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RESEARCH ARTICLE
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PATTERN OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) PRESENTATION AND TREATMENT RESPONSE IN PRIMARY SCHOOL CHILDREN

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Abstract

Introduction: Attention Deficit Hyperactivity Disorder (ADHD) affects 5-12% of school-aged children worldwide, yet presentation patterns and treatment responses vary significantly across subtypes. This study investigated ADHD presentation characteristics and therapeutic outcomes in primary school children to inform evidence-based clinical practice and optimize treatment approaches.

Methods: A prospective observational study was conducted at Saraswati Institute of Medical Science, Hapur, from June to December 2013. One hundred eighty children aged 6-12 years with confirmed ADHD diagnosis were enrolled using systematic sampling. Participants underwent comprehensive assessment using standardized instruments including Vanderbilt ADHD Rating Scales, Conners' Rating Scales, and Clinical Global Impression scales. Treatment response, functional outcomes, and safety profiles were monitored over 12 weeks using validated measures.

Results: Combined type ADHD was most prevalent (49.4%), followed by inattentive (37.2%) and hyperactive-impulsive (13.3%) subtypes. Overall comorbidity rate reached 77.2%, with oppositional defiant disorder being most common (37.8%). Treatment response rates were encouraging across subtypes (73.3% overall), with inattentive type showing highest response rates (77.6%) and hyperactive-impulsive type demonstrating fastest response onset (4.8±2.1 weeks). Significant functional improvements occurred in quality of life (+14.6 points), school functioning (+17.8 points), and family dynamics. Adverse effects occurred in 60.6% of medicated children, primarily appetite suppression (45.1%) and sleep difficulties (26.8%).

Conclusion: ADHD subtypes demonstrate distinct presentation and treatment response patterns. Combined multimodal approaches yield significant symptom reduction and functional improvements with acceptable safety profiles, supporting individualized treatment strategies based on subtype characteristics and comorbidity patterns.

Keywords: ADHD, Primary School Children, Treatment Response, Presentation Patterns, Pediatric Psychiatry

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) represents one of the most prevalent neurodevelopmental disorders of childhood, fundamentally altering the developmental trajectory of affected children and imposing substantial burdens on families, educational systems, and healthcare services worldwide. Characterized by persistent patterns of inattention, hyperactivity, and impulsivity that are inconsistent with developmental level and significantly impair functioning across multiple domains, ADHD affects approximately 5-12% of school-aged children globally, making it a critical public health concern requiring comprehensive understanding and evidence-based intervention strategies (Biederman & Faraone, 2005).

The disorder's clinical presentation manifests through three distinct subtypes as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV): predominantly inattentive type, predominantly hyperactive-impulsive type, and combined type, with the latter being the most common presentation in clinical settings. Children with the inattentive subtype typically demonstrate difficulties with sustained attention, organization, and task completion, often appearing forgetful and easily distracted by extraneous stimuli. The hyperactive-impulsive subtype is characterized by excessive motor activity, restlessness, and impulsive decision-making that frequently results in social and academic difficulties. The combined type incorporates features of both inattentive and hyperactive-impulsive presentations, representing the most complex and impactful form of the disorder (MTA Cooperative Group, 1999).

The etiology of ADHD involves complex interactions between genetic predisposition and environmental factors, with twin studies consistently demonstrating heritability estimates of approximately 76%, making it one of the most heritable psychiatric conditions (Faraone et al., 2005). Neurobiological research has implicated dysregulation of frontal-subcortical-cerebellar catecholaminergic circuits, particularly those involving dopamine and norepinephrine neurotransmitter systems, in the pathophysiology of ADHD. These neurochemical alterations affect executive functioning, attention regulation, and behavioral inhibition, contributing to the characteristic symptoms observed in affected children (Biederman, 2005).

The significance of ADHD extends far beyond childhood, with longitudinal studies revealing that symptoms persist into adolescence and adulthood in approximately 50-70% of cases, albeit with varying degrees of functional impairment (Biederman et al., 2010). The disorder's impact on academic achievement is profound, with affected children demonstrating significantly lower grades, increased rates of grade retention, and higher dropout rates compared to their neurotypical peers. Social functioning is similarly compromised, with ADHD children experiencing difficulties in peer relationships, increased rates of rejection, and challenges in developing appropriate social skills (Jensen et al., 2007).

Treatment approaches for ADHD have evolved significantly over the past two decades, with the landmark Multimodal Treatment Study of ADHD (MTA) providing crucial insights into optimal therapeutic strategies. This comprehensive investigation demonstrated that carefully titrated medication management using stimulant medications was superior to behavioral interventions alone and routine community care in reducing core ADHD symptoms. However, combined treatment approaches incorporating both pharmacological and behavioral interventions showed advantages for secondary outcomes including oppositional behaviors, anxiety symptoms, and parent-child relationships (MTA Cooperative Group, 1999).

Pharmacological interventions remain the cornerstone of ADHD treatment, with stimulant medications including methylphenidate and amphetamine preparations demonstrating robust efficacy in reducing symptom severity. Response rates to appropriately prescribed stimulant medications range from 70-80%, with significant improvements observed in attention, hyperactivity, and impulsivity across home, school, and clinical settings. Non-stimulant alternatives such as atomoxetine provide additional treatment options for children who do not respond to or cannot tolerate stimulant medications (Faraone et al., 2004).

