Relationship between Quality of Life and Sleep Habits in Children with Attention Deficit Hyperactivity Disorder

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Abstract

Background:

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common chronic disorders which influence millions of children worldwide. It is a neurodevelopmental disorder that has a great impact on children in a critical period of development, the treatment of which extends over years. Assessment of sleep problems and QOL can help the nurses to recognize life areas that are especially disturbed for children and their parents. **Aim of study:** was to assess relationship between quality of life and sleep habits in children with attention deficit hyperactivity disorder. **Design**: descriptive correlational research design was utilized to conduct and achieve the aim of study. **Setting**: This study was conducted at the outpatient clinics of Psychiatric and Mental Health Hospital at Benha city, Qalubia governorate. **Study subject**: Convenient sample of 100 children with ADHD and their parents / caregivers. **Tools of Data collection:** Three tools were used: **I:** Structured Interview Questionnaire it was divided in three parts. **I**: Socio–demographic data of children, **II**: Socio–demographic data of caregivers & **III**: Clinical data for children with ADHD, **II:** The Pediatric Quality of Life Inventory, **III:** The Children's Sleep Habits Questionnaire. **Results**: more than half of the studied children have poor quality of life. Also, more than one quarter of them have fair quality of life, while one fifth of them have good quality of life. Half of the studied children have severe sleep habits. Also, one quarter of them have moderate sleep habits. While less than one fifth of them have mild sleep habit and only of them have normal sleep habits. There is a highly statistically significant positive correlation between total quality of life and total sleep habits among the studied children. **Conclusion**: Findings confirmed that, quality of life and sleep habits seem to be related with each other in ADHD. **Recommendations**: Parent education and training in behavior management can improve behavior, enhance the QoL and sleep habits of their ADHD children.

Keywords: Quality of Life, Sleep Habits, Attention Deficit Hyperactivity Disorder

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a very common childhood-onset psychiatric condition of which the rates have risen over the past few decades and continue to raise ***(El-Bakry et al., 2019).*** ADHD is characterized by pervasive, persistent, and impairing symptoms of impulsivity, hyperactivity, and inattention that occur before the age of seven year, with the possibility of extending into adult life. ADHD has three subtypes which include the inattentive subtype, the hyperactive/impulsive subtype, and the combined subtype ***(Al-Habib et al., 2019).***

ADHD is not just a childhood disorder. Although the symptoms of ADHD begin in childhood, ADHD can continue through

adolescence and adulthood. ADHD is more often diagnosed in boys than girls. Girls are more likely to have symptoms of inattentiveness only, and are less likely to show disruptive behavior that makes ADHD symptoms more obvious. This means girls who have ADHD may not always be diagnosed. The diagnosis of ADHD remains challenging due to a lack of symptom specificity, a broad list of differential diagnoses, and the presence of comorbidities. For these reasons, a comprehensive and detailed clinical assessment is particularly important ***(Al-Saad et al., 2021).***

Between 70% and 85% of children with ADHD will experience problems with sleep. Sleep problems in children with ADHD may arise from unhealthy sleep practices (e.g., inconsistent bed and wake times, caffeine use, electronics in the bedroom, exposure to bright light on the computer late at night), from comorbid conditions, a shared biological component, or as a side effect of stimulant treatment ***(Gunia et al., 2020)***.

The association between ADHD and sleep disturbance is well documented and the prevalence of sleep disturbances in ADHD vary widely. For instance, poor sleep in ADHD has been associated with increased distractibility, increased prevalence of conduct problems, hyperactivity, restlessness; and difficulties with attention, memory and learning. In a large sample of ADHD children with moderate-to-severe sleep problems, the behavioral sleep therapy was successful in reducing sleep problems, alongside improving ADHD behavior severity, classroom behavior and working memory task performance ***(Knight et al., 2019).***

Previous research has demonstrated that children with ADHD and sleep disorders have greater deficits in physical, psychosocial, and total life quality. In fact, sleep makes an independent and clinically significant impact on specific domains of functional impairment and QoL over and above difficulty due to ADHD symptoms. Also, sleep has a greater impact on poor Satisfaction and Comfort than even ADHD. Since both ADHD and sleep problems lead to a poor QOL, early diagnosis and treatment are of vital importance ***(Craig et al., 2020).***

Aim of the study

Assess relationship between quality of life and sleep habits in children with attention deficit hyperactivity disorder.

Research hypothesis:

١. What is quality of life of children with attention deficit hyperactivity disorder?
٢. What are sleep habits in children with attention deficit hyperactivity disorder?
٣. Is there a relationship between quality of life and sleep habits in children with attention deficit hyperactivity disorder?

Subject and methods

Research design:

Descriptive correlational research design used to achieve the aim of the study.

