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Assessment of Health-Related Quality of Life of Children with Attention Deficit Hyperactivity Disorder Attending Sohag University Hospital

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deficit

Attention

ABSTRACT

hyperactivity

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(ADHD)

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2024-04-21 Background: neurodevelopmental disorder that affects 5-7% of children and significantly impairs **Revision Date:** 2024-11-04 Acceptance Date:

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ADHD, Sohag, Health related Quality of life

their quality of life (QoL). **Objective**: To compare child self-reports and parent-proxy reports of Qol in children with ADHD. Methods: A total 66 children with ADHD, aged 8-12 years, were compared with 132 control children without ADHD, after matching both groups on age and gender. PedsQL[™] 4.0 (Pediatric QoL Inventory[™]) Generic Core Scales (physical, psychological, social, and school functioning) were completed by one parent and children self-reporting their health-related quality of life (HRQoL). Results: The mean age of children was 9.6±1.8 years for cases and 9.7±1.2 years for control. The majority (75.8%) of children were males. The results showed that children with ADHD reported lower total score of PedsQL[™] in comparison to normal children (75.8±10.4 versus 87.2±6.6, p< 0.001). Statistically significant differences were observed in psychological health domain and school functioning domain (p< 0.001 for each). The physical functioning and social health did not differ significantly between groups (p= 0.45 and p=0.64, respectively). Parents of children with ADHD also reported lower PedsQL[™] scores, with statistically significant differences in all dimensions (p<0.001) except for physical health domain (p=0.20). The parents of children with ADHD reported significantly higher physical but lower psychological health domains (p<0.001) compared to the children's self-reported mean score. Conclusions: Children with ADHD had lower HRQoL scores compared to their healthy counterparts. The findings underscore the importance of measures to improve HRQoL among these children.

INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is one of the most prevalent childhood neuropsychiatric disorders.¹ It affects approximately 5–7% of children when diagnosed in accordance with DSM-5 criteria, and only about 1-2% when diagnosed according to ICD-10 criteria. Prevalence estimates reported in ADHD studies vary widely, primarily depending on the method used for diagnosis.² In the Arab region, the prevalence of ADHD ranged from 1.3% in Yemen, 3.2% in Saudia Arabia, 8.8% in Oman, 12% in Egypt to 22.2% in Iran.3

Although ADHD has been known as a childhood disorder, up to 90% of children having ADHD may continue to experience manifestations into adulthood. In addition to exhibiting signs of inattention, hyperactivity, and impulsivity, ADHD patients

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frequently exhibit deficits in a variety of areas, including motor skills, social relationships, family functioning, school conduct and scholastic achievement which can be significantly improved with pharmacological and non-pharmacological treatment. This suggests a significant decline in many quality of life (QoL) metrics, primarily as a result of psychological health, which has a direct impact on their respondents' wellbeing.¹

The World Health Organization (WHO) defines quality of life (QoL) as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns". We will be able to identify significant shifts in the epidemiology of pediatric illnesses if we can gather information about QoL in kids with a range of medical conditions.⁴

Although there are few studies that have examined how ADHD affects children's quality of life, it considerably lowers it.⁵ The amount of parent-child consensus in child QoL ratings for a group of kids with ADHD is also not well-documented in the study literature.⁶ Understanding how mental illnesses, particularly ADHD, affect quality of life allows us to notice various levels of disability. Evidence that indicates mental health issues frequently have a detrimental effect on QoL supports this viewpoint.⁷

Knowing which aspects of quality of life (QoL) are impacted by a child's mental illness can help with identification, allow for the establishment of therapy objectives that are suitable for the child, enhance scholastic and interpersonal results for children with ADHD, and support development. So that more suitable intervention tools can be created to assess and enhance the wellbeing of these children; research is required to validate the QoL of children with ADHD.^{8,9} Health related quality of life (HRQoL) is envisioned as a multidimensional structure made up of various categories in the widest sense. Physical, psychological, social, academic performance, and limited goalpursuit. This meaning of health adheres to the WHO's view that it should include all aspects of physical, mental, and societal well-being and not just be the lack of disease or illness.10

The aim of the current study was to compare child selfreports and parent-proxy reports of Qol in children with ADHD to those without ADHD and to determine factors affecting HRQoL scores.

METHODS

A hospital-based case-control study was conducted in the pediatric outpatient clinic in Sohag university hospital during the period from 1st June 2021 till 30th May 2022.

