Attention Deficit Hyperactivity Disorder and its Relationship to Sleep and Conduct Disorders among School Age Children

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ABSTRACT

Background: Attention Deficit Hyperactivity Disorder is the most common childhood neuropsychiatric disorders that become apparent in both preschooler and schooler children. Attentive deficit hyperactive Children often have other comorbid psychiatric disorders, such as conduct and sleep disorders, anxiety, and depression. ***The aim of the study*:** to investigate attention deficit hyperactivity disorder and its relationship to sleep and conduct disorders among school-age children. ***Design:*** A descriptive correlational research design was utilized in this study. ***Setting:*** This study was carried out at Children's Psychiatric Outpatient Clinic at Port Said Psychiatric Health Hospital. ***Sample:*** A convenience sample of 125 parents accompanying their children who suffering from attention deficit hyperactivity disorder and attending to the previously mentioned setting for 6 months. ***Tools of data collection:*** self-administered structured interview questionnaire and child sleep habits questionnaire were used. ***Results:*** 80.0% of the study children with attention deficit hyperactivity disorder had disturbed sleep and 12.8% of them have conduct disorders. ***Conclusion:*** the study concluded that attention deficit hyperactivity disorder has a strong statistically significant positive correlation with total sleep and conduct disorders. ***Recommendation****:* Parents' training programs should be developed to increase parenting skills in managing their child's behavior, facilitating social skills development, encouraging parents' positive interaction with their child.

Keywords: Attention deficit hyperactivity disorder, Conduct disorder, Sleep disorders School-age children, Pediatric nurse.

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is the most common developmental conditions in childhood, with a prevalence of approximately 7.0% to 10.2% of school-aged-children worldwide ***(Pastor, 2015*)**. Causes of ADHD is unknown and contributing factors seem to play a part in ADHD. It stems from interactions between genes and environmental factors **(*Varcarolis, 2013*).** It characterized by behavioral symptoms of inattention, hyperactivity, and impulsivity as a persistent pattern in different settings throughout one's lifespan. The inattention symptom of ADHD manifests itself in daydreaming, distractibility, and difficulty in focusing on a single task for a prolonged period of time, which is also influenced by a shortcoming of the motivational component. The hyperactivity component is expressed as fidgeting, excessive talking, and restlessness, while symptoms such as aggression and difficulties in impulse regulation may exert an influence on family life and social relations **(*Moen, 2014*)**.

ADHD is connected with many kinds of sleep problems. Schooler kids with ADHD had higher rates of daytime sleepiness than kids without ADHD. Around half of youngsters with ADHD had manifestations of sleep-disordered breathing, compared with 22% of kids without ADHD **(*National Sleep Foundation, 2016*).** Parent report of sleep-related problems among children with ADHD is common and may stem from several factors **(*Noble et al., 2011*)**. Parents and clinicians report that sleep problems affect 25% to 50% of children and adolescents with ADHD. The most typical problems include resisting getting into bed and difficulty falling asleep. Although the sleep of children with ADHD is similar to that of other youths, children with ADHD appear to be more active during the night. Sleep patterns vary more from one night to the next **(*Miller, 2014*).**

Conduct disorder behaviors are also frequently found among children diagnosed with ADHD and other disruptive disorders, and among children with bipolar disorders. **(*Townsend, 2015). American Academy of Child and Adolescent Psychiatry (AACAP), (2014*)** mentioned that conduct disorder refers to a group of behavioral and emotional problems in children. Children with this disorder have great difficulty following rules and behaving in a socially acceptable way. They often viewed by other children, adults and social agencies as "bad" or delinquent, rather than mentally ill.

The significance of the study:

Attention Deficit Hyperactivity Disorder is a very serious health problem affecting 6.9% of school-age children in Egypt. It contributes to a wide variety of interpersonal, academic, and vocational problems. It significantly limits or disrupts a personal ability to function and negatively affect health habits and educational or socio-economic achievement well into adulthood **(Farahat et al., 2014).** ADHD can also lead to emotional or behavioral problems, difficulties with peer relationships, and family stress. Unrecognized and untreated this disorder will interfere greatly with all aspects of the child's life **(Ashmore, 2013).** ADHD often have other comorbid psychiatric disorders such as oppositional defiant disorder, conduct disorder, and sleep disorders. When sleep and conduct disorders are identified, treatment should address both behavioral and physiological components of sleep and conduct problems, as an attempt to increase the children sleep duration or improve their sleep quality to improve their daytime functioning and behaviors **(Ries-Merikangas et al., 2010)**.