Setting:

This study was conducted at the outpatient clinics of Psychiatric and Mental Health Hospital at Benha city, Qalubia governorate

Subjects:

A Convenient sample of 100 children with ADHD and their parents / caregivers

Tools of Data Collection:

The data was collected using the following tools:

Tool (1): Structured Interview Questionnaire. It was developed by the researcher consisted of three parts.

Part one: Socio–demographic data of children: It was included 5 items to elicit data about the studied children such as age of child, sex of child, level of child education, type of school that the child attends and child birth order

Part two: Socio–demographic data of caregivers: It was included 8 items: relation of caregiver to the child, age of caregiver, level of caregiver's education, occupation of caregiver, residence of caregiver, family size, family marital status and family income

Part three: Clinical data for children with ADHD. It was included 8 items: child's age at onset of signs & symptoms of the disease, child's age at onset of diagnosis of the disease, ADHD subtype, type of treatment the child receives, number of treatment sessions per week, risk factors of ADHD, family history with ADHD and the degree of kinship of the child

Tool II: - The Pediatric Quality of Life Inventory: that was originally developed by ***(Varni, 1998)*** and it was translated into Arabic version by ***(Arabiat* et al., *2011).*** It is a questionnaire assessment tool used to evaluate quality of life in children. The scale contains 23 items: physical (8 items), emotional (5 items), social (5 items), and school (5 items), all of which carry a 3-point range of responses, as follows: Always (0), Some-times (1), and Never (2).

Scoring system:

- Poor quality of life: < 50% (<23 grades).
- Fair quality of life: 50-75% (23–34 grades).
- Better quality of life: > 75% (> 35 grades).

Tool III: The Children's Sleep Habits Questionnaire (CSHQ): It was originally developed by **(Owens et al., 2000)** and it was translated into Arabic version by **(Asaad and Kahla, 2001)**. The scale designed to assess behavioral and medically based sleep problems in school children. The scale contains 33-items: bedtime (8 items), sleep behavior (13 items), waking during the night (4 items), morning waking (5 items) and daytime sleepiness (3 items) using a 3-point scale: Rarely (1), sometime (2) and usually (3).

Scoring system:

- Normal sleep habits: < 25% (<25 grades).
- Mild disturbance: 25-<50% (25-< 50 grades).
- Moderate disturbance: 50-75% (50- 75 grades).
- Severe disturbance: >75% (> 75 grades).

Content validity and Reliability:

The validity of tools was done by jury of five expertises who checked the relevancy, comprehensiveness, clarity and applicability of the questions. The reliability of the tools was tested through Alpha Cronbach reliability analysis:

Tools	Alpha Cronbach
The Pediatric Quality of Life Inventory	0.814
The Children's Sleep Habits Questionnaire	0.825

Pilot study

After the tools were designed, they were tested through a pilot study, which was done before its application in the field work to check clarity and feasibility of the designed tools to be sure that it was understood and to estimate the time needed to complete its

items. It was carried on a sample of 10% (10 children with ADHD and their parents / caregivers) who were excluded later from the main study sample to assure stability of the results.

Ethical Consideration: The objectives and aim of the study were clarified by the researcher to every participant in the study, written consent obtained before conducting the interview and they were assured for maintaining anonymity and confidentiality. Every participant was informed that they have the right to participate in the study and the right to withdraw from the study at any time.

Field work:

The researcher started data collection by introducing herself to the child with ADHD and his/her caregiver.

- The researcher followed the specific precautions (wear mask, personal distance and using alcohol) due to corona virus circumstances after explanation and reassurance of caregivers and children.

- Brief description about the purpose of the study and the type of questionnaire required to fill was given to every participant.

-The sample was selected by interviewing 100 children with ADHD and their parents / caregivers that met the previous prescribed criteria.

-Data collection was done by interviewing every participant individually.

-The researcher started to collect data from caregivers of children, almost 6 children / day and each caregiver's interview lasted (30-45 minute).

-The process of data collection took a period of 2 months (from the first of October 2021 to the first of December 2021), 2 days / week (Monday and Thursday), from 9 A.M. : 1 P.M., 6 children / day.

Statistical analysis:

All data collected were organized, coded, computerized, tabulated and analyzed by using The Statistical Package for Social Science (SPSS) program (version 25), which used frequencies and percentages for qualitative descriptive data, Chi-square was used for relation tests, mean and standard deviation was used for quantitative data and person correlation coefficient (r) was used for correlation analysis and degree of significance was identified. A highly statistical significant difference was considered if p-value < 0.01, statistical significant difference was considered if p-value < 0.05 and non-statistical significant difference was considered if p-value $p > 0.05$.

