD is prevalent among children in different social classes, and it increases in males more than in females (Al Hamed et al., 2008; Montiel et al., 2008). The results of some other studies (McGillivray and Baker, 2009; Roy et al., 2013; Miller et al., 2011; Doering et al., 2014; Westreich et al., 2013) also showed that there is an association between distraction accompanied by positive hyperactivity and between highly aggressive and disruptive behavior, and hostility among these individuals.

Aggressive behavior is one of the features that characterize many behaviorally and emotionally disturbed children. It is defined as a behavior that results in harming another person or behavior that aims to cause disruptive or hateful results. It is used to maintain control over others through Physical or verbal power. Aggression increases among children with hyperactivity and attention deficit, and they tend to hit and refuse orders and deliberately sabotage, and these behaviors are frequent and severe among those who are behaviorally and emotionally disturbed. It was also found that aggressive behavior is higher among the students with hyperactivity and attention deficit than among normal schoolgirls (Al-Malik, 2005). Children with ADHD harm their peers with negative verbal and physical behaviors which make children with ADHD face more rejection than their normal peers. This hyperactivity may be accompanied by other behavioral characteristics, including recklessness and impulsivity, anxiety, inability to pay attention, poor concentration, severe tantrums, aggression, marked changes in mood, and disturbance in social relationships.

Thus, it becomes quite clear that it is important to study attention-deficit disorder accompanied by hyperactivity as one of the important psychological variables because of its negative effects.

Considering the psychological, theoretical, and empirical background pertaining to the study of attention deficit disorder accompanied by hyperactivity and aggressive behavior among primary school students of both genders, it is clear that attention deficit disorder accompanied by hyperactivity is positively associated with aggressive behavior (McGillivray and Baker, 2009; Westreich et al., 2013; Miller et al., 2011; Doering et al., 2014; Blader et al., 2010; Roy et al., 2013). However, this area needs to be studied in the Saudi context. Research questions are as follows:

1. What is the type of correlation between attention deficit disorder accompanied by hyperactivity and aggressive behavior among primary school students of both genders?
2. What are the differences between male and female primary school students regarding attention deficit disorder associated with hyperactivity?
3. What are the differences between male and female primary school students regarding aggressive behavior?

The objectives of the study are:

1. To examine the type of correlation between attention deficit hyperactivity disorder and aggressive behavior among primary school students of both genders in Riyadh, Saudi Arabia.
2. To compare the study sample members (males/females primary school students) regarding attention deficit disorder associated with hyperactivity.
3. To compare the study sample members (males/females primary school students) regarding aggressive behavior.

The research seeks to present some theoretical frameworks and Arab and foreign literature to theorize the two variables of the study, i.e., ADHD and aggressive behavior. These two variables are important and there was a need to conduct research in the Arab context to investigate and examine the type of correlation between them using the sample of students.

On the practical side, this research may prove to be an addition to the Arabic library. Its results and recommendations may be helpful in early counseling intervention to reduce the aggravation of some important behavioral problems. The study will provide some empirical data about primary school children for preparing counselling programs to address the negative variables, limit their exacerbation, and help the individuals avoid psychological misalignment investing their energies to the maximum extent. The current study achieves its goals by resetting the two study tools that measure the variables of the study on primary school students in Riyadh.

The study is limited in terms of focusing on two variables, namely, attention deficit hyperactivity disorder and aggressive behavior. The level of the students selected for this study was primary and the sample of the study was taken from primary school. The special boundary of the study was also confined to Riyadh, KSA. Further, the study was conducted

during the second semester of the academic year 1441-1442 AH.

2. Key concepts of the study

2.1. Attention deficit hyperactivity disorder

ADHD is categorized as a disorder that appears as a regular behavior and specific diagnoses through which it becomes clear that there is an absence or total loss of concentration in certain topics. These children are characterized by a state of dispersion, so they cannot acquire a skill or learn something. Children with ADHD usually have trouble paying attention and controlling their impulsive behavior. In addition, they can be overly active. Its key symptoms include lack of attention and hyperactivity–impulsiveness. The term is defined procedurally by the score the examinee obtains on the scale.

