Quality of life, adjustment, and associative comorbid conditions in children diagnosed with attention deficit hyperactivity disorder: A comparative study

Introduction: Attention deficit hyperactivity disorder (ADHD) is a common pediatric, neurodevelopmental disorder, with serious impacts on lives of those suffering from it. ADHD is known to be associated with social and emotional difficulties, poor self-regulation, aggression, reduced empathy, inability to regulate socially desirable behavior along with conflicts within family, and increased conflict with peers and several associated comorbid conditions. Aim: The study aims at exploring quality of life (QOL) and adjustment along with associated comorbid conditions in children diagnosed with ADHD in comparison with normal children. Methods: A total sample of 60 children including 30 children diagnosed with ADHD and 30 normal children were selected and assessed using Vanderbilt ADHD Parent rating scale Childhood Psychopathology Measurement Schedule, KINDL QOL: Parent Questionnaire and Pre-Adolescent adjustment Scale to assess level of ADHD, comorbid psychopathologies, their QOL and adjustment respectively. Results: Overall results have indicated that parents reported lesser symptom and pathology in comparisons to teachers for ADHD. Those diagnosed with ADHD had positive and significant comorbidities associated of; low intelligence with behavioral problems and high levels of conduct problems, anxiety, depression, psychotic tendencies, physical illness with emotional problems and somatization in comparison to normal and thus a poor adjusted life, with significant report of poor self-esteem and peer relations and QOL. Conclusion: The results of the present study has clearly stated that severe burden has been perceived by ADHD children, with a poor perceived QOL, several adjustment issues, and sufferance of one or other comorbidity. Thus, the study could help understand and emphasize the need of holistic treatment comprising medicinal and therapeutic methods, including intervention for parents, focusing exclusively on enhancing and curbing these factors.

Keywords: Adjustment problems, attention deficit hyperactivity disorder, quality of life

Every child has a moment or two when they are referred of being chaotic, excessively naughty, or the problem giver, with their constant speeding, running around, not listening or obeying to orders, making noise nonstop, refusing to wait for their turn, crashing into everything around them, poor attention and not been able to focus on any task. However, for some children, these kinds of behaviors are more than an occasional problem. Children with attention deficit hyperactivity disorder (ADHD) have behavior problems that are so

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frequent and severe that they interfere with their ability to live normal lives.

ADHD is considered one of the most common behavioral and neurocognitive condition among children and adolescents, characterized by gross motor overactivity, inattention, and impulsivity. The essential feature of ADHD is a persistent pattern of inattention and/or hyperactivity – impulsivity that is more frequent and severe than that is typically observed in children at a comparable level of development. The symptoms are usually evident in more than one setting (e.g., home and school) and result in impairment in multiple domains of functioning. An Indian study has also reported its prevalence to be 11.32% among primary school children, with 66.7% male and 33.3% female child between 9 and 10 years being most affected, and it is often associated with lifelong impairments. There is substantial literature evidence that speaks of the burden that ADHD imposes on care givers, family members, and society as a whole, including negative effects on their educational, personal, social, and overall quality of life (QOL).

The disorder is also known to be associated with several comorbid conditions. There is increased evidence reported of social and emotional difficulties in these children. Due to their inability to regulate socially desirable behavior, these children often face conflicts with family and increased conflict with peers. Emotional difficulties often include poor emotional self-regulation, aggression, and reduced empathy. Major depressive disorder has been reported to be present in 12%–50% of children with ADHD. Another associated condition commonly present among these children is anxiety and depression these conditions have been associated with greater functional impairment and worse educational outcomes.

Another important aspect in life of an ADHD child is the parent–child relationship, interaction, and the family environment, which has a significant effect on their behavioral outcome. Studies have shown that family environment and parents’ boundaries and limit settings are described as being associated with developmental and executive functions in children with ADHD. Parents of children with ADHD have problems with child interaction and experience emotional distress, stress, and exhaustion. Parent stress can rise sharply when the child does not respond to ordinary parental requests and behavioral advice. Mothers have described caring for a child with ADHD as demanding and putting restrictions on their social life and time for themselves. Moreover, inconsistent paternal discipline and a low involvement of the fathers have been associated with ADHD and may add more maternal stress, thereby highlighting the need for the involvement of fathers in the treatment of ADHD and in everyday life.

Thus, the present study aimed at exploring QOL and child’s adjustment along with associative comorbid conditions in children diagnosed with ADHD. This will help us get a global perspective into their life and will help us predict outcome conceptualizing a holistic intervention plan.