Results

Table (1) Shows that, three fifths (60%) of the studied children their age ranged between 8 <10 years, with mean age was 9.52 ± 1.39. As regard to sex, almost two thirds (65%) of them are males. Also, more than three quarters (76%) of the studied children had primary education and more than three quarters (77%) of them attend governmental school. As regard to child birth order, two fifths (40%) of the studied children are the last child

Table (2) illustrates that, the majority (84%) of caregivers of the studied children are mothers and approximately less than half (48%) of caregivers their age ranged between 30- 40 year with mean age was 44.5 ± 7.25. As regard to educational level, two fifths (40%) of them have an intermediate education and approximately less than half (48%) of them are unemployed / housewife. Regarding to residence, more than two thirds (69%) of the studied children are live in rural area and the majority (88%) of them are live within small family size. As regard to marital status of caregivers of the studied children, the

majority (83%) of them are married and more than half (56%) of them have enough family income.

Table (3) shows that, more than half (52%) of the studied children their age at onset of signs & symptoms of the disease ranged from 3 <6 years, with mean age was 3.6 ± 1.7 years. Also more than half (56%) of them their age at onset of diagnosis of the disease ranged from 3 <6 years, with mean age was 3.72 ± 1.4 years. As regard to ADHD type, more than two thirds (67%) of them diagnosed with combined type and more than half (56%) of them treated with both medication and treatment sessions. Also, more than two third (73.5%) of the studied children who treated with treatment sessions received sessions once per week.

Figure (1) Shows that, more than half (52%), (50%), and (56%) of the studied children have poor emotional function, social function, and school function respectively. Also, more than one third (35%) of them have poor physical health. While two fifths (40%) of them have good physical health as the highest percentage between subscales of quality of life.

Figure (2) Shows that, more than half (52%) of the studied children have poor quality of life. Also, more than one quarter of them (28%) have fair quality of life. While one fifth (20%) of them has good quality of life.

Figure (3) Shows that, half (50%) of the studied children has severe bedtime subscale of sleep habits. Also, approximately less than half (48%) and more than two fifths (45%) of them have severe waking during the night subscale and morning waking subscale respectively. Furthermore, two fifth (40%) and (40%) of the studied children have severe sleep behavior subscale and daytime sleepiness subscale.

Figure (4) Shows that, half (50%) of the studied children have severe sleep habits. Also, one quarter (25%) of them have moderate sleep habits. While less than one fifth (18%) of them have mild sleep habit and only (7%) of them have normal sleep habits.

Table (18) Shows that, there is a highly statistically significant positive correlation between total quality of life and total sleep habits among the studied children at p-value = < 0.01.

Table (1): Percentage distribution of the studied children according to their socio-demographic data **(n=100)**.

Socio-demographic data of the studied children	**Studied children (n = 100)**	
	N	**%**
Age		
8 < 10 years	60	60
10 ≤12 years	40	40
Mean SD **9.52 ± 1.39**		
Sex		
Male	65	65
Female	35	35
Level of child education		
Primary education	76	76
Preparatory education	12	12
Don't attend to school	12	12
Type of school that the child attends		

Governmental school	77	77
Private school	7	7
Experimental school	4	4
Don't attend to school	12	12
Child birth order		
First child	36	36
Second child	24	24
The last child	40	40

Table (2): Percentage distribution of the studied caregivers according to their socio–demographic data**.**

Socio–demographic data of the studied caregivers	**Studied caregivers (n = 100)**	
	N	**%**
Relation of caregiver to the child		
Mother	84	84
Father	8	8
Grand mother	5	5
Aunt	3	3
Age		
< 20 years	3	3
20 <30 years	37	37
30 < 40 years	48	48
≥ 40 years	12	12
Mean SD 44.5 ± 7.25		
Level of caregiver's education		
Illiterate	12	12
Read and write	4	4
Basic education	15	15
Intermediate education	40	40
High education	25	25
postgraduate studies	4	4
Occupation		
Unemployed / housewife	48	48
Private business	16	16
Governmental job	36	36
Residence		
Urban	31	31
Rural	69	69
Family size		
Small family size {family have 1-4 children}	88	88
Large family size { family have >4 children }	12	12
Family marital status		
Married	83	83
Widowed	4	4
Divorced	13	13
Family income		
not enough	36	36

enough	56	56
enough and more	8	8

Table (3): Percentage distribution of the studied children according to their clinical data**.**

Clinical data for children with ADHD	**Studied children (n = 100)**	
	N	**%**
Child's age at onset of signs & symptoms of the disease		
< 3 years	36	36
3 <6 years	52	52
6 <9 years	8	8
9 ≤12 year	4	4
Mean SD 3.6 ± 1.7		
Child's age at onset of diagnosis of the disease		
< 3 years	24	24
3 <6 years	56	56
6 <9 years	12	12
9 ≤12 year	8	8
Mean SD 3.72 ± 1.4		
ADHD subtype		
Inattention type	20	20
Hyperactivity / impulsivity type	13	13
Combined type	67	67
Type of treatment the child receives		
Medication	32	32
Treatment sessions	12	12
Both	56	56
Number of treatment sessions per week (n=68)		
Once	50	73.5
Twice	11	16.2
Triple	7	10.3
(*) Early risk factors of ADHD		
health problems of mothers or receiving medication during pregnancy	22	22
Psychological problems of mothers during pregnancy	21	21
Pre-mature birth	23	23
Low birth weight	7	7
Early trauma	9	9
Head injury	20	20
Psychiatric illness in family	5	5
conflict between spouses	21	21
consanguinity between spouses	12	12
Twins	8	8
Children's punishment	10	10

