

## A comparative study of Quality of Life and factors affecting it in children diagnosed with Attention – deficit/ hyperactivity disorder versus Bronchial asthma

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### ABSTRACT

**Background and Objectives:** Attention deficit hyperactivity disorder (ADHD) is a common childhood disorder which impairs multiple domains of life. The aim is to study and compare the impact of ADHD and Asthma on Quality of Life (QoL) as measured by child and parent ratings and explore the relationship between QoL and socio – demographic factors, illness variables, severity of symptoms and parenting styles.

**Methods:** Study conducted was of cross sectional design at the outpatient services of a tertiary care hospital. 60 children of 8 - 18 years, on treatment (and their parent) were recruited - 30 with ADHD and 30 with Asthma. PedsQL version 4.0 child and parent proxy report was used for QoL, ADHD – RS (ADHD Rating Scale) and GINA (Global Initiative for Asthma) guidelines for severity and Parenting Practices Questionnaire for parenting styles

**Results:** Parent and child ratings of QoL in both groups were similar. QoL of Asthma group was worse in Physical domain, while psychosocial domains and overall QoL were worse in ADHD group. Increased duration and severity of illness showed reduction in QoL, while treatment showed better QoL in ADHD group only. Parenting style had significant impact on QoL in the ADHD group alone.

**Conclusion:** ADHD is a childhood disorder with disability comparable to a physical illness like Asthma. QoL of the child can be significantly improved by treatment and focus on parenting styles.

**Keywords:** QoL, ADHD, Asthma, Parenting styles.

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### INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterised by developmentally inappropriate inattention, hyperactivity, and impulsivity. ADHD is the most prevalent childhood disorder affecting approximately 3 - 7% of school-aged children [1]. Lack of awareness of symptoms of ADHD and the importance of its diagnosis and treatment exists among many, including parents, teachers and healthcare providers [2-3]. Due to this, rather than being provided access to the much needed help and treatment that they require, such children are most often just labelled as “naughty” or “unruly” and punished whereas those with more obvious physical ailments like epilepsy or asthma with visible absenteeism, are more likely to come under the medical radar and seek treatment.

Studies have shown that ADHD leads to impairment in academic, social, emotional domains [4-5] and also essential biological functions like sleep [6]. Looking at Quality of Life (QoL), which is a crucial and holistic health parameter and an important outcome measure [7-8] when compared to individuals without the

disorder, those with ADHD have an impaired QoL [7, 9-10]. Studies in recent years have brought to light that QoL impairments in patients with ADHD are in fact comparable to other chronic illnesses, like cancer, cerebral palsy [11], diabetes [12] or asthma. [13]. QoL being a multifactorial parameter, various factors like sampling's age group, using different types of QoL scales, choosing proxy or self-report scales (whether filled out by parents or children), and different cultural contexts could affect studies' findings of ADHD and QoL [14]. In our literature review, the main limitation we came across is that most studies so far have used only parent/carer ratings and thus provide a limited understanding of the child's views. Furthermore, we could find no studies in the Indian context. Thus, we decided to study the impact of ADHD on QoL as compared to a physical illness and also look beyond the symptoms of illness into other factors that may influence QoL [15]. This includes parenting style - an important variable in the psychosocial development of a child. Studies show that intolerant or punitive families maintain or exacerbate ADHD symptomatology in vulnerable youngsters [16]. To throw some light on above issues, we conducted a cross sectional study comparing the impact of a chronic psychiatric condition, ADHD and a chronic physical illness, Bronchial Asthma on QoL, as measured by child and parent /carer ratings. We also looked into the relationship between QoL and socio – demographic factors (age, gender, family type, socioeconomic status, parental education), illness variables (duration of illness, duration of treatment, subtype), severity of symptoms and parenting styles among children with ADHD and Asthma.