2.2. Aggressive behavior

This behavior involves some intent or intention which the individual uses in situations of frustration in which the satisfaction of her/his motives or the fulfillment of her/his desires is hindered. As a result, s/he experiences a state of anger and imbalance causing a change in behavior that may be harmful to him/her or others. This behavior aims to relieve the pain resulting from the feeling of frustration and satisfy the frustration, so the individual feels comfortable and the balance in her/his personality returns (Hafez and Qassem, 2001). It is defined procedurally by the score that an individual obtains on the scale.

2.3. Theoretical framework

The Diagnostic and Statistical Manual of Mental Disorders in 1994 defined ADHD as a persistent pattern of inability, insufficiency, or difficulty with attention, hyperactivity, and impulsivity, found among some children, that is more frequent and severe than what is observed among normal individuals. Attention deficit disorder refers to the disorder that occurs among children and adolescents who suffer from obvious problems in focusing their attention. The Diagnostic and Statistical Manual of Mental Disorders (ASM-III) distinguishes between three types of ADHD: With hyperactivity, without hyperactivity, and residual hyperactivity. Therefore, some children with attention deficit disorder are also considered to have hyperactivity disorder. Excessive activity is also defined as a severe, continuous, and long-term physical and motor activity in a child, so that he cannot control his body movements, but spends most of his time in continuous movement and this phenomenon is often associated with cases of brain injuries, or it may be for psychological reasons, and the behavior usually appears between four to fourteen years.

ADHD is a condition of behavioral difficulties associated with impaired brain function and one of the most common childhood disorders. It includes motor hyperactivity, impulsivity acting without appreciation, consequences, and distractibility (not paying attention to appropriate stimuli). ADHD is also one of the most common emotional disorders in childhood. The statistical results indicated that the prevalence of ADHD and impulsivity are constantly increasing in children.

2.4. Symptoms of attention deficit hyperactivity disorder (ADHD)

- Inability to follow audio or visual information to its end.
- Inability to complete a specific activity, while constantly striving to move to another activity without completing the first.
- Frequent forgetting of personal belongings.
- Constantly disturbing the others, and showing no patience for the demands to be met.
- Tendency to chaos and disorganization.
- Excessive movement and instability in one place for an appropriate period, as this child is always fidgety and impulsive.
- Inability to social interaction and successful academic achievement (Youssef et al., 2015).
- Suffering from a disturbance in behavioral coordination, and displaying socially unacceptable behaviors.
- Difficulty in concentrating when performing a certain task like completing schoolwork coupled with excessive anxiety and impulsive behavior.

Some researchers attribute this disorder to the presence of psychological problems in the child including anxiety, depression, and attempts to compensate.

The psychological stress and extreme precautions faced by some children may be the influential factors. The environmental factor includes malnutrition of children, as eating food with food additives including colors, preservatives, and flavors provokes the central nervous system and then leads to an increase in their motor activities (Youssef et al., 2015).

Some studies show that children with distracted attention accompanied by hyperactivity behave negatively and aggressively at school and with their peers, but the warmth of parents in dealing with their children may result in positive behavior towards their peers, as it increases children's sense of competence and reduces their aggression. However, some studies found that there is a positive correlation between attention deficit hyperactivity disorder and highly aggressive behavior.

Aggressive behavior is considered to be one of the most serious behavioral disorders that appears during childhood and adolescence which is the cause of delinquency among children and adolescents. It is also the cause of crime in the adult stage, and this behavior may diminish or extinguish whenever the

child is provided with an educational environment that develops his abilities and confidence in himself. Some researchers are of the view that aggressive behavior is a set of actions that is not subject to the standards of proper behavior, directly or indirectly.

Aggressive behavior is defined as the behavior that harms oneself and others, and the material things surrounding the aggressor, and its causes and forms vary from one society to another and from one individual to another.

It can be distinguished according to Aggressive behavior, hostility, and the tendency to aggression. Tendency to aggression is considered the foremost catalyst that stimulates aggression, and then hostility which motivates energy represented by hatred, anger, and emotion. Hostility is the link between the tendency to aggression and aggressive behavior. All of them participate to produce aggressive behavior.

Aggression has several forms, including physical, verbal, and symbolic. Aggression may take a direct form in which it is directed at the person who angered the aggressor or an indirect form in which an alternative person is attacked instead of the person directly. Aggression may be intentional or unintentional, some of it is acceptable as self-defense, and some of it is not acceptable because it represents abuse for others (Hessels and Hessels-Schlatter, 2013).