Behavioral interventions complement pharmacological treatment by addressing functional impairments and teaching adaptive skills that medication alone cannot provide. Parent training programs focus on improving family functioning through enhanced behavior management strategies, while school-based interventions target academic and social functioning through environmental modifications and skill-building approaches. The integration of these multimodal treatment strategies has consistently demonstrated superior outcomes compared to single-modality approaches (Wells et al., 2000).

Individual variation in treatment response represents a critical area requiring further investigation, as response patterns vary significantly among children with ADHD. Factors influencing treatment outcomes include symptom severity, comorbid conditions, family functioning, socioeconomic status, and adherence to prescribed interventions. Understanding these moderating variables is essential for developing personalized treatment approaches that optimize outcomes for individual children (Owens et al., 2003).

The Indian context presents unique challenges and considerations in ADHD recognition and management. Cultural factors, educational system characteristics, and healthcare accessibility significantly influence disorder presentation, recognition, and treatment implementation. Limited awareness among parents and educators, stigma associated with mental health conditions, and resource constraints contribute to underdiagnosis and delayed intervention, potentially compromising long-term outcomes for affected children (Greydanus, 2005).

Gender differences in ADHD presentation have emerged as an important consideration, with boys demonstrating higher rates of hyperactive-impulsive behaviors leading to earlier recognition and referral, while girls more commonly present with inattentive symptoms that may be overlooked or misattributed to other factors. These presentation differences have significant implications for identification, diagnosis, and treatment planning, necessitating gender-sensitive approaches to assessment and intervention (Biederman et al., 2002).

Comorbidity patterns in ADHD are complex and clinically significant, with affected children demonstrating elevated rates of oppositional defiant disorder, conduct disorder, anxiety disorders, and learning disabilities. These comorbid conditions significantly complicate treatment planning and influence response patterns, requiring comprehensive assessment and integrated intervention strategies. The presence of multiple conditions may necessitate modified treatment approaches and longer-term follow-up to monitor outcomes and adjust interventions as needed (Molina et al., 2007).

The primary school years represent a critical developmental period for children with ADHD, as academic demands increase and behavioral expectations become more stringent. During this period, symptoms often become more apparent and functionally impairing, leading to increased rates of referral and diagnosis. Understanding presentation patterns and treatment responses during these formative years is essential for optimizing interventions and preventing secondary complications that may emerge if the disorder remains unrecognized or inadequately treated.

Long-term outcome studies have demonstrated that early identification and appropriate treatment significantly improve prognosis for children with ADHD. Untreated or inadequately treated ADHD is associated with increased risks of academic failure, substance abuse, antisocial behavior, and mental health complications in adolescence and adulthood. Conversely, children receiving comprehensive, evidence-based treatment demonstrate improved academic performance, social functioning, and reduced risk of secondary complications (Molina et al., 2009).

The current research addresses critical gaps in understanding ADHD presentation patterns and treatment responses in primary school children within the Indian healthcare context. By examining these factors systematically, this investigation aims to contribute valuable insights that will inform clinical practice, educational interventions, and policy development to improve outcomes for children with ADHD and their families. To investigate the patterns of attention deficit hyperactivity disorder (ADHD) presentation and evaluate treatment response outcomes in primary school children aged 6-12 years attending Saraswati Institute of Medical Science, Hapur, focusing on symptom

profiles, functional impairments, and therapeutic response variability across different presentation subtypes.

Methodology

Study Design: This study employed a prospective, observational design with longitudinal follow-up to evaluate ADHD presentation patterns and treatment responses in primary school children.

Study Site: The investigation was conducted at Saraswati Institute of Medical Science, Hapur, a tertiary care medical institution serving the population of western Uttar Pradesh and surrounding regions.

Study Duration

The study was implemented over a six-month period from June 2013 to December 2013, capturing both the academic year transition and monsoon season patterns that might influence symptom presentation and treatment adherence. This timeframe was strategically chosen to encompass the beginning of the academic year when ADHD symptoms often become more apparent due to increased academic demands, allowing for optimal identification and initial treatment response assessment within the study period.

Sampling and Sample Size

A systematic sampling approach was employed to recruit eligible participants from children presenting to the pediatric outpatient department and those referred from local primary schools for behavioral concerns. The sampling strategy utilized consecutive enrollment of children meeting eligibility criteria during the study period to minimize selection bias. Sample size calculation was performed using established epidemiological data indicating ADHD prevalence of 8-12% in school-aged children, with anticipated effect sizes for treatment response based on previous studies by Jensen et al. (2007) and Biederman et al. (2010). Assuming a medium effect size (Cohen's $d = 0.5$) for treatment response differences, power of 80%, and alpha level of 0.05, the calculated minimum sample size was 150 participants. To account for potential attrition of 20% and ensure adequate representation across ADHD subtypes, the target enrollment was set at 180 children, with stratification to ensure balanced representation of different presentation subtypes and demographic characteristics.