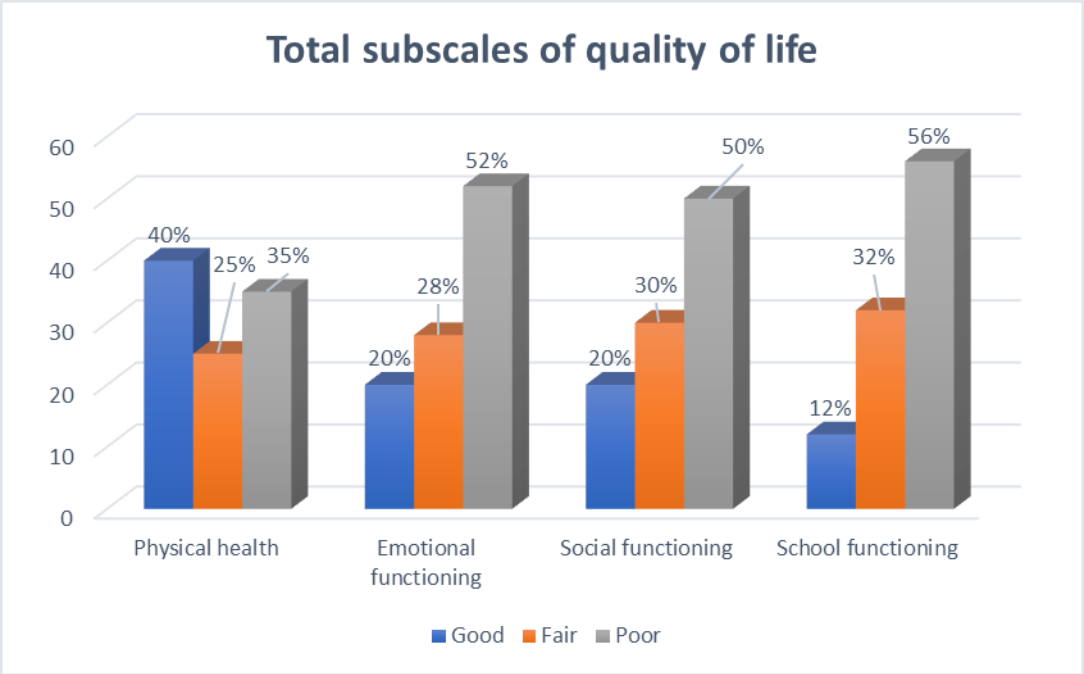

Figure (1): Distribution of the studied children according to total subscales of quality of life.

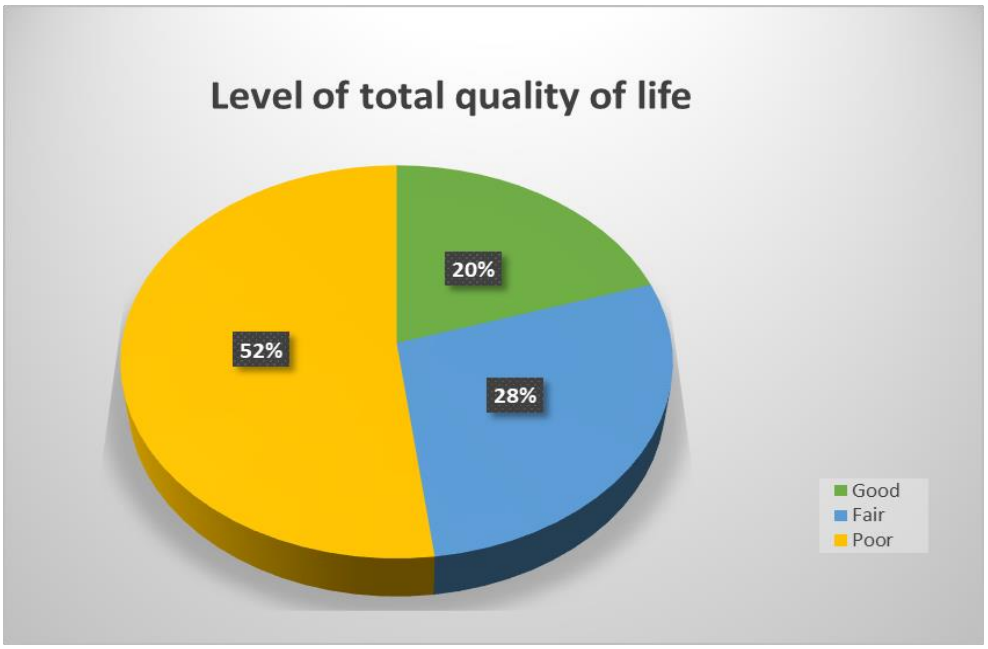

Figure (2): Distribution of the studied children according to level of total quality of life