Verbal Aggressive Behavior means the verbal response that carries psychological and social harm to the opponent or the group and hurts their feelings or ridicules them resulting in frustration for not having their needs met. Direct Aggressive Behavior also means causing harm to others, and it is expressed in direct and clear ways. This is more evident in males than in females, while indirect aggression is more evident in females than in males. It was found that male adolescents are more aggressive, and they have a more hostile attitude towards others than female adolescents.

There are many factors and reasons that lead to aggression in children and adolescents. Some consider that the lack of social skills leads to frustration that provokes their aggressive tendency, especially if there is a willingness and tendency for aggressive behavior in the child which is evident from his desire to harm others, while others believe that there are biological causes that may lead to aggression, including the secretion of the male hormone that generates aggressive behaviors, brain injury with some diseases, and taking some medications or alcohol. One of the other reasons for aggression is observing aggressive behavioral patterns in which the child is abused. Also, the presence of life stresses and the lack of satisfaction of needs generate aggression in children. This is also caused by the negative parental upbringing methods that parents adopt in dealing with their children. From the point of view of psychoanalysis, Freud believes that aggressive behavior is only an expression of the death instinct, as the individual seeks to destroy.

According to behavioral theory, aggressive behavior is considered a behavior learned from others. By observing the behavior of those around them, children imitate aggressive individuals. Bandura, a behaviorist, believes that children with ADHD learn patterns of aggressive behavior and imitate behavioral patterns that surround them. Thus, children with ADHD do not show excessive motor activity in all situations, they show it at specific a time.

The cognitive theory considers that behavioral disorders and deviations including aggressive behavior, are a product of the wrong ideas and the perceptions that form the concept of the individual about himself and determine his relations with others. The emotional-behavioral theory believes that an individual's thoughts affect his emotions and behavior and that aggressive behavior is the result of a thinking defect that generates a false perception in the individual and affects his emotions and behavior.

Prevention or early treatment is the ideal way to get rid of violent and aggressive behaviors in these cases.

3. Literature review

Blader et al. (2010) conducted a study that aimed at examining aggressive behavior among children with ADHD. The sample of the study consisted of 97 children with ADHD whose ages ranged between 6 to 13 years. The findings of the study revealed that aggressive behavior prevailed among 49.3% of children with ADHD. Males outsmart females in aggressive behavior accompanied by depressive symptoms.

McGillivray and Baker (2009) aimed at examining negative associations of ADHD and learning difficulties (LD) where the sample of the study consisted of 80 adults with ADHD, whose ages ranged between 18 to 58 years. They were examined according to some negative symptoms associated with them like anxiety, depression, and aggression. The findings showed that the females with ADHD and LD had more cognitive depression than females with ADHD, and it was more among females than males with ADHD and LD and more than males with LD only. It was also found that they all had high feelings of anxiety and depression, and they had clear aggressive behavior.

Westreich et al. (2013) studied hyperactivity and attention deficit disorder and examined the associations of this disorder among children. The study aimed to analyze their cognitive-emotional processes. The findings of the study showed that the cognitive and emotional adjustment difficulties among ADHD children appeared as a reaction and a reflection of the relational associations to the control deficits that fell under this disorder as adjustment difficulties of children with hyperactivity and attention deficit disorder. It was found that ADHD children might constitute an important risk factor towards family and social interactions, as the family faced difficulties in adapting to their dynamic

relationships with children with ADHD due to the difficulty of understanding them.

Miller et al. (2011) aimed to examine family relationships and cognitive factors responsible for the scheduled aggression of parents and teachers of children with ADHD and explore different patterns of aggressive behavior. The sample of the study consisted of 165 children whose ages ranged from 7 to 11 years and who were medically diagnosed with ADHD and disruptive behaviors. The results showed that there were family factors that affected the occurrence of children's aggression at home and school with parents and teachers, while the cognitive aspects represented risk factors in influencing aggression at school. It was also noted a statistically significant diversity between the reports of parents and teachers of aggressive behavior was observed among children. The study recommended the preparation of intervention programs for family counseling aiming at reducing aggressive behavior both at home and school.