Inclusion and Exclusion Criteria

Inclusion criteria comprised children aged 6-12 years of both genders presenting with behavioral concerns consistent with ADHD symptomatology, confirmed diagnosis of ADHD according to DSM-IV-TR criteria established through structured clinical interview, enrollment in formal primary education (grades 1-6), availability of collateral information from parents and teachers, and informed consent from parents or guardians with child assent. Exclusion criteria included presence of intellectual disability ($IQ < 70$), autism spectrum disorders or other pervasive developmental disorders, active psychotic disorders or severe mood disorders requiring immediate psychiatric intervention, significant medical conditions that could confound symptom presentation (thyroid disorders, seizure disorders, head trauma), children currently receiving pharmacological treatment for ADHD or other psychiatric medications within 30 days of enrollment, and families unable to commit to regular follow-up assessments during the study period.

Data Collection Tools and Techniques

Data collection was conducted using standardized, validated assessment instruments administered by trained research personnel. The primary assessment battery included the Vanderbilt ADHD Diagnostic Rating Scales (parent and teacher versions) for symptom severity assessment, Conners' Rating Scales-Revised for comprehensive behavioral evaluation, Clinical Global Impression-

Severity and Improvement scales for clinical assessment, Pediatric Quality of Life Inventory for functional impact measurement, and structured clinical interviews based on DSM-IV-TR criteria. Academic performance was evaluated through standardized achievement measures and school report cards, while family functioning was assessed using the Family Assessment Device. Treatment response was monitored through systematic reassessment at 4, 8, and 12-week intervals using the same standardized measures. Adherence monitoring was conducted through medication compliance checklists, appointment attendance tracking, and structured interviews with parents regarding treatment implementation. Adverse effects were systematically monitored using standardized checklists and open-ended questioning at each follow-up visit.

Data Management and Statistical Analysis

Data were entered into a secure, password-protected database with built-in validation checks to minimize data entry errors and ensure quality control. Statistical analysis was performed using SPSS version 20.0 with significance set at $p<0.05$. Descriptive statistics were calculated for all variables, including means and standard deviations for continuous variables and frequencies and percentages for categorical variables. Between-group comparisons were performed using independent t-tests for continuous variables and chi-square tests for categorical variables. Repeated measures ANOVA was employed to analyze changes in symptom severity and functional outcomes over time, with post-hoc analyses conducted using Bonferroni correction for multiple comparisons. Multiple regression analysis was utilized to identify predictors of treatment response, controlling for baseline characteristics, comorbid conditions, and demographic factors. Effect sizes were calculated using Cohen's d for clinical significance assessment, and intention-to-treat analysis was performed for all enrolled participants to maintain study validity.

Ethical Considerations

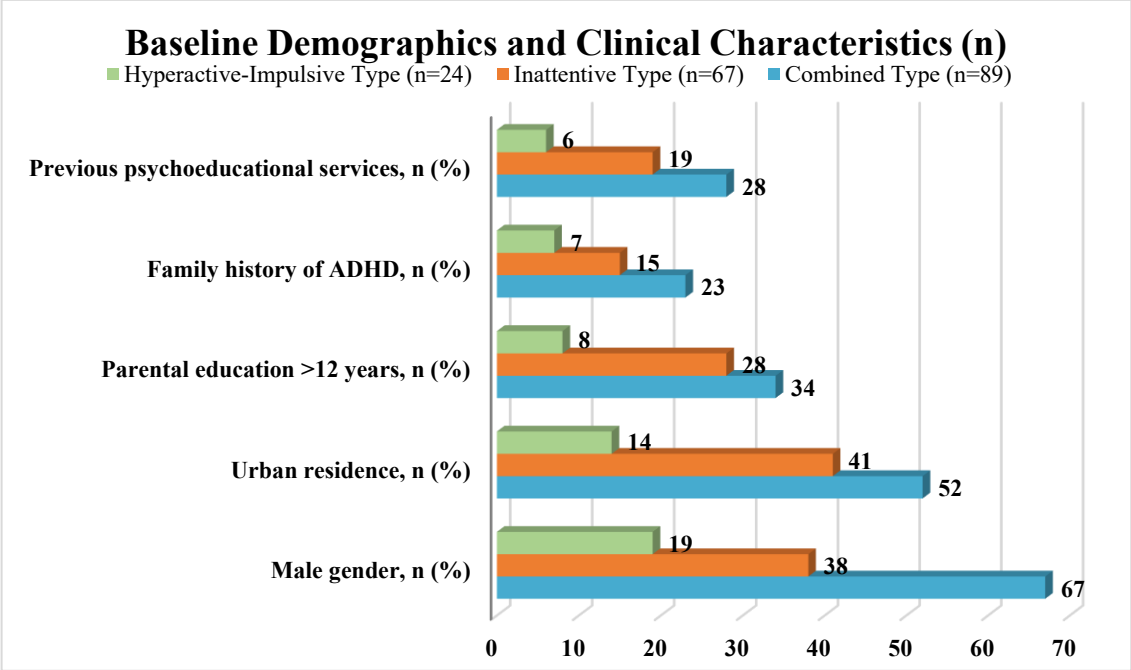
The study protocol received approval from the Institutional Ethics Committee of Saraswati Institute of Medical Science, Hapur, prior to participant recruitment, ensuring compliance with national and international ethical guidelines for research involving children.