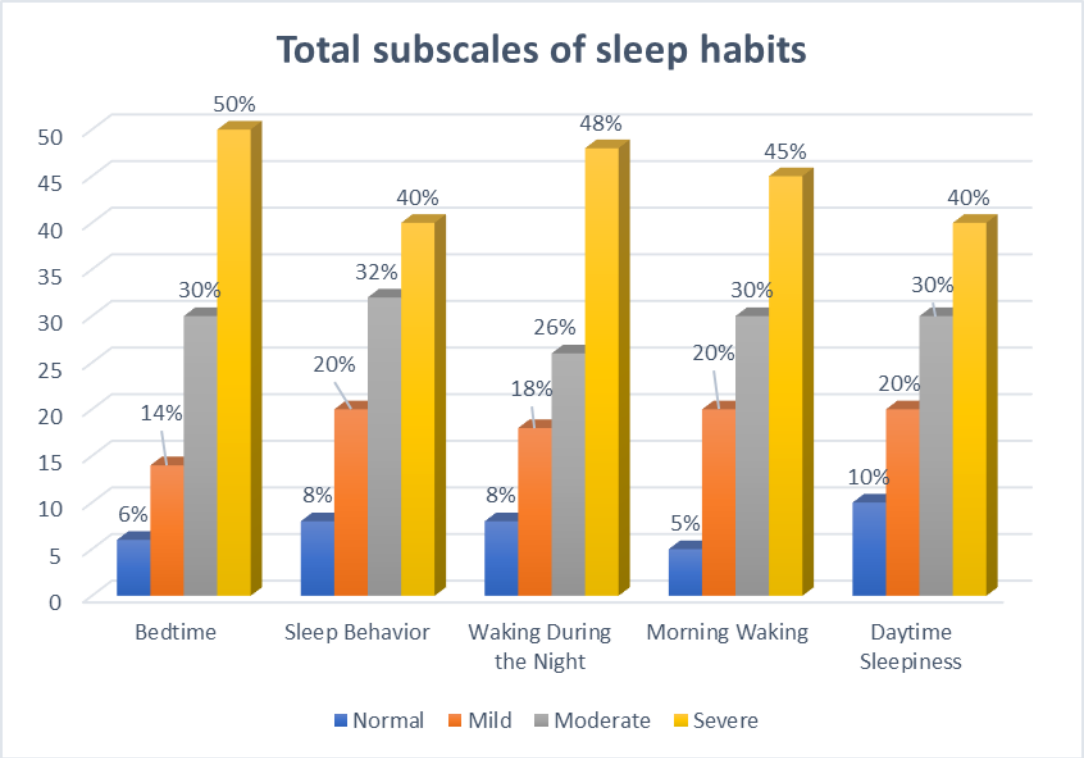

Figure (3): Distribution of the studied children according to total subscales of sleep habits