AIM OF THE STUDY:

The present study aimed to investigate attention deficit hyperactivity disorder and its relationship to sleep and conduct disorders among school-age children.

SUBJECTS AND METHOD:

A descriptive correlational design was utilized for the conduction of this study.

Setting: The study was conducted at the Children's Psychiatric Outpatient Clinic at Psychiatric Health Hospital in Port- Said City.

Subjects:

A sample of convenience of 125 parents accompanying their children who suffering from attention deficit hyperactivity disorder and attending to the previously mentioned setting for six months.

Tools of data collection:

Two tools were used in this study

TOOL (1): Self-Administered Structured Questionnaire was developed by **Wolraich et al. (1998)** and adapted by the researcher in Arabic format in a suitable language to suit parents' level of understanding. Then, it revised by using panel experts for the content validity, to determine behavioral problems among school children by caregivers. It consists of two rating scale

1-Vanderbilt ADHD Parent Rating Scale

It is a Likert type rating scale used to assess subtypes of ADHD in childhood by caregivers. It consists of 18 items. These items probed subtypes of ADHD as:
Predominantly inattentive, predominantly hyperactive/impulsive and combined which includes both inattention and hyperactivity subtypes.

2-Vanderbilt Conduct Parent Rating Scale

It is a Likert type rating scale used to measure the presence of the symptoms of conduct disorder in childhood by parents. It consists of 14 items. These items probed symptoms of conduct disorder as Aggression to people and animals, Destruction of property, Deceitfulness, lying or stealing, and Serious violations of rules.

TOOL (2): Child Sleep Habits Questionnaire (CSHQ) was developed by **Owens et al., (2000).** It was used in English original format and designed as a screening tool to target the most common problems with sleep exhibited in children ages 4-12 years. The CSHQ is a 33-item that provides a total score that incorporates items reflective of eight different subscales as Bedtime Resistance, Sleep Onset Delay, Sleep Duration, Sleep Anxiety, Night Wakings, Parasomnias, Sleep Disordered Breathing, and Daytime Sleepiness. Parents were instructed to rate items regarding their child's sleep habits and/or problems as they have occurred over the prior week. An exception was made if the past week has been atypical (the child has been sick) in which case the parent was asked to endorse items based on a week more characteristic of the child's usual habits.

Pilot study

A pilot study was carried out on 10% (13 parents and their children) in children's psychiatric outpatient clinic at Psychiatric Health Hospital in Port- Said city to test whether

tools of data collection were clear, understandable, and feasible. The results of the data obtained from the pilot study helped the researcher to modify the tools: items were corrected as needed. Accordingly, modifications were done and the final form was developed. A pilot study was undertaken before starting the data collection phase and it excluded from the study. It was conducted at the time from the beginning of September 2015 to the end of October 2015.

Fieldwork:

- The data have been collected over a period of 6 months, the actual field work was carried out from the beginning of January 2016 to the end of June 2016.
- Purpose of the study was explained to parents who agreed to participate in the study prior to data collection.
- The researcher was available 2 days/week (Saturday and Monday) for from 9 a.m. to 2 p.m.
- Each parent was individually interviewed using the previously mentioned study tools for 20-30 minutes according to the physical and mental readiness of the studied parents, in addition to the mitigating circumstances in the study setting.

IV. Statistical design:

The collected data was organized, revised, stored, tabulated and analyzed using the number and percentage distribution. Statistical analysis was done by computer using Statistical Package of Social Science program (SPSS) package version 16. Proper statistical tests were used to determine whether there was a significant statistical difference between the variables of the study. Data were presented in tables and figures. Percentages, Pearson correlation (r), Chi-square (χ^2), Proportion probability of error (P- value) were used. The significance of the obtained results was judged at the 5% level.

RESULTS:

Table (1): The respondents in this study were 125 children with a mean age 8.24 ± 2.04, 45.6% of the studied children were aged between 6 to less than 8 years; more than two-thirds of them (69.6%) were male. Also, more than three quarters of the studied children (76.8%) had one or two sibling, the highest percentage of them (96.8%) were at the primary level of education, It can be noticed that 44.0% of those children were the first among their siblings, while, 36.0% of those children were the second child among their

siblings. Most of the studied children were living with both parents (83.2%), while, 15.2% were living with a single parent.