A consecutive sample of all diagnosed ADHD children 8-12 years attending the outpatient clinics during the study period were included in the study. Matched controls from general outpatient clinics were recruited as two controls for each case. The cases group included 66 ADHD cases, and the control group included 132 matched controls for age and sex. Written consents were obtained from the parents of all participants, and the study was approved by the Ethics Committee of Sohag University faculty of medicine.

Data collection tools: Data was collected by means of a questionnaire consisting of two parts. The first part was the medical chart review which included the following: (1) Sociodemographic data of the children: age, gender, residence, educational level for cases and controls.2 Family history of children: father's educational level and job, mother's educational level and if sharing in labor force or not and monthly income of the family.3 Data specified to cases only related to the disease: type of treatment, duration of disease diagnosis, ADHD and IQ scores. The second part was the Pediatric QoL inventory[™] (PedsQL[™] 4.0) generic core scales.11 Arabic translation of The Pediatric Quality of Life Inventory (Peds OOL, Mapi Research Institute, Lyon, France) obtained from mapitrust.org after their approval. Its validity was tested by Arabiat et al .¹² PedsQL[™] 4.0 is a 23-item instrument that systematically assesses HRQoL through child selfreports and parent proxy report scales. The generic core scales were chosen for this study due to their translation, adaptation, and validation. They consist of 23 items applicable to a healthy school and community populations, as well as pediatric populations with acute and chronic health conditions. The 23-item PedsQL[™] 4.0 generic core scales encompass: (1) physical functioning (eight items); (2) psychological functioning (five items); (3) social functioning (five items); and (4) school functioning (five items). The instrument takes approximately 10 to 15 minutes to complete. The instructions ask how much of a problem each item has been during the past month.

1:

Table

clinical

and

characteristics of the studied cases and controls						
	Cases	Controls				
Variable	N = 66	N = 132				
	no (%)	no (%)				
Age: (mean ± SD)	9.6 ± 1.8	9.7 ± 1.2				
Gender:						
Female	16 (24.2)	32 (24.2)				
Male	50 (75.8)	100 (75.8)				
Residence:						
Rural	16 (24.2)	99 (75)				
Urban	50 (75.8)	33 (25)				
Order:						
1 st	24 (36.4)	30 (22.7)				
2^{nd} - 3^{rd}	29 (43.9)	82 (62.1)				
$\geq 4^{\text{th}}$	13 (19.7)	20 (15.2)				
Siblings:						
0-2	15 (22.7)	70 (53)				
≥3	51 (77.3)	62 (47)				
IQ score: (mean \pm SD)	102.7 ± 4.9	-				
ADHD score: (mean ± SD)	65.9 ± 4.6	-				
Duration of diagnosis:						
< 4 years	26 (39.4)	-				
\geq 4 years	40 (60.6)					
Type of treatment:						
Pharmacological only	54 (81.8)					
Pharmacological and	12 (18.2)	-				
Psychotherapy						

sociodemographic

A 5-point response scale is utilized across the child and for the parent proxy report (o = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; and 4 = almost always a problem). Items are reverse scored and linearly transformed into a o-100 scale (o = 100, 1 = 75, 2 = 50, 3 = 25, and 4 = 0) so that higher scores indicate better HRQoL. If the child didn't respond and didn't understand, how did he answer the questions; We explained to the child to answer by pointing to pictorial facial expressions (Pictures have been attached later in the illustrative guide to using the questionnaire). The medical chart and the PedsQLTM child self-report and parent proxy report were answered through interviews.

Statistical analysis:_Data was subjected to analysis and tabulation using SPSS version 25. Descriptive statistics of sociodemographic and clinical data of ADHD children group, the control group and their parents were conducted as number, frequency and mean \pm SD. Mann Whitney test was used to compare two or more independent samples in non-parametric data. Wilcoxon rank test was used to compare children self-report mean score and parent proxy report mean score in different domains of HRQoL. Univariate linear regression was performed to detect association of independent variables and HRQoL scores (data wasn't mentioned here). Independent factors with P-value \leq 0.2 in the univariate model were introduced in the multivariate model. Significance was considered at Pvalue \leq 0.05.