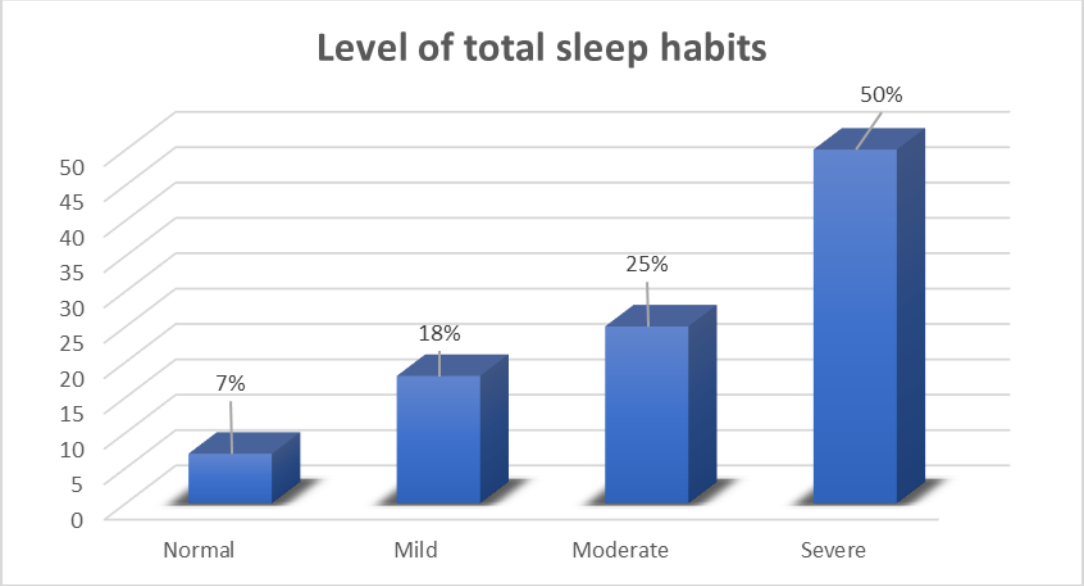

Figure (4): Distribution of the studied children according to level of total sleep habits.

Table (18): Correlation between total quality of life and total sleep habits among the studied children.

Variables	Total sleep habits	
Total quality of life	**R**	**p-value**
	.488	.000**

Discussion

The current result revealed that socio demographic data of children with ADHD, their mean age was **9.52 ± 1.39.** These results come in agreement with a study done by ***El-Sadek et al., (2021)*** who reported that children with ADHD, their mean age ± SD of 9.5±1.65 years, Also ***Kousha & Kakrodi, (2019)*** found that children with ADHD, their mean age ± SD of 9.30 ±1.3 years. On the other hand, this finding was in disagreement with a study carried out by ***Darweesh et al., (2021)*** who found that, children with ADHD, their mean age ± SD of 7.92 ± 1.66 years.

As regards to sex, the current study revealed that, ADHD affected children of both sexes, but males are diagnosed with ADHD more frequently than females with ratio1.8:1. From the view point of researcher, these differences may be attributable to hyperactive behavior being more apparent in males and hormonal changes between two sexes. These result come in line with a study done by ***Ragab et al., (2020) & Çetin et al., (2020)*** who mentioned that males affected nearly two times more female. On the other hand, this finding was in disagreement with a study carried out by ***Mulraney et al., (2019)*** who found that, males affected nearly six times more female.

Concerning to Child birth order, the current study showed that two fifth of the studied children are the last birth order and more than one third of them the first birth order. Accordingly, a study done by ***EL-Gendy et al., (2017)*** found that the prevalence of the ADHD was higher if the child was the last one in the family. On the other hand, this finding was in disagreement with a study carried out by ***El Ghaiaty et al., (2021)*** who stated that, the last child affected with only 3.3% percent.

In the opinion of the researcher; the risk of ADHD increased as birth order increase due to increased mother age, increase the risk of some medical problems during pregnancy and decreased interest in taking care of last child. Higher prevalence was reported in the first birth order children may be attributed to increased risk of complicated pregnancy in primigravida than multigravida and the lack of experience of mothers to deal with the first baby.

As regards to relation of caregiver to the child, in this study the majority of caregivers of the studied children were mothers. This may be due to Egyptian family culture that, mothers have more responsibility compared to fathers in caring for children with ADHD; have more interactions with health-care providers, teachers, and school staff. This is agreement with ***Mostafavi et al., (2020)*** stated that the majority of caregivers of the children with ADHD were mothers.

As regard to marital status of caregivers of the studied children, the majority of them are married. This is somewhat satisfactory percent referred to intact family and the affected child live with both parent, but more than tenth of the studied children their parent divorced. ADHD was more likely occur in children with poor parents' relation particularly in presence of parent conflict. These result come in line with a study done by ***Al-Habib et al., (2019); and Mulraney et al., (2019)*** who mentioned that the majority of parent of the children with ADHD are married.

Regarding to family income of the studied children, more than one third of them their families had not enough income. At the same time less than half of care givers are unemployed / housewife. In the researcher opinion, this contributes to poor quality of life for the studied children and affects receiving the health services they need. The result of this study was in the same line of a study done by ***El-Monshed et al., (2019)*** who founded that, more than one third of families had not enough monthly income. In the other side, this result is contradicted with a study done by ***Badra et al., (2019)*** who stated that more than two fifths of families with ADHD child had not satisfied income.

Concerning to age at onset of ADHD signs & symptoms of the studied children the result of this study revealed that, the mean age ± SD was 3.6 ± 1.7 years. This may be due to the caregiver of child noticed fewer and warning signs at early age when the child became more interactive with the surroundings; and development of the child different from his peers. The result of this study come in agreement with a study done by ***El-Sadek et al., (2021)*** who founded that the mean age at onset of signs & symptoms appear was 4.7±1.5 years. The result of this study contradicted with a study done by ***Al-Saad et al., (2021)*** who stated that the age of onset of symptoms was raised from 7 years to 12 years.