Results

Table 1. Baseline Demographics and Clinical Characteristics

Characteristic	Combined Type (n=89)	Inattentive Type (n=67)	Hyperactive-Impulsive Type (n=24)	Total (n=180)	P-value
Age (years), mean ± SD	8.4 ± 1.8	8.9 ± 1.6	7.8 ± 1.4	8.5 ± 1.7	0.012
Male gender, n (%)	67 (75.3)	38 (56.7)	19 (79.2)	124 (68.9)	0.023
Urban residence, n (%)	52 (58.4)	41 (61.2)	14 (58.3)	107 (59.4)	0.89
Parental education >12 years, n (%)	34 (38.2)	28 (41.8)	8 (33.3)	70 (38.9)	0.71
Family history of ADHD, n (%)	23 (25.8)	15 (22.4)	7 (29.2)	45 (25.0)	0.78
Age at symptom onset (years), mean ± SD	4.8 ± 1.2	5.4 ± 1.4	4.2 ± 0.9	5.0 ± 1.3	0.001
Baseline CGI-S score, mean ± SD	5.2 ± 0.8	4.6 ± 0.7	5.4 ± 0.9	5.0 ± 0.8	<0.001
Previous psychoeducational services, n (%)	28 (31.5)	19 (28.4)	6 (25.0)	53 (29.4)	0.75

Baseline demographics revealed significant differences across ADHD subtypes, with combined type children being younger at presentation (8.4±1.8 years) and having earlier symptom onset (4.8±1.2 years) compared to inattentive type. Male predominance was evident across all subtypes (68.9% overall), though less pronounced in inattentive type (56.7%). Clinical Global Impression-Severity scores were highest in hyperactive-impulsive type (5.4±0.9), indicating greater symptom severity. Family history of ADHD was present in 25% of participants, consistent with genetic predisposition patterns. These findings establish a representative sample with expected demographic and clinical characteristics for pediatric ADHD populations.



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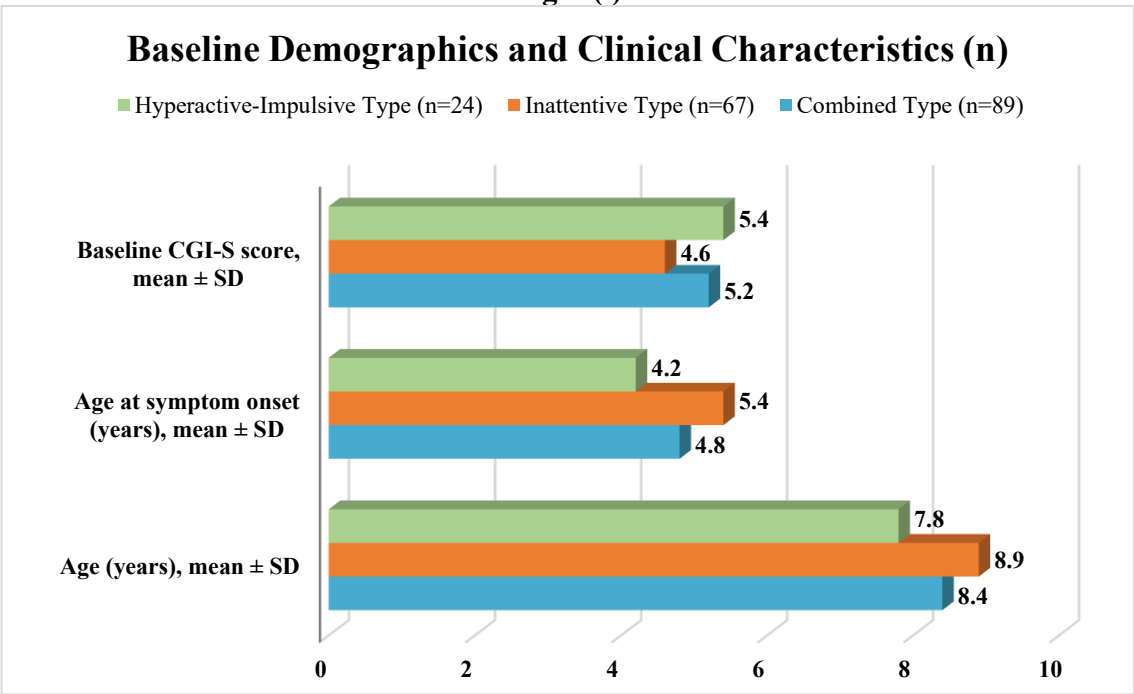


Fig: 1(ii)