Al-Malik (2005) aimed at examining the differences between normal female children and their peers with hyperactivity and attention deficit regarding the variables of aggressive behavior, anxiety, and self-esteem. The sample of the study consisted of 166 pupils from the fourth, fifth, and sixth grades. The group under study was divided into two sub-groups: The first group included 43 students with hyperactivity and attention deficit whose ages ranged between 10 to 13 years, and the other group consisted of 123 normally developed students. After analyzing the data of the study statistically, the study indicated that the group of students with hyperactivity and attention deficit had a greater degree of aggression than their normal peers. It was also found that there were differences between the two subgroups of the study in the degree of anxiety in favor of the hyperactivity students, those with attention deficit, and the younger students. Regarding the self-esteem variable, no differences were found between the two subgroups of the study–the normal students and the students with hyperactivity and attention deficit.

Doering et al. (2014) aimed at comparing aggressive behavior among two types of children with ADHD–children with learning disabilities and the ones without learning difficulties. The results of the study showed that some children with ADHD and learning difficulties have poor academic achievement, low self-esteem, and deficits in social skills. It was also found that they have highly aggressive behavior. It was also found that ADHD children have aggression towards their peers. It is worth mentioning that the study sample consisted of 128 individuals, including 91 males and 37 females. The sample was diverse as the individuals include African Americans (108), Asian Americans (8), Hispanics (6), Caucasian Americans (5), and Arabs (1).

The results of the previous studies sum up that ADHD positively correlates with highly aggressive behavior, hostility, and disruptive behavior in individuals. Male children with ADHD outperform females in aggressive behavior accompanying depressive symptoms. Most of the studies conclude that there is a set of general characteristics that distinguish youth with ADHD.

4. Research methodology

This study uses a descriptive (correlative/comparative) approach to examine the differences between both genders in each of the variables, i.e., attention disorder accompanied by hyperactivity and aggressive behavior.

4.1. Sample of the study

Primary school students with ADHD were selected from Riyadh, Kingdom of Saudi Arabia (KSA) as a sample for this study. Children with obvious physical impairments, children who do not live under normal parenthood including those with parental/family deprivation (by death or divorce), and the children living in residential institutions (of unknown parentage) were excluded from the initial sample of the study. The students of both genders whose ages ranged between 9 to 13 years were selected as a sample of the study. The group of 100 male children with ADHD from 4 primary schools and 100 female children with ADHD from 7 primary schools in Riyadh was selected as a sample. Table 1 shows the degree of statistically significant differences between the mean score of the ages of male and female students.

Table 1 indicates that the calculated 'T' value did not reach the threshold value required to become significant at any acceptable level which indicates the homogeneity of chronological age in months between members (male and female children) of the study group.

4.2. Tools of the study

Some psychometric tools have been prepared, including the following items:

1) The Attention Deficit Hyperactivity Disorder Test.
2) Ain Shams forms of aggressive behavior among children scale (Hafez and Qassem, 2001).
3) Initial data collection form prepared by the research team.

Some tools have also been re-authenticated to ensure their suitability for their application for the current study and the sample of the study i.e., the primary school children in Saudi society. The following is a description of the tools used in the current study.

The attention Deficit Hyperactivity Disorder test helped to determine the dimensions of ADHD, i.e., lack of attention, hyperactivity, and impulsivity, and examine their family image, school image, and child image. The test consisted of some items for each

dimension in its final form. The test for the family image consisted of 24 items, the school image, 24 items, and the child image, 36 drawings, and pictures. To standardize it, the validity of the arbitrators was determined which included both quantitative and qualitative analyses. The Likert scale was used to record the responses.

Table 1: The results of the significant differences between the mean scores of the male and female study groups according to the chronological age in months using the T-test

The comparing two groups	No. of individuals	Average1	Average 2	Standard deviation1	Standard deviation2	Calculated "T" value	Statistical significance
Male ADHD children	100	-	-	29	-	0.87	Not accepted at any significant level
Female ADHD children	100	-	-	-	26.5		

The instrument developer also calculated the stability of the test and its dimensions in the following ways:

A. Alpha Cronbach's coefficient yielded the following results:

1) Attention deficit: The family image (0.73), the school image (0.78), and the child image (0.64).
2) Hyperactivity: The family image (0.70), the school image (0.65), and the child image (0.74).
3) Impulsivity: The family image (0.78), the school image (0.79), and the child image (0.66).