**METHODS**

**Sample**

A total sample of 60 including 30 children diagnosed with ADHD and 30 normal children were selected as sample from the out–patient department of Psychiatry Department at PGIMER, using purposive and convenient sampling method.

**Inclusion criteria**

- Fulfilling the diagnostic criteria of attention deficit hyperkinetic disorder, all types according to the Diagnostic and Statistical Manual DSM-IVTR
- Age range, 4–16 years
- Either gender.

**Exclusion criteria**

- Presence of any other psychiatric/chronic medical illness
- Presence of psychoactive substance abuse.

**Tools**

**Sociodemographic detail sheet**

To take basic information such as name, age, sex, gender, marital status, education, and others from parents and child.

**Vanderbilt ADHD parent rating scale**

It is designed to access disruptive problems associated with ADHD modeled on DSM-IV criteria. It comprises 47 items. Its items include all 18 criteria for ADHD. The items are rated on 4-point scale with responses as never, occasionally, often, and very often. It also has 8 performance items that are rated on 5-point scale with only 3 labels, namely problematic, average, and above average. The Vanderbilt ADHD parent rating scale has two components: symptom assessment and impairment of performance at home, in school, and in social settings.

**Childhood Psychopathology Measurement Schedule**

(Malhotra et al., 1988): This is an Indian adaptation of Achenbach’s child Behavior Checklist (Malhotra et al).
present scale measures overall psychopathology in the form of total scores and also the type of psychopathology in the form of eight factorials derived syndromes (including low intelligence and behavioral problems, conduct problems, depression, anxiety, psychotic symptoms, somatization, special symptoms, and physical illnesses and emotional problems), which have satisfactory reliability and validity. It is a bilingual interview schedule having 75 items with “yes” “no” responses. It can be applied on the children with an age range of 4–14 years. It has a cutoff score of 10 and children scoring above the cutoff score are considered as exhibiting clinically significant level of maladjustment. This scale has 87% specificity and 82% sensitivity.

KINDL quality of life: Parent questionnaire[19]
(Ravens-Sieberer, 2000): The KINDLR = 0.80. α = 0.70 for most subscales, while the overall scale displayed a consistency coefficient of over a questionnaire consists of 24 Likert-scaled items associated with six dimensions: physical well-being, emotional well-being, self-esteem, family, friends, and everyday functioning (school or nursery school/kindergarten). The subscales of these six dimensions can be combined to produce a total score. The reliability was checked by confirmatory means, \ Cronbach’s alpha as a measure of internal consistency reached values of around.

Preadolescent adjustment Scale[20]
(Pareekh et al. 1975): The present scale was developed by Pareekh et al. in 1975. The final scale consisted of 40 items. It measures adjustment in home, teachers, school, peers, and general areas. Scoring of items is different for each area of adjustment. Thus, 5 subscores of adjustment would be obtained for each subject/child. Subject/child has to respond with “yes” or “no.” The preadolescent adjustment scale (PAAS) has been validated by the authors against the rating of the teachers from five schools. For all areas, the calculated Mann–Whitney U values were significant. Test–retest reliability values for different areas are, however, moderate and range from 0.28 to 0.54. The total adjustment ranges from −46 to +34. Score of a subject/child in any area of adjustment would be the sum total of scale values in that particular area. Obtained scores may be negative or positive. Positive scores indicate good adjustment, whereas negative scores indicates poor/maladjustment.

RESULTS

The present study comprised 30 children diagnosed with ADHD and 30 normal children with 100% response rate. The present sample was also matched on their gender and education. In the represented sample, the mean age of children was 9.40 (2.54), and majority of the participants were male (80%) with one-fifth of them as female (20%). Majority of the participants have attained secondary level education (36.7%). 70% of the participants belonged to middle economic status and living in urban locality (53.3%) with joint families (76.7%). The results are reflected in Table 1.

On Vanderbilt ADHD diagnostic scale, parents and teachers showed difference in their rating for overall symptom of ADHD where major difference was observed in their rating for inattentiveness among children with ADHD. 33.3% of parents were of the view that children fall into the category of being majorly inattentive, whereas teachers were of the view that only 20% of children were inattentive. Teachers reported that 23.3% of children were of combined type, and as per parents, only 10% of children fall into combined type. Similar finding has been reported in several studies where teachers and parents report for type of ADHD diagnosis and symptoms’ severity has been different.[21–23] It has also been found that teachers look into child’s symptoms more from the perspective of their school behavior within limited access and time frame and thus sometime underreport the symptoms in comparison to parents.[24] The present research findings have also shown difference in reporting of associative comorbid symptoms; as per teachers, 13.3% of children were hyperactive with ODD and 3.3% were