## METHODOLOGY

Following approval by the Institutional Ethics Committee, 60 children of age group 8 – 18 years, on treatment from the outpatient services of a tertiary care hospital in Mumbai, Maharashtra, were recruited as a convenience sample. 30 were children with recently established diagnosis of ADHD (as per DSM IV TR criteria for ADHD and treatment of less than 3 months) – from the Child Psychiatry services and 30 were children with established diagnosis of Bronchial Asthma (as per GINA guidelines) – from the Pediatric services. Only those cases where parent/ carer and child were willing to give consent / assent were included. Children with low intelligence (ascertained clinically on interview), with other psychiatric/ medical co morbidities and with an acute exacerbation of asthma at time of interview were excluded from the study. Parent/ carer and child completed the standardized questionnaires independently –

1. Details of demographic data and illness variables were collected.
2. **Pediatric Quality of Life Scale (PedsQL):** generic core scale, both child self – report (age appropriate version for children, i.e. 8 – 12 years and teens, i.e. 13 – 18 years) and parallel parent proxy – report was used for QoL. It is a 23 item 5 – point Likert scale with good reliability (0.88 for child self – report and 0.90 for parent proxy report) and validity, and comprising of 4 domains: Physical (About health and activities; “It is hard for me to run”), Emotional (About feelings; “I feel sad or blue”), Social Functioning (About getting along with others; “Other kids tease me”) and School functioning (About school; “It is hard to pay attention in class”) and a total score. A higher PedsQL score indicates a better QoL [17].
3. **ADHD Severity Rating Scale:** Data on symptom severity for the ADHD group was collected using the ADHD Rating Scale – IV (ADHD – RS – IV), completed by the clinician following interview with the parent / carer (Cronbach alpha is 0.795 for the total score, 0.724 for the Inattention subscale and 0.825 for the Hyperactive / Impulsive subscale; Item to total correlation ranges from 0.25 to 0.51) [18] and for the Asthma group using GINA guidelines [19].
4. **Parenting Practices Questionnaire:** was used to measure characteristics of authoritative, authoritarian and permissive parenting styles [20].

## STATISTICAL ANALYSIS

Data obtained was statistically analyzed using SPSS version 20.0. Independent t test was used to compare QoL between the two groups and factors affecting QoL (socio demographic factors, illness variables, severity, parenting styles) were analyzed using correlation coefficients, ANOVA and Simple linear regression. p value of <0.05 was considered statistically significant.

## RESULTS

Socio demographic profile of both groups was found to be similar with mean age being 11 years, 67% of children being male, 63% of families were nuclear families, 45% of parents were educated up to X Std. and 50% families belonged to Class II Socio – economic class of Modified B.G. Prasad's classification. In the ADHD group, mean duration of illness was 4.66 years and mean duration of treatment received was 1.85 months, while it was 1.58 years and 11.13 months in the Asthma group respectively. In the ADHD group (n=30), 5 were of inattentive subtype, 5 of hyperactive / impulsive subtype and 20 of mixed subtype. In the Asthma group (n=30), 6 were of Mild intermittent subtype, 15 of Mild persistent subtype, 9 of Moderate persistent subtype and none of Severe persistent subtype. The symptom severity on the ADHD – RS scale showed mean scores as follows: Inattention subscale = 17.97, Impulsivity / Hyperactivity subscale = 18.17 and Total = 36.13.

**Comparison of child and parent ratings of QoL:** showed lower scores in the parent report of both the groups, but this difference was not statistically significant. In both the groups, the lowest mean scores were in the domain of school functioning.

**Table 1: Comparison of QoL scores (parent report) of ADHD and Asthma groups**

QoL Domains		Mean	S.D.	t – test	
				t	Sig.(2-tailed)
Physical	ADHD	98.97	1.49	12.190	.000 **
	Asthma	71.78	12.12		
Emotional	ADHD	80.00	8.51	6.021	.000 **
	Asthma	93.33	8.64		
Social	ADHD	74.00	14.29	5.713	.000 **
	Asthma	91.17	8.17		
School functioning	ADHD	68.33	11.55	1.086	.282
	Asthma	71.83	13.36		
Psychosocial health summary	ADHD	74.11	7.98	4.972	.000 **
	Asthma	85.44	9.60		
Total	ADHD	80.33	6.04	0.804	.425
	Asthma	82.03	9.90		