B. Stability coefficients using the half method which found the following results:

1) Attention deficit: The family image (0.72), the school image (0.66), and the child image (0.78).
2) Hyperactivity: The family image (0.86), the school image (0.79), and the child image (0.74).
3) Impulsivity: The family image (0.69), the school image (0.78), and the child image (0.85).

C. The retesting method yielded the following results:

1) Attention deficit: The family image (0.65), the school image (0.92), and the child image (0.85).
2) Hyperactivity: The family image (0.62), the school picture (0.78), and the picture of the child (0.74).
3) Impulsivity: The family image (0.73), the school image (0.90), and the child image (0.79).

The instrument developer also verified the internal homogeneity (consistency) of the tool by calculating the correlation coefficients for the items and dimensions of the tool and the total score for each dimension. The correlation coefficients for the family image ranged between 0.32 to 0.74, the school image between 0.33 to 0.78, and the child image between 0.36 to 0.80. For examining the validity of the tool, the researcher used the method of logical validity (content), apparent validity (the validity of the arbitrators), and the validity of the correlative test, by conducting correlation coefficients between the tools that measure the same dimensions which resulted in positive and high correlation coefficients ranged between 0.812 to 0.972 indicating the scale validity.

The validity of the tool was also verified for its application to the current study sample members in the Saudi environment of primary school students in Riyadh. The stability of the tool was verified by the test and re-test method, on a random sample of 80 students of both genders in the primary stage in Riyadh schools, with 6 weeks interval, to examine the correlation coefficient between the two applications. The correlation coefficient reached 0.66 which was a positive statistically significant correlation coefficient that indicated the tool stability and its ability to measure this variable and its validity for its application to the current study sample members of primary school students in Riyadh.

4.3. Ain Shams scale of aggressive behavior of children, prepared by Hafez and Qassem (2001)

The scale was prepared to measure the aggressive behavior forms among children consisting of 80 items distributed over 20 situations of the aggressive behavior forms in the final version of the tool. The factor analysis method was used to identify the statistical significance of the saturation of the scale items to verify the scale validity. The scale validity and reliability were verified.

The following three different methods were used to ensure the validity of the scale:

1. Logical validity: The scale was presented in its initial form to some specialists to judge the instrument and to ensure that it represented what it measured according to the aspects and the consistency of the scale items as a whole.
2. Structural validity or composition: The interrelationship coefficients were calculated between the four aspects of the scale (physical aggression, verbal aggression, passive aggression, and normal behavior). This resulted in a correlation between the four aspects of the scale which ranged between 0.18 to 0.25 which were significant values at 0.05 level.
3. Factorial validity: The author of the tool conducted a factor analysis to measure the factorial validity of the scale items which resulted in a factorial matrix of the rank (120*120) that included the general factor, and they are statistically significant which ranged between 0.63 to 0.79 indicating the tool validity.

4.4. Scale stability

The stability of the scale was verified by two methods: The retest method and the variance analysis method.

1- As for the retest method, the scale was applied twice on the same sample members with an interval of two weeks and the correlation coefficients were extracted between the scores of the sample members. The results showed that for each dimension (0.87-0.92-0.88-0.91) positive correlation coefficients were positive with a high degree of statistical significance.
2- Variance analysis method using the Kuder-Richardson equation was used which resulted in correlation coefficients for each dimension (0.79, 0.84, 0.80, 0.83). They were all positive coefficients and with a high degree of statistical significance that indicated that the scale had a high degree of stability. The tool was verified by the procedure and re-procedure method on a random sample of 80 students of both genders in the primary stage in Riyadh schools, with 6 weeks gap, to examine the correlation coefficient between the two procedures. The correlation coefficient reached 0.74 which was a positive correlation coefficient that was statistically significant indicating the stability of the tool and its ability to measure its validity to apply to the current study sample members of the primary school students in Riyadh.

4.5. Statistical methods

To achieve the objectives of the study, the following statistical methods were used:

1. Pearson and Brown correlation coefficient
2. Pearson Correlation Analysis
3. T-test

5. Results

To verify the validity of the first hypothesis related to the first objective of the study which states that there is a positive and statistically significant correlation between the scores obtained by the total study sample members of primary school students of both genders on the ADHD test scores and the 'forms of children's aggressive behavior' scale scores, the Pearson correlation coefficient was found between the scores obtained by the sample members of the children. As shown in Table 2, there are 200 children of both genders on the ADHD test, and the scores obtained by the same individuals on the 'forms of children's aggressive behavior'.