| Table 1: Sociodemographic description of parents and children |
|---------------------------------------------------------------|
| **Demographic variables** | **Frequency (%)** |
| Age of children, mean (SD) | 9.40 (2.54) |
| Gender of children | |
| Male | 24 (80.00) |
| Female | 6 (20.00) |
| Education | |
| Primary | 6 (20.2) |
| Upto matric | 8 (26.7) |
| Higher secondary | 11 (36.7) |
| Graduate | 5 (16.7) |
| Socioeconomic status | |
| High | 6 (20.00) |
| Middle | 21 (70.00) |
| Low | 3 (10.00) |
| Family type | |
| Nuclear | 7 (23.3) |
| Joint | 23 (76.7) |
| Extended | 0 |
| Locality | |
| Urban | 16 (53.3) |
| Semi urban | 6 (20.0) |
| Rural | 8 (26.7) |
| Sibling | |
| Single | 15 (50.00) |
| Two | 15 (50.00) |

SD – Standard deviation
hyperactive with ODD and conduct disorder; whereas, as per parents, 6.7% children were hyperactive with ODD and 10% fall into later type; the same is been reflective in Graph 1.

However, the overall impairment scores on Vanderbilt ADHD diagnostic scale by parents and teachers indicates; parents reported diagnosis of ADHD caused impaired functioning in 46% of children and as per teachers this proportion was 60%. In normal group children parents 13.3% children exhibited functional impairment without any diagnosis and as per teachers only 3.3% normal children had impairment.\textsuperscript{[23,24]}

Further, analysis of the mean scores of clinical (children with ADHD) and control group (normal children) when compared on various domains of Childhood Psychopathology Measurement Schedule [mean, standard deviation (SD), \textit{t}-value, and \textit{P} values are given in Table 2] indicated that children with ADHD scored significantly higher on all parameters of Childhood Psychopathology Measurement Schedule when compared to healthy children.\textsuperscript{[25-27]} (Clinical Group Mean 22.33, SD 5.46; Control group Mean 11.20, SD 2.32; \textit{t} = 10.16; \textit{P} ≥ 0.000).

The findings hereby suggest that children with ADHD tend to be at higher risk of having low intelligence with behavioral problems, conduct problems, anxiety, depression, psychotic tendencies, physical illness with emotional problems, and somatization when compared to normal population.\textsuperscript{[28-30]}

The results clearly indicate that the diagnosis of ADHD itself has an adverse effect on the psychological state of the children and thus it could be one of the reasons for significantly high scores than normal group children on most of the psychopathological dimensions. The ADHD children were not able to cope up due to their disease, and as a result, they might have developed variety of psychopathological/behavioral problems. These children also tend to have secondary gains of their illness, seeking more attention of their caregivers/parents.

When ADHD children were compared to that of normal control, the result indicated about 16.7% of ADHD children scored less than zero on overall adjustment, with half of these participants scoring less than zero on teacher dimension, 46.7% on school dimension, 43.3% on general adjustment, and 36.7% on peer dimension. This distribution of scores shows their maladjustment toward teachers, their schools, general adjustment, and with peers.\textsuperscript{[14,15,24,30-32]}

Both groups (clinical and control) were also compared on various domains of PAAS scores, and a significant difference was observed between both the groups on all domains, except home adjustment. Comparative score profile is given in Table 3. (clinical group: mean = 7.96, SD = 3.61; control group: mean = 21.86, SD = 6.63; \textit{t} = −7.00; \textit{P} ≥ 0.000). Children with ADHD have been found to have major adjustment issues with life, due to their inability to control impulse and other behavioral disturbances due to the very innate and biological nature of the disorder.\textsuperscript{[30-32]}

This could be a reason as children with ADHD are been reported to be more apprehensive about attitude of their teachers and at school toward their physical and behavioral problems exhibited by them. They may presume that their

Graph 1: Attention deficit hyperactivity disorder type described by parents and teachers on Vanderbilt attention deficit hyperactivity disorder diagnostic scale (experiment group)