\*\* - Correlation is significant at 0.01 level (2 – tailed)

**Table 2: Comparison of QoL scores (child report) in the ADHD and Asthma groups**

QoL Domains		Mean	S.D.	t – test	
				t	Sig.(2-tailed)
Physical	ADHD	99.17	1.39	11.199	.000 **
	Asthma	73.97	12.25		
Emotional	ADHD	82.50	8.69	5.723	.000 **
	Asthma	95.17	8.46		
Social	ADHD	76.33	14.50	5.496	.000 **
	Asthma	92.67	7.40		
School functioning	ADHD	70.17	12.07	0.982	.330
	Asthma	73.50	14.15		
Psychosocial health summary	ADHD	76.33	8.75	4.545	.000 **
	Asthma	87.11	9.60		
Total	ADHD	82.04	6.67	0.816	.418
	Asthma	83.83	9.94		

\*\* - Correlation is significant at 0.01 level (2 – tailed)

**Between group comparisons:** (a). QoL: (Table 1 & 2) Significant difference found in the Physical domain ( $p = 0.000$ ), with lower scores in the Asthma group and in the Emotional, Social and Psychosocial domains ( $p = 0.000$ ), with lower scores in the ADHD group in both parent and child ratings. (b). Parenting styles: Showed no significant correlations.

**Correlations with QoL:** As it has been established that there is no significant difference between the parent and child ratings of QoL, for the correlations only the child report of QoL has been used.

(a). Socio – demographic factors (age, gender, family type, socioeconomic status, parental education): No significant correlations were found in both groups.

(b). Illness duration (years): (Table 3) In both groups, illness duration was significantly negatively correlated with the QoL domains (Emotional, School functioning, Psychosocial Health Summary and Total QoL), i.e., increased symptom severity was associated with poorer QoL in the above mentioned domains ( $p < 0.05$  in ADHD group,  $p = 0.01$  in Asthma group). No significant correlation was observed with the Physical domain of QoL.

**Table 3: Correlation of illness and treatment duration of both groups with QoL domains**

	Subject group		QoL domains					
			Physical	Emotional	Social	School functioning	Psychosocial health summary	Total
Duration of illness (years)	ADHD	r	.028	-.480	-.264	-.410	-.526	-.520
		p	.882	.007**	.158	.025*	.003**	.003**
	Asthma	r	-.272	-.496	-.458	-.469	-.496	-.444
		p	.146	.005**	.011*	.009**	.005***	.014*
Duration of treatment (months)	ADHD	r	-.098	-.014	.701	.306	.561	.551
		p	.606	.942	.000**	.101	.001**	.002**
	Asthma	r	-.121	-.204	-.274	-.253	-.257	-.224
		p	.524	.279	.143	.177	.171	.235

r = Pearson’s correlation, p = Significance (2-tailed)

\* - Correlation is significant at 0.05 level (2-tailed); \*\* - Correlation is significant at 0.01 level (2-tailed)

**(c) Duration of treatment (months):** (Table 3) In the ADHD group duration of treatment was significantly positively correlated with the QoL domains (Social, Psychosocial Health Summary and Total QoL), ( $p < 0.01$ ) i.e., increased treatment duration was associated with improvement in QoL in the above-mentioned domains. No significant correlation was found in the Asthma group.

**(d) Subtypes:** An analysis of variance showed that the subtypes have a significant effect on QoL. In the ADHD group (Table 4), this was seen in the Social ( $F = 4.649$ ;  $p = 0.018$ ) and School functioning ( $F = 4.135$ ;  $p = 0.027$ ) domains with post hoc analysis (Scheffe) showing Inattentive subtype to have significantly higher QoL than the other two subtypes. In the Asthma group (Table 5), there was significant differences in all the domains of QoL ( $p = 0.000$ ) with post hoc analysis showing highest QoL in Intermittent subtype, followed by Mild persistent and least QoL in Moderate persistent subtype.