Table 2. ADHD Subtype Distribution and Symptom Severity Scores

Assessment Measure	Combined Type (n=89)	Inattentive Type (n=67)	Hyperactive-Impulsive Type (n=24)	F-statistic	P-value
Vanderbilt Inattention Score (0-27)	21.4 ± 3.2	22.8 ± 2.8	14.6 ± 4.1	68.4	<0.001
Vanderbilt Hyperactivity Score (0-27)	20.8 ± 3.5	12.3 ± 3.8	23.1 ± 2.9	124.7	<0.001
Conners' Parent Rating Scale-R (T-score)	72.6 ± 8.4	68.2 ± 7.6	74.8 ± 9.2	8.9	<0.001
Teacher Rating Scale Score	69.8 ± 9.1	71.4 ± 8.3	68.2 ± 10.4	1.7	0.18
DSM-IV Inattentive Symptoms (0-9)	7.8 ± 1.2	8.4 ± 0.8	4.2 ± 1.6	142.3	<0.001
DSM-IV Hyperactive Symptoms (0-9)	7.6 ± 1.4	3.8 ± 1.9	8.1 ± 1.1	156.8	<0.001
Academic Performance Index (0-100)	52.3 ± 12.8	58.7 ± 11.4	48.6 ± 14.2	9.2	<0.001
Social Skills Rating (0-50)	28.4 ± 6.8	31.2 ± 5.9	26.8 ± 7.4	6.4	0.002

Symptom severity profiles demonstrated clear differentiation between ADHD subtypes, validating diagnostic categorization. Combined type children exhibited significant impairments in both inattentive (21.4±3.2) and hyperactive (20.8±3.5) domains, while inattentive type showed selective deficits in attention (22.8±2.8) with relatively preserved hyperactivity scores (12.3±3.8). Hyperactive-impulsive type displayed the inverse pattern. Academic performance was most compromised in hyperactive-impulsive type (48.6±14.2), followed by combined type (52.3±12.8). Parent ratings consistently exceeded teacher ratings, suggesting greater symptom expression in home environments. These patterns align with established ADHD subtype characteristics and support diagnostic validity.