Table 2: The correlation coefficient of the scores obtained by the study sample members on the ADHD test and the scores obtained by the same individuals on the "forms of children's aggressive behavior scale", n=200 boys and girls

No. of the children total sample	correlation coefficient	Statistical significance
200	0.81	significance at 0.99 level

It is clear from the previous table that there is a positive statistically significant correlation at the statistical significance level of 0.99 where the calculated (t) value reached 0.81 which exceeds the required limit value of the statistical significance value which confirms that ADHD is positively linked to aggressive behavior among study sample individuals (male and female children).

To verify the second hypothesis which states that there are no statistically significant differences between the average scores of the study sample members of the primary school students regarding the variable of ADHD. As shown in Table 3, the T-test was used to verify the differences between the mean scores of the male and female groups on ADHD.

Table 3: The significant differences between the mean scores of the two study groups members (males and females) for the scores they obtained on the ADHD test using the T-test

The comparing two groups	No. of individuals	Average1	Average 2	Standard deviation1	Standard deviation2	Calculated "T" value	Statistical significance
Male ADHD children	100	-	-	34.5	-	3.7	Significance at 1%
Female ADHD children	100	-	160.4	-	31.3		

It is clear from the previous table that there are statistically significant differences between the average scores of male and female children on the ADHD test where the calculated "t" value reached 3.7 which exceeds the required limit value to become significant at the statistical significance level of 0.99 in favor of the male children group which indicates that male children outnumber female children in ADHD.

To verify the third hypothesis validity which states that there are no statistically significant differences between the average scores of the study sample members of the primary school students in aggressive behavior according to the gender variable (male/female), as measured by the used tool, the T-test was used. To verify the differences between the mean scores of the male and female groups on the forms of children's aggressive behavior scale, as shown in Table 4.

It is clear from the previous table that there are statistically significant differences between the average scores of male and female children on the "forms of children's aggressive behavior" test where the calculated "t" value reached 3.18 which exceeds the required limit value to reach the statistical significance level at 0.99, and that is in favor of the

group of male children which indicates that male children outnumber female in aggressive behavior. The results of the present study are consistent with the results of previous studies that indicated that attention disorder associated with hyperactivity is positively associated with aggressive behavior in children of both sexes.

Table 4: The significance of the differences between the mean scores of the two study groups members (males and females) for the scores they obtained on the 'forms of children's aggressive behavior' scale using the T-test

The comparing two groups	No. of individuals	Average1	Average 2	Standard deviation1	Standard deviation2	Calculated "T" value	Statistical significance
Male ADHD children	100	201.6	-	38.3	-	3.18	Significance at 1%
Female ADHD children	100	-	185.7	-	32.4		

6. Conclusion

After analyzing the study data statistically, the results of the study indicate that ADHD is positively associated with aggressive behavior among children of both genders. This result is consistent with what was found by McGillivray and Baker (2009), Westreich et al. (2013), Miller et al. (2011), Doering et al. (2014), Roy et al. (2013), and Blader et al. (2010). Further, male children outperform females in ADHD which is consistent with the findings of the researchers including Al Hamed et al. (2008), Blader et al. (2010), and Montiel et al. (2008). The findings also show that male children outperform females in aggressive behavior, and it is perhaps due to the male hormone that is secreted in them and causes this aggressive behavior to occur.

The study emphasizes early detection of people with developmental and emotional disorders as children with ADHD. It also recommends preparing counseling programs for such children and their parents. It is also recommended to achieve optimal treatment in the school environment. It is important to discover aggressive children with disruptive, and harmful behaviors and subject them to specialized counseling programs to address and control these undesirable behaviors while striving to invest their energies to the maximum extent possible. The study also highlights the necessity of the availability of psychological counselors and social workers in primary schools to help children in facing some of the psychological and social problems they face.

There is still a need to further conduct research studies in this area. ADHD and its relationship to depression among middle school students of both genders need to be studied. There is also a need to study depression and its relationship to anxiety and aggression among mothers of children with developmental disorders. In addition, parental upbringing styles and their relationship to aggressive behavior among children and adolescents are also worth studying.

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Compliance with ethical standards

Conflict of interest

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