**(e) Symptom severity:** In ADHD group (Table 6), it was significantly negatively correlated with the QoL domains (Emotional, Social, School functioning, Psychosocial Health Summary and Total QoL), i.e., increased symptom severity was associated with reduction in the above mentioned domains of QoL of the child but no significant correlation was found with the Physical domain. Table 6 further shows that the severity of ADHD significantly predicts the QoL ( $F = 55.66$ ,  $p = 0.00$ , R Square = 0.66), i.e. for every one unit increase in ADHD severity there will be a .816 unit decrease in QoL (Beta = -0.816,  $t = 7.46$ ,  $p = 0.000$ ). In the Asthma group, as seen in Table 5, higher severity has lower QoL.

**Table 4: Association of subtypes of ADHD with QoL and its domains**

QoL Domains		Subtypes of ADHD			F	Sig.	
		Hyperactive/ Impulsive (n=5)	Inattentive (n=5)	Mixed (n=20)			
Physical	Mean	98.14	100	99.23	2.50	.101	Hyperactive = inattentive = Mixed
	S.D.	1.70	0	1.38			
Emotional	Mean	84	79	83	.49	.614	Hyperactive = inattentive = Mixed
	S.D.	8.22	4.18	9.65			
Social	Mean	82	90	71.5	4.64	.018*	Hyperactive, Mixed < Inattentive
	S.D.	17.18	5	13.09			
School functioning	Mean	67	83	67.75	4.13	.027*	Hyperactive, Mixed < Inattentive
	S.D.	4.47	9.08	12.19			
Psycho -social health summary	Mean	77.67	84	74.08	3.00	.066	Hyperactive = inattentive = Mixed
	S.D.	9.17	3.46	8.68			
Total	Mean	82.79	88	80.37	3.02	.065	Hyperactive = inattentive = Mixed
	S.D.	7.02	2.59	6.60			

\* - Correlation is significant at 0.05 level (2-tailed), \*\* - Correlation is significant at .01 level (2-tailed)

**Table 5: Association of the subtypes of Asthma with QoL and its domains**

QoL Domains		Subtypes of Asthma			F	Sig.	
		Mild Intermittent (n=6)	Mild Persistent (n=15)	Moderate Persistent (n=9)			
Physical	Mean	90.60	75.03	61.12	35.96	.000*	Mod < Mild < Intermittent
	S.D.	0	9.12	1.63			
Emotional	Mean	100	100	83.89	50.30	.000*	Mod < Mild, Intermittent
	S.D.	0	0	7.41			
Social	Mean	100	95.67	82.78	72.56	.000*	Mod < Mild < Intermittent
	S.D.	0	3.72	2.64			
School functioning	Mean	93.33	76.33	55.56	169.30	.000*	Mod < Mild < Intermittent
	S.D.	2.58	3.52	5.27			
Psycho -social health summary	Mean	97.78	90.67	74.07	120.20	.000*	Mod < Mild < Intermittent
	S.D.	0.86	2.07	5.08			
Total	Mean	95.98	86.76	70.84	102.73	.000**	Mod < Mild < Intermittent
	S.D.	0.65	3.67	4.22			

\* - Correlation is significant at 0.05 level (2-tailed), \*\* - Correlation is significant at .01 level (2-tailed)

**Table 6: Correlation of ADHD symptom severity and QoL domains**

Severity	QoL domains					
	Physical	Emotional	Social	School functioning	Psychosocial health summary	Total
Pearson's correlation	-.111	-.444	-.717	-.608	-.823	-.816
Sig. (2-tailed)	.558	.014*	.000**	.000**	.000**	.000**
* - Correlation is significant at 0.05 level (2-tailed); ** - Correlation is significant at 0.01 level (2-tailed)						
<b>Linear regression of ADHD severity with Total QoL</b>						
ADHD severity	Standard coefficient				T	Sig.
	Beta					
				- .816	7.46	.000**
Dependent Variable: QoL; R Square: .66						