As regard to child's age at onset of diagnosis of the disease, the result of this study revealed that the mean age ± SD was 3.72 ± 1.4 years. This result was agreement with a study done by ***Al-Habib et al., (2019)*** who found that the mean age ± SD of disease diagnosis was 5.76 ± 2.28 years. Most cases are diagnosed when children are 3 to 7 years old, but sometimes it's diagnosed later in childhood. Early diagnosis can reduce the negative impacts of the disease, child burden on family.

In the researcher point of view, this may be due to that age of preschool and the child begin to go to the nursery school. At the time of the physician need obtain information from at least 2 places (home & school) to diagnose the disease. The mean age at onset of signs & symptoms and the mean age at onset of diagnosis of disease are close to each other. This may indicated increase awareness of ADHD among caregivers of children that once signs & symptoms appear on and affect their child, they seek for diagnosis.

Regarding to ADHD subtype, the result in this study showed that the more than two thirds of them diagnosed with combined type. This result was agreement with studies done by ***El-Sadek et al., (2021) & Mulraney et al., (2021)*** who found that the combined type constituted nearly two thirds. The result of this study is contradicted with a study done by ***Badra et al., (2019)*** who stated that the combined type constituted only more than one third.

Concerning to early risk factors of ADHD in this study, the result revealed that the common risk factors were pre-mature birth child of, mother's health problems or receiving medication during pregnancy, Psychological problems of mothers during pregnancy and head injury. In the researcher point of view, exact cause ADHD is unknown, but certain things are known to play a role. presence of more than one factor in the same child increase the risk of disease. This result was agreement with studies done by ***Badra et al., (2019)*** who found that the risk factor were pre-mature

birth, head injury, psychological problems of mothers during pregnancy and low birth weight.

The result of this study was disagreement with a study done by ***EL-Gendy et al., (2017)*** who stated that children who suffered cyanosis or had head trauma were more likely to have ADHD. This was explained by the occurrence of minor damage in the central nervous system, which can lead to the appearance of ADHD in those children. It was suggested that pregnancy problems including toxemia of pregnancy, Caesarean section and practiced artificial feeding were potential risks for ADHD

Regarding to family history with ADHD, the result of this study referred to that less than one third of children had positive family history with ADHD with more than one third of them from the first degree of kinship to the studied children. In the researcher point of view, this is the most dangerous risk factor to cause the disease because the genetic factor plays an important role in causing the disease especially if the degree of kinship was closer.

Generally according to level of quality of life, the result of this study revealed that more than half of the studied children had poor quality of life levels. While only one fifth of them had good quality of life levels. This is related to that ADHD is associated with a variety of functional impairments, such as executive functioning deficits, attentional issues, poor short-term memory which affect every aspect of daily life and produce negative consequences on their daily routine quality of life (QoL).

This result comes in the same line with a study done by ***Noureldin, (2019); and Conlon, (2020)*** who showed that all subscale scores (physical, emotional, social, and school functioning) of PedsQL are generally low. Also, emotions, social and school are of low values. Also, ***Kousha & Kakrodi, (2019)*** indicated that ADHD impact a child QOL negativity, with moderate effect in physical and severe effect in psychosocial domains, including emotional and social aspects and school performance

This result was inconsistent with a study done by ***Ragab et al., (2020)*** reported that, ADHD had Poor overall domains of QoL and the physical domain of QoL better than the psychosocial domain. This is due to children with ADHD frequently have trouble staying focused, sitting still, and controlling their emotions and behaviors which consider the intrinsic features of ADHD. These features can lead to dependency, impaired social skills, being isolated, and poor academic performance which leading to poorer psychosocial outcomes.

Regarding to total sleep habits, the result of this study revealed that half of the studied children had severe sleep habits at all subscales (bedtime, sleep behavior, waking during the night, morning waking and daytime sleepiness). Also, one quarter of them had moderate sleep habits and only 7% of them had normal sleep habits. This is due to those hyperactivity symptoms and motor problems in children with ADHD that have been found to be associated with sleep problems. For this reason, the screening of sleep disorders is crucial in these children, even more so because sleep disorders could

trigger similar symptoms or worsen ADHD clinical characteristics.

This result comes in the same line with a study done by ***Becker et al., (2018)*** who showed that There is evidence that children with ADHD experience greater problems than their peers across a range of sleep problems, including higher bedtime resistance, more sleep onset difficulties related to bedtime subscale, more night wakings, greater sleep-disordered breathing related to sleep behavior subscale, and higher daytime sleepiness.

This result was consistent with a study done by ***Knight & Dimitriou, (2019)*** reported that, Sleep duration (insufficient) related to sleep behavior subscale, Sleep anxiety (refusal to sleep independently) related to bedtime subscale and more problems were found in Night waking subscale and; ***Parreira et al., (2019)*** who found an increased presence of parasomnias in ADHD children, including nightmares and bed wetting related to sleep behavior subscale. As well as other nighttime behaviors such as increased nighttime restlessness, and over activity.