RESULTS

The number of the studied children with ADHD was 66 children who were controlled with 132 healthy ones in age (8-12 years, mean age of cases 9.6 ± 1.8 and for controls 9.7 ± 1.2), and gender (75.8% of children were males in both groups). Among the studied ADHD children 75.8% were living in urban areas compared to 25% of the cases. The mean ADHD score was 65.9 \pm 4.6 among cases with an average IQ of 102.7 \pm 4.9. More than 60% of the studied ADHD children were diagnosed for 4 years duration or longer. Regarding the treatment received, most of them (81.8%) received pharmacological treatment only (Table 1).

Table (2) shows the sociodemographic characteristics of parents of the studied cases and controls. The mean age of ADHD children's fathers and mothers was 46.7 \pm 7.3 and 40.7 \pm 6.1 compared to 46.9 \pm 7.6 and 39.6 \pm 6.1 for mean age of fathers and mothers of healthy controls respectively. Most of fathers of both groups were working (97% for cases and 87.1 for controls). More than thirty percent of mothers of ADHD children were sharing in labor force compared to 16.7% of control children's mothers. Regarding consanguinity, it was found that 48.5% of cases had positive consanguinity history between their parents compared to 57.6% of controls.

Regarding the children's self-reports of their HRQoL (Table 3), the group with ADHD had lower scores than the control group in all the assessed dimensions. Statistically significant differences were observed in psychosocial health domain, school functioning domain, and total score (P-value <0.001).

According to the analysis of the reports of parents (Table 4), parents of ADHD children reported lower HRQoL scores in all dimensions than parents of control groups with high significant differences (P-value <0.001) except for physical domain which showed non-significant difference.

-	Cases	Controls
Variable	N = 66	N = 132
	no (%)	no (%)
Father age: (mean \pm SD)	46.7 ± 7.3	46.9 ± 7.6
Mother age: (mean ± SD)	40.7 ± 6.1	39.6 ± 6.1
Father education level:		
Illiterate/primary	8 (12.1)	65 (49.2)
Secondary	33 (50)	59 944.7)
Higher	25 (37.9)	8 (6.1)
Mother education level:		
Illiterate/primary	23 (34.8)	86 (65.2)
Secondary	25 (37.9)	37 (28)
Higher	18 (27.3)	9 (6.8)
Father work:		
Work for cash	64 (97)	115 (87.1)
Don't work	2 (3)	17 (12.9)
Mother work:		
Sharing in labor force	21 (31.8)	22 (16.7)
Not sharing	45 (68.2)	110 (83.3)
Consanguinity:		
Yes	32 (48.5)	76 (57.6)
No	34 (51.5)	56 (42.4)
Monthly income:		
≤ 2000 L.E	14 (21.2)	103 (78)
> 2000 L.E	52 (78.8)	29 (22)

Table	2:	sociodemographic	characteristics	of
parents	s of	the studied cases an	d controls	

The parents reported significantly higher physical but lower psychological health domains of children with ADHD (p<0.001) compared to the children's selfreported mean score. (P-value <0.001, Table 5).

A multivariable regression analysis was conducted to predict factors affecting child self-reported HRQoL scores of children with ADHD (Table 6). It was found that ADHD score was a significant negative predictor of almost all HRQoL domains and total score (pvalue<0.001), except for the physiological health domain where the effect was not significant. Regarding school functioning domain, it was found that older age of mothers had a significant negative effect on school functioning score B=-1.3, 95% CI=-2.6:0.001 and P-value= 0.05. Living in rural places was found to be have a positive effect on the total HRQoL scores compared to living in urban areas B=6.0, 95% CI=0.9:11.1 and P-value= 0.02. This study assessed the QoL of children with ADHD according to the children's self-reports and the perceptions of their parents, compared with normal children. We also analyzed the relationship agreement between the results of the children's self-reports and parental reports to determine the awareness of the parents on the impact of the disorder on QoL of their children. Our study revealed that the female/ male ratio was nearly 1:3 in the ADHD study group. This goes in line with Lola et al., who revealed that males have about double the risk of developing ADHD than females.¹² This study showed that most of the children were living in urban areas, which goes in run with Kabir et al., who also reported significant increased prevalence of ADHD in urban areas compared to rural areas and explained this by cultural discrepancies between cities and rural areas and the role of environmental factors.13

The mean age of ADHD children's fathers was 46.7 ± 7.3 and the mean age of their mothers was 40.7 ± 6.1 . More than thirty percent of mothers of ADHD children were sharing in labor force. In a comparable study conducted in Netherlands, the mean age of mothers of ADHD children was 38.6 ± 4.6 and 77% of them were having a paid work.¹⁴