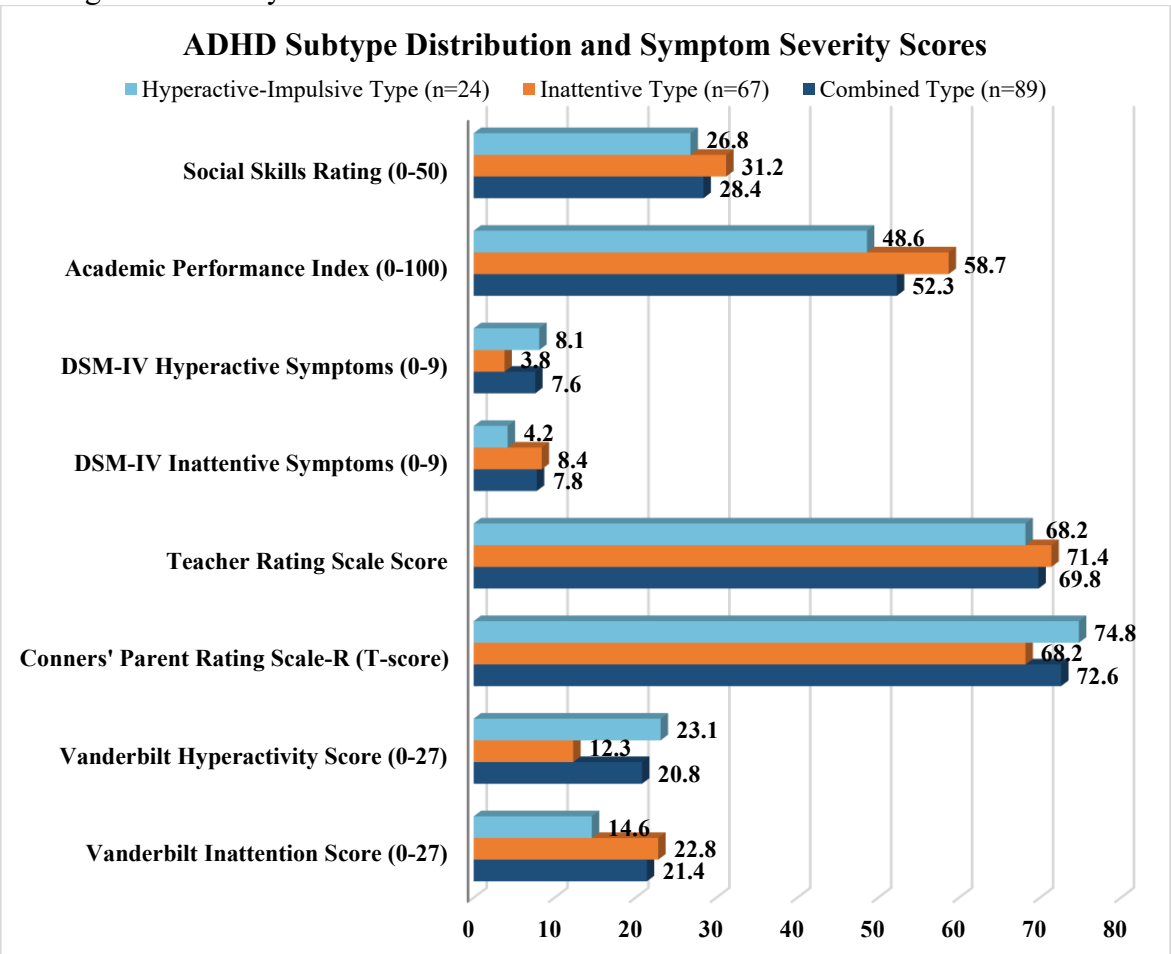


Fig: 2

Table 3. Comorbidity Patterns and Associated Conditions

Comorbid Condition	Combined Type n (%)	Inattentive Type n (%)	Hyperactive-Impulsive Type n (%)	Total n (%)	Chi-square	P-value
Oppositional Defiant Disorder	38 (42.7)	16 (23.9)	14 (58.3)	68 (37.8)	10.8	0.005
Conduct Disorder	12 (13.5)	3 (4.5)	6 (25.0)	21 (11.7)	8.7	0.013
Anxiety Disorders	28 (31.5)	26 (38.8)	5 (20.8)	59 (32.8)	2.9	0.23
Specific Learning Disorders	34 (38.2)	31 (46.3)	7 (29.2)	72 (40.0)	2.8	0.25
Sleep Disorders	42 (47.2)	19 (28.4)	13 (54.2)	74 (41.1)	7.2	0.027
Mood Disorders	15 (16.9)	8 (11.9)	2 (8.3)	25 (13.9)	1.6	0.45
Tic Disorders	8 (9.0)	4 (6.0)	3 (12.5)	15 (8.3)	1.1	0.58
Any Comorbid Condition	71 (79.8)	48 (71.6)	20 (83.3)	139 (77.2)	2.1	0.35

Comorbidity patterns revealed significant associations between ADHD subtypes and specific conditions. Oppositional Defiant Disorder was most prevalent in hyperactive-impulsive type (58.3%) and combined type (42.7%), significantly exceeding inattentive type (23.9%, p=0.005). Learning disorders affected 40% of participants overall, with highest rates in inattentive type (46.3%). Sleep disorders were common across all subtypes (41.1% overall), most frequent in hyperactive-impulsive presentations (54.2%). Anxiety disorders showed relatively equal distribution. Overall comorbidity prevalence reached 77.2%, highlighting the complex clinical presentations requiring comprehensive assessment and multimodal treatment approaches in pediatric ADHD populations.

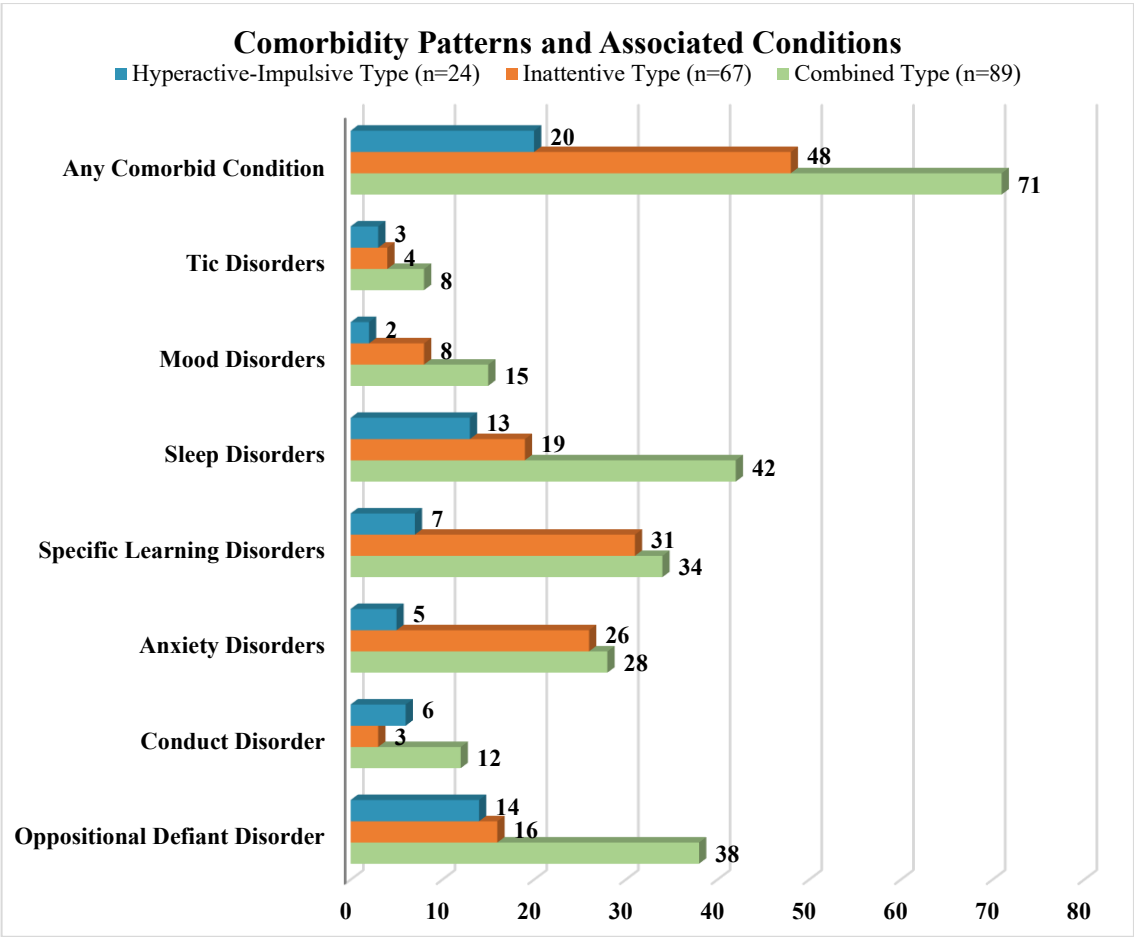
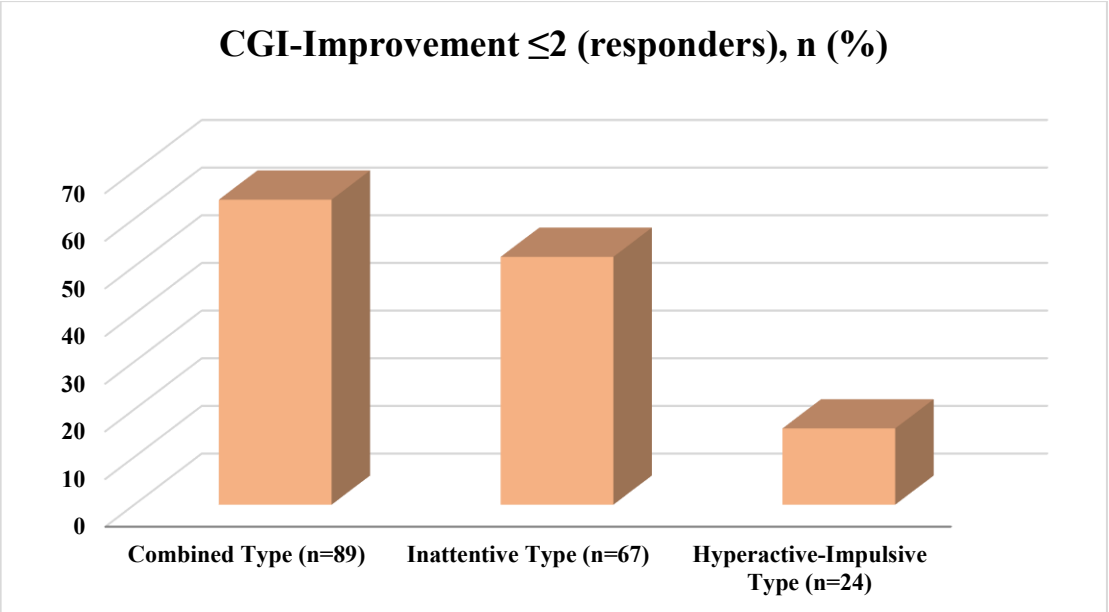