Regarding to the relationship between and socio-demographic data and level of total quality of life among the studied children, the result of this study revealed that there was a statistically significant relation between total quality of life and their age, at p-value = < 0.05. This may be related to, that level of quality of life was poor at 8 < 10 years and increase with the increase of age so, level of quality of life is significantly related with age.

This result was inconsistent with a study done by ***Dallos et al., (2017)*** who stated that QoL was significantly associated with the child's age, indicating that, QoL is worse with higher age, i.e lower QoL in their older children and; ***Galloway et al., (2019)*** who found that Neither age nor gender was significantly correlated with QoL between childrens age and their QoL.

Regarding to the relationship between and socio-demographic data and level of total sleep habits among the studied children, the result of this study revealed that there was a statistically significant relation between total sleep habits and their age, at p-value = < 0.05. All children with severe level of sleep habits their age was 8 < 10 years and no child at this age had normal sleep habits, while normal sleep habits present in 10 ≤12 years and no child at this age had severe sleep habits. This means that sleep habits improve with age and become more regular.

The result of this study was in agreement with ***Ekinci et al., (2017)*** who found that, age was negatively correlated with sleep problems. A higher frequency of sleep problems in younger ages may be related with several factors. First, parental worries and resulting co-sleeping may disrupt the sleep hygiene and sleep quality. Overprotective parental attitudes may also affect the parental limits negatively. These may all lead to a resistance to sleep in the night, sleep onset delay, and daytime sleepiness; and disagreement with ***Becker et al., (2018)*** who found that, age was not significantly correlated with any of the sleep functioning variables (all ps > .05).

There was a highly statistically significant relation between ADHD type and level of total sleep habits, at p-value = < 0.01. The majority of children had moderate

and severe sleep habits diagnosed with combined ADHD type. This is may be due to that when the symptoms duplicated and complex as in the combined type, sleep habits become severe. ADHD sleep problems may be a side effect of medications.

This result was agreement with ***Papadopoulos et al., (2018)*** who found that children with Attention Deficit Hyperactivity Disorder- Combined type experience more sleep problems than others; and ***Durmuş et al., (2017)*** who stated that there was a positive correlation between the higher scores of The ADHD group with combined-type and total scores on resistance to sleep time, respiratory problems during sleep and daytime sleepiness in the ADHD group.

Concerning to correlation between total quality of life and total sleep habits among the studied children the result of this study revealed that, there was a highly statistically significant positive correlation between total quality of life and total sleep habits among them. This is because ADHD may affect circadian rhythm, the ideal wake-cycle of sleep; and severe ADHD symptoms increases the risk of sleep problems and poor QoL .

This supported by ***Papadopoulos et al., (2018)***; and ***Craig et al., (2020)*** who revealed that, statistical significant associations were found between the overall score of CSHQ and PedsQLTM ($P \leq 0.001$); and sleep makes a specific contribution over and above the impact of ADHD on QoL and that sleep problems associated with functional impairment and poor comfort .

This result was in line with ***El-Monshed et al., (2020)*** who reported that sleep disturbances in children with ADHD have a significant association with poor QoL and poor academic performance. Children with ADHD have higher rates of sleep problems include bedtime resistance, difficulties with sleep onset and maintenance, sleepwalking, sleep anxiety, and sleep-disordered breathing. These sleep disorders are strongly associated with poorer physical and psychosocial quality of life.

Conclusion

Findings confirmed that, quality of life and sleep habits seem to be related with each other. Quality of life domains are negatively affected in children having ADHD are prone to have poor quality of life that in turn affect their sleep habits. The present study revealed that, more than half of the studied children have poor quality of life and half of the studied children have severe sleep habits. Therefore, children reported poor quality of life and problems in sleep habits. Also, it is observed that, there was a highly statistically significant positive correlation between total quality of life and total sleep habits, which means that, children who had poor quality of life are more likely to have severe sleep habits and this answered the research question about the relation between quality of life and sleep habits in children with attention deficit hyperactivity disorder**.**

Recommendations

١. Parent education and training in behavior management can improve behavior, enhance the QoL and sleep habits of their ADHD children.

٢. Behavioral classroom interventions for all children attending school. The importance of considering parent's views when implementing programs in schools.

٣. The school is a necessary part of any treatment plan. These plans can include

٤. Educational interventions; and

٥. Individual school supports, such as school environment and behavioral supports.

٦. Provision of training and information for teachers about the characteristics of ADHD and its basic behavioral management

٧. Health care providers especially nurses caring for children with ADHD must assess their sleep and QoL, and if the child experienced the problem, this must be addressed and managed.

٨. Longitudinal studies are required to characterize the sleep habits of each different subtype of ADHD.

٩. Interventional studies are required to educate parent how to deal with their child with ADHD, and how to improve QoL and sleep habits.

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