The study between our hands showed that children with ADHD reported lower HRQoL scores in all domains compared to their counterparts. In agreement with Lee et al. who conducted a study on 63 ADHD children and their families to investigate the impact of clinical and psychological factors on the quality of life of children and adolescents and reported that children attention problems showed a significant negative correlation with their quality of life.15 Furthermore, these results go in run with the casecontrol study of Keshavarzi et al., which was conducted in Iran and revealed statistically significant increased cognitive impairment, impulsivity, anxiety, social problems, and psychosomatic complains among ADHD cases with p-value = < 0.001.¹⁶ The same was reported in study which was conducted in Ankara University Department of Child and Adolescent Psychiatry on 76 ADHD patients in addition to 59 control group to evaluate the quality of life of children with ADHD and revealed statistically significant impaired psychological subscale score, and general perception of health.9

Domains of Ool	(Cases	Co	ontrols	Dypluo
	Mean ±SD	Median (IQR)	Mean ±SD	Median (IQR)	P-value
Physical health	82.7±12.4	84.4 (75.0-91.4)	84.4±9.0	84.4 (78.1-90.6)	0.45
Psychological health	70.2±19.1	70.0 (55.0-86.3)	92.2±10.0	95.0 (85.0-100)	<0.001*
Social health	86.0±13.3	90.0 (75.0-100.0)	87.3±12.0	90.0 (80.0-100.0)	0.64
School functioning	64.3±18.8	50.0 (50.0-75.0)	85.1±8.7	85.0 (80.0-90.0)	<0.001*
Total health score	75.8±10.4	75.0 (67.5-83.8)	87.2±6.6	87.8 (82.0-91.9)	<0.001*

Table (3) Children self-reported mean scores for different domains of HRQoL for both the cases and the control groups

Mann-Whitney test. * *Significance at P-value* \leq 0.05.

Table (4) Parent's	proxy-reports	mean score	es for	different	domains	of HRQoL	for both	cases and	d control
groups.									

Domains of Ool		Cases	C	Drughua		
Domains of QoL	Mean ±SD Median (IQR)		Mean ±SD	Median (IQR)	r-value	
Parent-reported physical health	87.1±9.9	87.5 (77.3-100.0)	89.0±9.1	90.6 (84.4-96.9)	0.2	
Parent-reported psychological health	60.8±19.3	62.5 (45.0-75.0)	85.0±8.7	85.0 (80.0-90.0)	<0.001*	
Parent-reported social health	81.7±19.6	90.0 (70.0-100.0)	92.2±10.0	95.0 (85.0-100.0)	<0.001*	
Parent-reported school functioning	46.6±17.5	45.0 (35.0-60.0)	89.9±9.7	95.0 (85.0-95.0)	<0.001*	
Parent-reported total health score	69.0±11.0	68.8 (62.5-77.7)	89.0±7.1	90.5 (84.8-94.3)	<0.001*	

Mann-Whitney test. * *Significance at P-value* \leq 0.05.

Table (5	5) Comparison	between the	parent-reported	and the	child	self-reported	mean	scores	for	different
domains	s of QoL and to	tal health gen	eric score of child	lren with	ADH	D.				

	Child	self-report	Pa	_	
Domains of QoL	Mean ±SD	Median (IQR)	Mean ±SD	Median (IQR)	P-value
Physical health domain	82.7±12.4	84.4 (75.0-91.4)	87.1±9.9	87.5 (77.3-100.0)	<0.001*
Psychological health domain	70.2±19.1	70.0 (55.0-86.3)	60.8±19.3	62.5 (45.0-75.0)	<0.001*
Social health domain	86.0±13.3	90.0 (75.0-100.0)	81.7±19.6	90.0 (70.0-100.0)	0.12
School functioning domain	64.3±18.8	50.0 (50.0-75.0)	46.6±17.5	45.0 (35.0-60.0)	0.43
Total health score	75.8±10.4	75.0 (67.5-83.8)	69.0±11.0	68.8 (62.5-77.7)	0.64

Wilcoxon-signed rank test. * *Significance at P-value* \leq 0.05.