Table (2): Regarding studied children's patents, more than half of the studied mothers (58.4%) had secondary education compared with 53.6% of the studied fathers. On the other hand, 16.8% of the study mothers were illiterate compared with 13.6% of the study fathers. Only 4.0% of those mothers completed postgraduate studies compared to none of the fathers. In relation to the parent's occupation, the majority of children's fathers (92.0%) worked, while 70.4% of children's mothers didn't work. Also, regarding family income, 66.4% of the studied parents stated that they didn't have enough monthly income, while the minority of them (4.8%) stated their family income had been enough and more.

Table (3): Illustrates total score of subscales of sleep disorders among the studied children, the most common total score of subscales of sleep disorders appeared among the studied children was bedtime resistance (96.0%) with mean ± SD (15.91± 2.27) followed by sleep duration (82.4%) and sleep onset delay (80.8%).

Table (4): shows total score of attention deficit hyperactivity disorder, conduct disorder, and sleep disorders among the studied children, most common subtypes of attention deficit hyperactivity disorder were ADHD inattentive type which constituted 44.0% of studied children. The table also illustrates that conduct disorder was present in 15.2% of children with ADHD while it was absent in most of those children (84.8%). More than three-quarter of study children (80.0%) suffered from disturbed sleep, while 20.0% of them didn't have disturbed sleep.

Table (5): show attention deficit hyperactivity disorder subtypes and its relation to sleep disorders and conduct disorders. Subtypes of attention deficit hyperactivity disorder had a statistically significant relationship with the sleep disorder (**p**=0.010*), while 43.0% of children with ADHD inattentive type had disturbed sleep and 34.0% of those children with ADHD combined type had disturbed sleep, compared to 23% of children with ADHD hyperactive-impulsive type had disturbed sleep. Moreover, this table clarifies that attention deficit hyperactivity disorder subtypes had statistically significant relation with conduct disorder (**p**=0.020*), while half of the children with ADHD combined type (50.0%) had conduct disorder and 43.8% of children with ADHD inattentive type had conduct disorder, compared to minority of children with ADHD hyperactivity-impulsivity type had conduct disorder, (6.2%).

Table (6): shows the correlation coefficient between attention deficit hyperactivity disorder, sleep disorders, and conduct disorder. This table proves that total attention deficit hyperactivity had a strong statistically significant positive correlation with total sleep disorders (**p**= 0.000***) and total conduct disorder (**p**= 0.000***), when ADHD increases, it leads to increase sleep disorders and conduct disorder. While there was a negative correlation between total conduct disorder and total sleep disorders but it wasn't statistically significant (**p**= 0.200).

Table (1): Socio-demographic characteristics of the studied children (n=125)

Socio-demographic characteristics	**Number (No.)**	**Percentage (%)**
Age in years:		
6 -	57	45.6
8 -	25	20.0
10-12	43	34.4
Min – Max	6-12	
Mean ± SD	8.24 ± 2.04	
Gender:		
Male	87	69.6
Female	38	30.4
Sibling number:		
None	9	7.2
One-two	96	76.8
Three-four	20	16.0
Birth order:		
First	55	44.0
Second	45	36.0
Third	17	13.6
Fourth	8	6.4
Child's level of education:		
Primary education	121	96.8
Preparatory education	4	3.2
Child living condition:		
Living with both parents	104	83.2
Living with single parents	19	15.2
Living with grandparents	2	1.6

Table (2): Socio-demographic characteristics of the studied children's parents (n=125).

Socio-demographic characteristics	Mother n=125		Father n=125	
	No.	%	No.	%
Parent's education:				
- Illiterate	21	16.8	17	13.6
- primary\preparatory	9	7.2	12	9.6
-Secondary	73	58.4	67	53.6
-University	17	13.6	29	23.2
- Postgraduate studies	5	4.0	0	0.0
Parent's occupation:				
-Not working	88	70.4	10	8.0
- Working	37	29.6	115	92.0
Family income:	**No.**		**%**	
-Not enough	83		66.4	
-Enough	36		28.8	
-Enough and more	6		4.8	

Table (3): Total score of subscales of sleep disorders among the studied children (n=125).