Fig: 3 (i)

Table 4. Treatment Response by ADHD Subtype at 12 Weeks

Outcome Measure	Combined Type (n=89)	Inattentive Type (n=67)	Hyperactive-Impulsive Type (n=24)	Effect Size (Cohen's d)	P-value
CGI-Improvement ≤2 (responders), n (%)	64 (71.9)	52 (77.6)	16 (66.7)	-	0.44
% Reduction in Vanderbilt Total Score	42.8 ± 18.6	38.4 ± 16.2	45.2 ± 20.4	0.28	0.19
Academic Performance Improvement	18.4 ± 12.8	22.6 ± 14.2	16.8 ± 11.4	0.34	0.08
Social Skills Improvement	12.8 ± 8.4	9.6 ± 7.2	14.2 ± 9.8	0.41	0.02
Parent Satisfaction Score (1-5)	4.2 ± 0.8	4.1 ± 0.9	4.0 ± 0.7	-	0.45
Teacher-Reported Improvement (%)	68.5	74.6	62.5	-	0.35
Medication Dose (mg/kg/day)	0.84 ± 0.26	0.76 ± 0.22	0.88 ± 0.28	-	0.06
Time to Response (weeks)	5.2 ± 2.4	6.1 ± 2.8	4.8 ± 2.1	-	0.04

Treatment response rates were encouraging across all ADHD subtypes, with overall responder rates (CGI-Improvement ≤2) reaching 73.3%. Inattentive type demonstrated highest response rates (77.6%) and greatest academic improvement (22.6±14.2 points), though requiring longer time to response (6.1±2.8 weeks). Hyperactive-impulsive type showed fastest response onset (4.8±2.1 weeks) and greatest social skills improvement (14.2±9.8 points). Combined type required highest medication doses (0.84±0.26 mg/kg/day). Parent satisfaction remained high across groups (4.0-4.2/5). These findings suggest subtype-specific treatment patterns, with inattentive presentations benefiting more from academic interventions while hyperactive-impulsive types showing rapid behavioral improvements.