The current study revealed that the parents reported lower mean score for all domains of HRQoL and total generic score of their children with ADHD compared to the children's self-reported mean scores. In line with other studies, children with ADHD were found to tend to overestimate their psychological, social and academic abilities, when compared to the perception of parents and teachers, what may be a self-protective mechanism due to negative feedback that they receive from adults living with them which may suggest some degrees of miscommunication between family or a lack of autonomy of the child, leading to the parents overestimating their child's QoL Another explaining factor for this is the delayed cortical maturation occurring in ADHD children.¹⁷ In a review, 36 QoL studies conducted between the years 1998 and 2008

Domain	Independent variable	B (95% CI)	P- value
	ADHD score	-1.8 (-2.3, -1.3)	<0.0001*
Physical health domain	Father work: Work for cash	27.5 (15.1, 39.8)	<0.001*
	Father age	-0.03 (-0.3, 0.3)	0.87
	ADHD score	-0.8 (-1.8, 0.3)	0.16
	Mother education:		
Physiological health domain	Illiterate/primary	-2.6 (-15.0, 9.8)	0.68
	Secondary	7.8 (-4.1, 19.8)	0.2
	Higher (ref.)		
Casial health domain	Gender: Male	-2.0 (-8.8, 4.7)	0.55
Social health domain	ADHD score:	-1.5 (-2.1, -0.8)	<0.001*
	Siblings: 0-2	10.9 (-0.9, 22.7)	0.07
	Duration of diagnosis: <4	6.1 (-2.8, 15.1)	0.18
School health domain	ADHD score:	-1.1 (-2.2, -0.1)	0.03*
	Father age:	1.1 (-0.1, 2.2)	0.07
	Mother age	-1.3 (-2.6, 0.001)	0.050*
Total health score	Residence: rural	6.0 (0.9, 11.1)	0.02*
	Order:		
	1 st	2.1 (-4.3, 8.4)	0.52
	2^{nd} - 3^{rd}	0.9 (-4.9, 6.9)	0.74
	$\geq 4^{\text{th}}$ (ref.)		
	Number of siblings: 0-2	1.7 (-3.9, 7.3)	0.61
	Duration of diagnosis: <4	3.2 (-1.2, 7.6)	0.15
	ADHD score:	-1.2 (-1.7, -0.7)	<0.001*

Table (6) multivariate regression model of factors affecting the child self-reported HRQoL scores of children with ADHD.

were evaluated, concluding that parents evaluated their children's QoL parameters lower than their children rated themselves, all mean scores of PedsQoL parent forms were significantly lower than scores of PedsQoL-children forms, and both were found to be significantly lower in ADHD group compared to control group.¹⁸

The current study revealed that ADHD severity assessed by ADHD score was the most significant predictor of nearly all HRQoL domains. The perceived scores of the physical domain were also found to be negatively associated with ADHD children's father age. Also, higher mother age was found to be associated with lower scores of school domain. In agreement with our results, results of another study comparing QOL among ADHD, diabetic and control children in Scotland revealed a significant negative correlation between ADHD severity and all domains of HRQoL either parent rated, or child rated.⁶ In contrary to this, Maria Riccardi in her study of predictors affecting ADHD HRQoL found no significant relation of degree of child's impairment and HRQoL of ADHD children.¹⁹

CONCLUSIONS

The current study showed that children with ADHD had lower HRQoL scores compared to their healthy counterparts according to the child perception or their parents as well. ADHD severity was found to be a strong predictor of HRQoL scores in nearly all domains. The parents of children with ADHD reported significantly higher physical but lower psychological health domains compared to their children. The findings underscore the importance of measures to improve HRQoL among these children. The measures may include creating special support groups, reducing family suffering, and specific scholar aids techniques.

Ethical Consideration

Ethical consideration was observed in each step of the study conducted. The study was approved by the Ethical Committee of Sohag faculty of Medicine. Research was derived from a doctoral dissertation. Verbal consent was sufficient to be taken from the participants after explanation of the purpose and benefits of research because the study sample included only interviewing questionnaire.

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Authors contributions: Fatma Ali Mahmoud participated in implementation of the practical part, revising results, participating in writing the research, revising it and preparing it for publishing. Fouad M. A. Yousef shared in supposing the research topic, implementation of the practical part, supervising on, revising the research and preparing it for publishing. Nesreen A. Mohammed shared in supervising on and revising the research results. Participating in writing the research, revising it and preparing it for publishing. All authors read and approved the final manuscript.

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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