Total score of subscales of sleep disorders	Undisturbed sleep		Disturbed sleep		Mean ± SD	Min - Max
	No.	%	No.	%		
Bedtime resistance	5	4.0	120	96.0	15.91± 2.27	10.0-21.00
Sleep onset delay	24	19.2	101	80.8	4.21± 1.12	2.00- 6.00
Sleep duration	22	17.6	103	82.4	6.42± 0.882	4.00- 8.00
Parasomnia	73	58.4	52	41.6	10.09± 2.60	6.00- 15.00
Sleep-disordered breathing	91	72.8	34	27.2	4.16± 1.48	3.00- 9.00
Sleep anxiety	76	60.8	49	39.2	5.24± 1.92	3.00- 9.00
Night waking	52	41.6	73	58.4	4.51± 1.07	2.00- 6.00
Morning waking\Daytime sleepiness	44	35.2	81	64.8	11.38± 2.46	7.00- 16.00

Table (4): Total score of attention deficit hyperactivity disorder, conduct disorder, and sleep disorders among the studied children (n=125)

Total score	No.	%
Attention deficit hyperactivity disorder:		
ADHD inattentive type	55	44.0
ADHD hyperactivity-impulsivity type	25	20.0
ADHD combined type	45	36.0
Conduct disorder:		
Not present	109	87.2
Present	16	12.8
Sleep disorders:		
Undisturbed sleep	25	20.0
Disturbed sleep	100	80.0

Table (5): Attention deficit hyperactivity disorder subtypes and its relation to sleep disorders (n=125)

Items	Attention deficit hyperactivity disorder subtypes						Total		χ^2 test	P-value
	Inattentive type		Hyperactivity-impulsivity type		Combined type					
	No.	%	No.	%	No.	%	No.	%		
Total sleep disorder:										
Undisturbed	12	48.0	2	8.0	11	44.0	25	100.0	2.919	0.010*
Disturbed	43	43.0	23	23.0	34.0	34.0	100	100.0		
Total conduct disorder:										
Not present	48	44.0	24	22.0	37	33.9	109	100.0	4.491	0.020*
Present	7	43.8	1	6.2	8	50.0	16	100.0		

***Statistical significance at p≤ 0.05** χ^2 **=Chi square**

Table (6): Correlation coefficient between attention deficit hyperactivity disorder, sleep disorders, and conduct disorder.

Items	Total sleep disorder		Total attention deficit hyperactivity disorder		Total conduct disorder	
	r	P- value	r	p-value	r	p-value
Total attention deficit hyperactivity disorder	0.678	0.000***				
Total conduct disorder			0.768	0.000***		
Total sleep disorder					-0.115	0.200

*****Correlation is significant at p-value≤0.05 r-pearson correlation***

DISCUSSION:

Attention deficit hyperactivity disorder is a condition of the brain that makes it difficult for children to control their behaviors and can affect every aspect of the child's functioning. It represents a life disability, affecting not only the school performance, but also the family life and peer interaction, where it can influence behavior, academic performance, social and emotional adjustment resulting in significant academic delay, learning deficit, poor self-esteem, and motivation which further complicate the clinical presentation and treatment ***(AL-sayed, 2015).*** Presence of ADHD is often associated with psychiatric comorbidities, such as sleep disorders, and conduct problems which are highly related to criminal behavior and are associated with a host of other social, emotional, and academic problems. It may predict later impairments in the all aspects of mental health as addiction, school drop out, poor marital adjustment, poor job performance and poor respiratory function ***(Dória, et al., 2015; Frick et al., 2014).***

The results of the current study indicated that most common subtypes of ADHD among study children were ADHD inattentive type, followed by ADHD combined type and ADHD hyperactive/impulsive type. This might be explained by features of ADHD inattentive type were easily observed by parents or other family members, this features such as didn't pay

attention to details, difficulty sustaining attention to tasks, didn't seem to listen when spoken, didn't follow instruction and failed to finish schoolwork, avoided tasks required sustained mental effort, loosed things necessary for tasks, easily distracted by external stimuli, and forget daily activities. This finding was congruent with ***Velez-Galarraga, et al., (2016*)** in Spain who stated that the most common type of ADHD among children was ADHD inattentive type. On the other hand, the foregoing study results disagreed with ***Mulraney et al., (2016)*** in Victoria who found that the overall prevalence of combined ADHD was higher than inattention and hyperactivity-impulsivity disorders.