**(f) Parenting style:** In the ADHD group (Table 7), Authoritarian style of parenting was significantly negatively correlated with QoL ( $p = 0.01$ ) while Authoritative style of parenting was significantly positively correlated with QoL ( $p = 0.002$ ). These parenting styles significantly predict the QoL – for every one unit increase in Authoritarian parenting style there will be a .465 unit decrease in QoL ( $F = 7.728$ ,  $p = 0.01$ ,  $R$  Square = .21,  $Beta = -.465$ ,  $t = 2.78$ ,  $p = 0.01$ ) while for every one unit increase in Authoritative parenting style there will be a .534 unit increase in QoL ( $F = 11.16$ ,  $p = 0.002$ ,  $R$  Square = .28,  $Beta = .534$ ,  $t = 3.34$ ,  $p = 0.002$ ). No significant correlations were seen in the Asthma group.

**Table7: Correlation of Parenting style and QoL – ADHD Group**

Quality of life	Parenting style		
	Authoritarian	Authoritative	Permissive
	Pearson's correlation	-.465	.534
Sig.(2-tailed)	.010**	.002**	.987
** - Correlation is significant at 0.01 level (2-tailed)			
<b>Linear regression analysis of Authoritarian and Authoritative parenting styles with QoL – ADHD group</b>			
	Standard coefficient	T	Sig.
	Beta		
Authoritarian parenting style	-.465	2.78	.01**
Dependent Variable: QoL (ADHD group); R Square: .21			
Authoritative parenting style	.534	3.34	.002**
Dependent Variable: QoL (ADHD group); R Square: .28			

## DISCUSSION

This study provides child and parent rated data on QoL of children diagnosed with ADHD and Asthma and factors affecting them. In our study, parent and child ratings did not differ. Some studies have shown no significant differences between parent and child ratings of QoL, [11, 21-22] though a recent review by Galloway and Newman found that children with ADHD rated their QoL higher than their parents [23] which could be the result of factors like *positive illusory bias*, [24] the attention difficulties of the child coming in the way of answering [25] or increased parenting stress experienced by parents of children with ADHD. [7,26] Our sample size could have been a limitation in this case.

On comparing the QoL scores of the two groups, overall QoL is impaired in both groups of children. However, in the physical function domain, child and parent rating of QoL in Asthma group was worse than the ADHD group while it was vice versa in the psychosocial domains. Current published evidence also suggests that ADHD has a comparable overall impact on QoL in comparison to chronic physical illnesses, with a greater impact on psychosocial rather than physical domains [7,14].

QoL (Overall and Psychosocial domains) was found to deteriorate with increasing duration of illness in both the groups, but a point of interest is that increasing duration of treatment showed improved QoL scores in ADHD, but not in Asthma. This is probably due to children having repeated exacerbations of asthma despite being on medications, due to various environmental triggers. This further highlights the essentiality of adequate treatment of ADHD and the resultant transformation it can bring in the life of the child. Subtype of ADHD was found to have an impact on the QoL with the Inattentive subtype having a better QoL, especially in the Social and School functioning domains which is in accordance with literature [27]. The Inattentive subtype has comparatively fewer behavioral issues and usually comes to light only in higher classes due to poor academic performance. In both the groups in the study, we found that increase in severity of illness was associated with poorer QoL which is in accordance with many previous studies [27-30].

We found no significant differences in parenting styles between the groups, but Parenting style was seen to significantly impact QoL in the ADHD group only. This suggests an important influence of parenting style in ADHD as previously hypothesized in the diathesis – stress model of ADHD [16] and in studies showing an improvement in ADHD symptoms with parents having been taught alternative parenting skills [31] and

could be due to the negative aspects of the child's behaviour influencing the parent's response or vice versa. [32].

## CONCLUSION

ADHD is a childhood disorder that is as disabling as a chronic physical illness like Asthma and QoL of the child can be significantly improved by treatment and focus on parenting styles, both of which are factors that clinicians can work on through measures like psycho education and parenting skills training and thus improve overall outcomes and quality of care. The limitations of this study are that it is cross sectional and hospital based. We believe that further prospective studies, especially with interventions on parenting skills are necessary to obtain a consensus opinion of factors that can improve QoL in addition to treatment.

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