Table 2: Comparative scores of both groups (Group I: attention deficit hyperactivity disorder; Group II: normal children) on Childhood Psychopathology Measurement Schedule

| Domains                              | Mean (SD)          | t      | P     |
|--------------------------------------|--------------------|--------|-------|
| Low intelligence with behavior problem | 5.46 (2.22)        | 1.50 (0.57) | 9.46 | 0.000 |
| Conduct disorder                     | 4.20 (2.02)        | 1.86 (0.50) | 6.12 | 0.000 |
| Anxiety                              | 1.80 (0.98)        | 1.10 (0.40) | 2.93 | 0.005 |
| Depression                           | 4.03 (1.88)        | 1.46 (0.57) | 7.14 | 0.000 |
| Psychotic symptoms                   | 2.20 (0.76)        | 1.06 (0.36) | 7.35 | 0.000 |
| Special symptoms                     | 2.10 (0.30)        | 1.06 (0.25) | 8.34 | 0.000 |
| Physical illness with emotional problem | 2.10 (0.99)        | 1.70 (0.53) | 1.94 | 0.057 |
| Somatization                         | 2.33 (1.15)        | 1.43 (0.56) | 3.03 | 0.000 |

SD – Standard deviation; ADHD – Attention deficit hyperactivity disorder
Impact of ADHD on QOL and functional impairment was also assessed. ADHD children reported significantly overall poorer QOL than normal children. Increased symptoms and functional impairment among ADHD group are predictors of poorer QOL. ADHD children have reported significantly poorer self-esteem and peer relations than normal children. They also had significantly more problems with their family members.

Statistically significant difference was observed in physical and mental well-being of both the groups. Children with ADHD also reported poorer physical and mental well-being. The findings are shown in Table 4.

Children living in urban area scored high on depression ($r = 0.448; P = 0.013$), and those living in rural area exhibited more physical illness with emotional problems ($r = -0.367; P = 0.046$). Children belonged to low income group exhibited more conduct problems ($r = -0.386; P = 0.035$).

Emotional and behavioral functioning of ADHD children was negatively associated with their psychosocial adjustment, which indicates that only when a child’s emotional and behavioral disturbances are addressed adequately and monitored, issues related to associative symptoms as conduct problems, anxiety, and depression, which in addition impairs their adjustment would improve.

The results also indicated that the presence of any physical illness, emotional problems, and somatization in these children were also negatively associated with their adjustment in school and overall general adjustment. The findings indicate that any physical pain, the emotional turmoil, and the somatic symptoms in these children until addressed effectively will continue to affecting their school performance and their overall adjustment. These symptoms add additional burden to the child’s functioning and thus need to be monitored effectively and must be inclusive as part of their treatment measure toward holistic healing and enhancing QOL.

General adjustment was positively associated with mental well-being ($r = 0.290; P = 0.024$), self-esteem ($r = 0.354; P = 0.006$), family ($r = 0.453; P = 0.000$), friend ($r = 0.366; P = 0.004$), and daily working ($r = 0.463; P = 0.000$). Relation with friends was positively associated with adjustment in school ($r = 0.308; P = 0.017$), with peers ($r = 0.340; P = 0.008$), and general adjustment ($r = 0.403; P = 0.001$).

The research gave few new findings where the analysis indicated negative association of emotional behavioral functioning with few dimensions of QOL. Depression had significant negative correlation with family ($r = -0.368; P = 0.004$) and daily functioning ($r = -0.349; P = 0.006$), psychotic symptoms with self-esteem ($r = -0.311; P = 0.016$), special symptoms positive association with daily functioning ($r = 0.332; P = 0.010$) and physical illness with emotional problems had significant negative correlation with mental well-being ($r = -0.360; P = 0.005$).

These findings are shown in Table 5.

**DISCUSSION**

Overall results have indicated that general adjustment and QOL of an ADHD child are grossly impaired because of which they face several issues in their school life, with peers, their teachers, parents, and largely their environment. These children due to their in-attentiveness and psychomotor agitation are not able to sit in a place, follow rules and regulations, gain appreciation, complete a given task in hand, or even concentrate to achieve and acquire the fundamental expectations of them. Due to these symptoms, they are not able to act effectively at school, play, or social gathering. In a child’s life, as they are growing appreciation, acceptance and sense of belongingness in such social situation becomes very important for building positive self-image and self-esteem and thus these children also have a poor sense of QOL.

In the present study, parents reported lesser symptom and pathology in comparison to teachers for ADHD and comorbid conditions. However, those diagnosed with ADHD had positive and significant comorbidities associated with low intelligence with behavioral problems and high levels of conduct problems, anxiety, depression, psychotic tendencies, physical illness with emotional problems, and somatization, which again leads to a poor adjusted life, with significant report of poor self-esteem and peer relations.