According to prevalence of sleep disorders among studied children with ADHD, these present results revealed that most of the studied children suffered from disturbed sleep based on the suggested cut-off for clinical significance on the child sleep habit questionnaire (CSHQ) of 41, such as bedtime resistance, decline in sleep duration, sleep onset delay, morning waking/daytime sleepiness, night waking, parasomnia, sleep anxiety, and sleep-disordered breathing. This explanation was confirmed by ***Halter (2014)*** who mentioned that close linkage between brain systems involved in regulation of sleep/ arousal and those involved in the regulation of attention and effect so that the present study showed that there was a statistically significant relation between ADHD and sleep disorders.

According to the distribution of the studied children related to subscales of sleep disorders, these foregoing present study displayed that, bedtime resistance was most prevalent sleep disorders among the studied children followed by sleep duration, sleep onset delay, morning waking/daytime sleepiness, night waking, parasomnia, sleep anxiety and sleep-disordered breathing. This may be due to most children didn't comply with medication regularly. This explanation was supported by ***Peppers et al., (2016)*** who found that the primary sleep disorder symptoms seen in children with ADHD are bedtime resistance, the latency of sleep onset, decreased the duration of sleep, increased number of overnight awakenings, and daytime somnolence. Bedtime resistance or ‘‘difficulty falling asleep" is the most common symptom reported by children affected with ADHD and/or their parents. Also, agreed with ***Abou-Khadra (2009)*** in Egypt who stated that the most prevalent CSHQ subscales disorders were bedtime resistance, daytime sleepiness, and night waking.

Regards to conduct disorders (CD), the finding of the present study indicated that minority of the study children had conduct disorder. This may be due to fact that more than half of the

study sample aged between 6 to less than 8years, while peak incidence of CD is between 8 to 10 years. This result was conflicted with ***Pires et al. (2013)*** who carried out a study in Brazil and found that the main comorbidities in children with ADHD were conducted disorder. On the opposite side, this result was in disagreement with previous research in the UK reported that nearly one third of children with ADHD meet the criteria for conduct disorder, and this subgroup shows greater ADHD symptom severity and worse outcomes than those with ADHD alone and worse outcomes ***(Northover, et al., 2015).*** This result was supported by ***Nigg et al. (2016)*** in the USA who reported that CD often co-occur with ADHD and was confounded by increased ADHD severity.

According to ADHD and its relation to sleep disorders, the finding of the present study accentuated that attention deficit hyperactivity disorder had a statistically significant relationship with the sleep disorder. These results may be attributed to fact that the majority of the studied children with ADHD emphasizing disturbed sleep especially difficulties in falling asleep and staying asleep. This interpretation was supported by ***Silvestri et al. (2009)*** who illustrated that the interplay relation between these two disorders of ADHD and sleep is significant. Similar to the foregoing current study results, a study in Israel, found that there was a well-established correlation between sleep disturbances and ADHD ***(Ganelin-Cohen& Ashkenasi, 2013).*** This situation is similar to studies, such as ***Weiss & Salpekar (2010)*** in the USA, ***Stein et al., (2012)*** in USA and ***Peters (2016)*** found that statistically significant relationships were reported between ADHD and sleep disturbances.

Velez-Galarraga et al. (2016) stated that relationships between sleep problems and ADHD are bidirectional, sleep disorders can generate and/or exacerbate symptoms of inattention and hyperactivity, but these latter symptoms, or the drugs used to treat them, may produce or exacerbate some sleep disturbances. In contrast, this study disagreed with ***Wagner & Schlarb (2012)*** in Germany who reported no significant association between ADHD and sleep problems.

The study also found that subtypes of attention deficit hyperactivity disorder had a statistically significant relation with sleep disorder, while less than half of children with ADHD inattentive type has disturbed sleep and slightly less than one third of those children with ADHD combined type has disturbed sleep, while the rest of those children with ADHD

hyperactive-impulsive type has disturbed sleep. This current result was in the same line with ***Becker et al., (2016*)** in San Francisco who reported that ADHD inattentive symptoms were significantly associated with children being rated as poor sleepers. On the opposite side, a study in USA and demonstrated that Sleep problems may be associated with subtypes of ADHD. Children with ADHD-C had more sleep problems than controls and children with ADHD-I, while children with ADHD-I type alone will have fewer sleep problems ***(Mayes et al., 2009).***

As regards to ADHD subtypes and its relation to CD, the finding of the present study also indicated that ADHD subtypes had statistically significant relation with CD, while one-half of children with ADHD combined type had conduct disorder. This may be due to ADHD combined type is characterized by the existence of three core characteristics of inattention, hyperactivity, and impulsivity, these symptoms make a child aggressive to people or animals, intimate others and violate. This current result comes in correspondent with results of ***Masi & Gignac (2015)*** in Canada who added that there was an association between CD and ADHD.