The results indicated that the presence emotional and behavioral problems was negatively associated with psychosocial adjustments, and any comorbidity of physical illness and somatization in these children were negatively associated with their adjustment in school and overall general adjustment. These findings suggest that only when a child’s emotional and behavioral disturbances are addressed adequately, issues related to comorbidity will decrease and help enhance their QOL, leading to a better adjusted life.

As ADHD limits these children to access adequate resources to learn and deal effectively with their issues and thus
limits their functioning. These children often resolve to pathological measure of attention seeking as otherwise they lack reinforcement in their life; thus novelty seeking behavior are very high in such children. Thus, until these symptoms which could be an adaptive mechanism of seeking attention in life has to be treated and dealt effectively to improve their adjustment and overall QOL.\textsuperscript{35,36}

Table 3: Comparative scores of both groups (Group I: attention deficit hyperactivity disorder; Group II: normal children) on preadolescent adjustment scale

| Domains          | Mean (SD) ADHD children | Mean (SD) Normal children | t    | P    |
|------------------|-------------------------|---------------------------|------|------|
| Home             | 6.20 (2.98)             | 6.53 (2.41)               | 0.47 | 0.637|
| School           | 0.46 (3.41)             | 4.26 (2.66)               | 4.80 | 0.000|
| Peer             | 0.83 (3.19)             | 3.70 (1.78)               | 2.29 | 0.000|
| Teacher          | -0.26 (3.70)            | 3.40 (3.23)               | 4.08 | 0.000|
| General          | 0.66 (2.32)             | 3.90 (1.95)               | 6.00 | 0.000|
| Total adjustment | 7.96 (3.61)             | 21.86 (6.63)              | 7.00 | 0.000|

SD – Standard deviation; ADHD – Attention deficit hyperactivity disorder

Table 4: Comparative scores of both groups (Group I: attention deficit hyperactivity disorder; Group II: normal children) on kindle quality of life scale

| Domains            | Mean (SD) ADHD children | Mean (SD) Normal children | t    | P    |
|--------------------|-------------------------|---------------------------|------|------|
| Physical well-being| 10.56 (1.88)            | 11.50 (2.45)              | 1.87 | 0.066|
| Mental well-being  | 10.76 (1.59)            | 11.86 (2.71)              | 2.57 | 0.013|
| Self-esteem        | 8.76 (1.38)             | 10.20 (2.17)              | 3.05 | 0.003|
| Family             | 10.06 (1.08)            | 11.10 (1.53)              | 3.01 | 0.004|
| Friends            | 9.73 (1.55)             | 11.50 (1.64)              | 4.23 | 0.000|
| Everyday working   | 10.30 (0.91)            | 11.43 (1.45)              | 3.61 | 0.001|
| Overall QOL        | 60.20 (3.96)            | 67.80 (6.63)              | 5.38 | 0.000|

SD – Standard deviation; ADHD – Attention deficit hyperactivity disorder; QOL – Quality of life

Table 5: Association between clinical measures

| CPMS domains                                | QOL Friend | Adjustment domains |
|---------------------------------------------|------------|--------------------|
| Low intelligence with behavior problem      | -0.301*    | School             |
| Conduct disorder                            | -0.355**   | -0.476**           |
| Anxiety                                     | -0.380**   | -0.376**           |
| Depression                                  | -0.296*    | -0.411**           |
| Psychotic symptoms                          | -0.386**   | -0.470**           |
| Special symptoms                            | 0.400**    | 0.417**            |
| Physical illness with emotional problem     | -0.421**   | -0.357**           |
| Somatization                                | -0.287*    | -0.367**           |
| Total CPMS scores                           | -0.562**   | -0.525**           |

* 001, **01, CPMS – Childhood Psychopathology Measurement Schedule; QOL – Quality of life

CONCLUSION

The results of the present study have clearly indicated that children with ADHD are more susceptible than normal children to face emotional, behavioral, physical, and psychosocial issues, which, in turn, leads to a poor QOL and several adjustment issues these children faces in school, with peers, family, and overall general adjustment.

Thus, it can be concluded that ADHD not only has an impact on the lives of people who are living with it, but also their parents, siblings, friends, and teachers. ADHD is a disorder that may affect all aspects of a child's life, as its symptoms confine a child, to achieve the very basic needs and accomplish a sense of achievement within them and thus leads to poor development of self-image and self-esteem in these children. As children and adults, these individuals face several difficulties adapting and adjusting to life. What is needed here is a constant force of positivity, with persistence compassion, and plenty of support to the child and an effective means of treatment for the overall condition and not only focus on the short term relief of core symptoms, mainly during the school day.

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