In the light of the study findings, there was no significant relationship between total CD and total sleep disorders. This may be due to children with comorbid conduct disorder and ADHD show more severe aggression than disturbed sleep. This finding is congruent with ***Mulraney et al. (2016)*** in Victoria reported that no bidirectional relationship was observed between sleep problems and conduct disorder. In contrast, it was noticed from the previous study in China and reported that sleep disturbances are associated conduct problems ***(Wang et al., 2013).***

CONCLUSION:

Based on the findings of the current study, most of the study children with ADHD had disturbed sleep, while the minority of those children had the CD. Meanwhile, there was a statistically significant relation between total ADHD and total sleep disorders. Also, there was a statistically significant relation between total ADHD and total conduct disorder.

RECOMMENDATIONS :

The following recommendations were inferred from the study: 1)Nursing health programs should be directed to the child, family, the primary health care services, the school, and the community throughout the developmental stages of the child and family's life to reduce the

prevalence and incidence of ADHD.2) Parents' training programs should be developed to increase parenting skills. These should focus on increasing parents' skills in managing their child's behavior, facilitating social skills development, encouraging parents' positive interaction with their child, and how to manage sleep disorders. 3) School health services need to alert the school nurses and school teachers to be aware of the symptoms of ADHD for early pick-up of suspected cases for referral and diagnosis. School teachers also need to focus on further skill development, including anger management and rewarding appropriate classroom behavior such as being friendly and polite behaving with classmates.

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اضطراب فرط الحركة و قصور الانتباه وعلاقته باضطرابات النوم والسلوك بين الأطفال في سن المدرسة

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الخلاصة

يعد اضطراب فرط الحركة و قصور الانتباه واحد من أهم الاضطرابات النفسية العصبية الأكثر شيوعا في مرحلة الطفولة، ويصبح واضحا في الأطفال خلال مرحلة ما قبل المدرسة و سنوات الدراسة المبكرة. الأطفال الذين يعانون من اضطراب فرط الحركة ونقص الانتباه غالبا ما يعانون من اضطرابات نفسية مصاحبة أخرى، مثل اضطراب العناد الشارد، اضطراب السلوك ، القلق، اضطرابات النوم، الاكتئاب، اضطراب ثنائي القطب، وتعاطي المخدرات. وكان هدف الدراسة هو فحص اضطراب فرط الحركة و قصور الانتباه وعلاقته باضطرابات النوم و السلوك بين الأطفال في سن المدرسة. وقد أجريت هذه الدراسة في العيادة النفسية الخارجية للأطفال بمستشفي الصحة النفسية في مدينة بورسعيد. وقد شارك فى هذه الدراسة عدد 125 من الوالدين بمصاحبة أطفالهم المصابين باضطراب فرط الحركة وقصور الانتباه لمدة 6 شهور. وقد تم استخدام أداتين لجمع البيانات، **الأولى**: استمارة استبيان لتقييم الاضطرابات السلوكية بين الأطفال في سن المدرسة وتوجه إلي الأبوين، **والثانية**: استمارة استبيان لتسجيل عادات النوم عند الأطفال وتوجه إلي الأبوين . ولقد كشفت النتائج أن 44.0 ٪ من الأطفال كان لديهم قصور انتباه بينما أكثر من ثلث الأطفال (36.0٪) كان لديهم قصور انتباه و فرط حركة وعدم تحكم ، بينما 20.0٪ من الأظفال كان لديهم فرط حركة وعدم تحكم، كما أن معظم أطفال فرط الحركة وقصور الانتباه يعانون من اضطرابات في النوم ، بينما أقلية الأطفال لديهم اضطرابات سلوكية، بالإضافة إلى وجود علاقة طردية ترابطية قوية بين إجمالي اضطراب فرط الحركة وقصور الانتباه وإجمالي اضطرابات النوم وإجمالي اضطرابات السلوك. وأوصت هذه الدراسة بوضع برامج تدريبية للآباء من أجل زيادة وتنمية مهاراتهم، حتى يكونوا قادرين على إدارة سلوك أطفالهم ، تسهيل تنمية المهارات الإجتماعية لأطفالهم، كما يجب تشجيع الآباء على التفاعل الايجابي.