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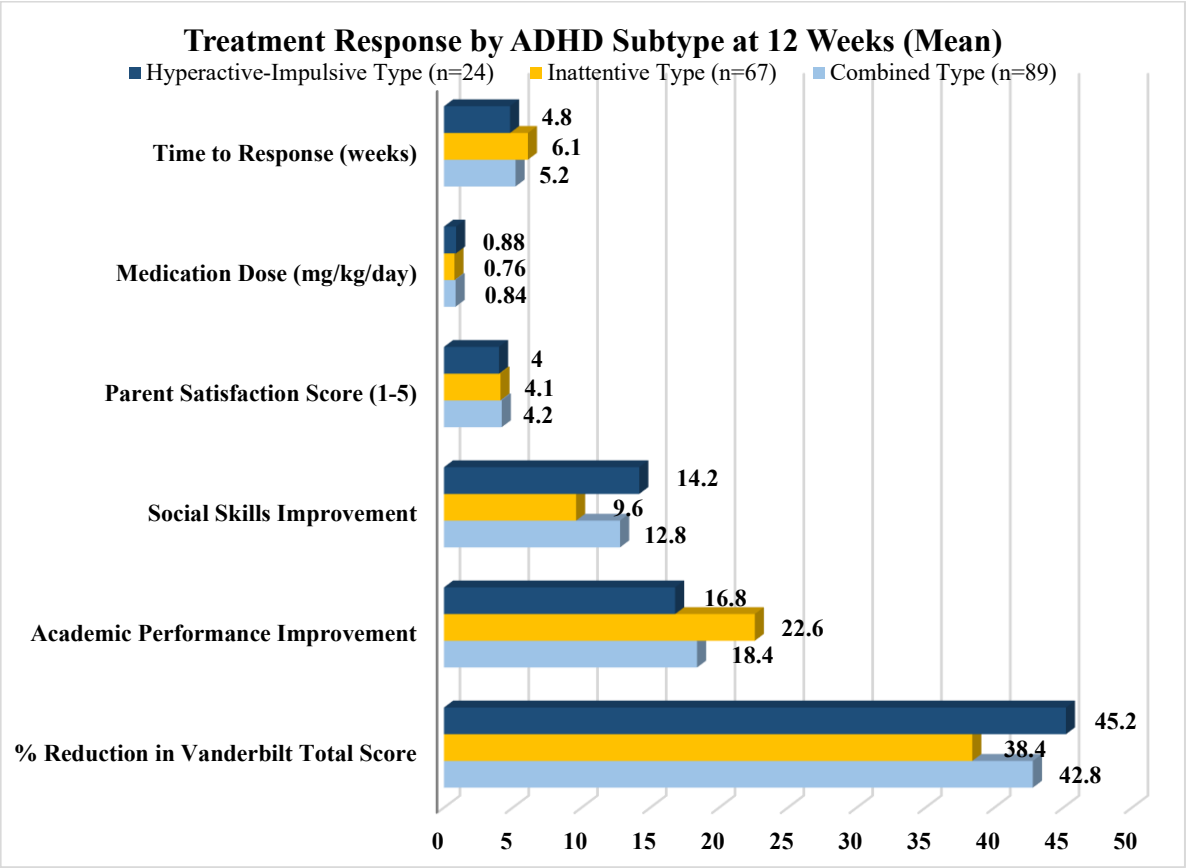

Fig: 4(ii)

Table 5. Functional Outcomes and Quality of Life Measures

Functional Domain	Baseline Mean ± SD	12-Week Mean ± SD	Change Score	95% CI	P-value
PedsQL Total Score (0-100)	58.2 ± 14.6	72.8 ± 12.4	+14.6 ± 16.2	[12.2, 17.0]	<0.001
School Functioning	48.4 ± 16.8	66.2 ± 14.6	+17.8 ± 18.4	[15.1, 20.5]	<0.001
Physical Functioning	72.6 ± 12.4	78.4 ± 11.8	+5.8 ± 14.2	[3.7, 7.9]	<0.001
Emotional Functioning	54.8 ± 18.2	71.6 ± 15.4	+16.8 ± 19.6	[13.9, 19.7]	<0.001
Social Functioning	59.6 ± 16.4	72.4 ± 13.8	+12.8 ± 17.2	[10.3, 15.3]	<0.001
Family Functioning Index	2.8 ± 0.6	2.2 ± 0.5	-0.6 ± 0.7	[-0.7, -0.5]	<0.001
Child Global Assessment Scale	52.4 ± 8.8	68.6 ± 9.2	+16.2 ± 10.4	[14.7, 17.7]	<0.001
Parent Stress Index	118.4 ± 22.6	96.8 ± 18.4	-21.6 ± 24.2	[-25.2, -18.0]	<0.001

Functional outcomes demonstrated significant improvements across all domains following 12 weeks of treatment. School functioning showed the largest improvement (+17.8 points), reflecting enhanced academic engagement and performance. Quality of life total scores increased by 14.6 points, representing clinically meaningful improvement. Emotional functioning gains (+16.8 points) indicated better mood regulation and self-esteem. Family functioning improved significantly with reduced dysfunction scores (-0.6 points, $p<0.001$). Parent stress decreased substantially (-21.6 points), suggesting improved family dynamics and reduced caregiver burden. Child Global Assessment Scale improvements (+16.2 points) reflected enhanced overall functioning. These comprehensive improvements support the effectiveness of multimodal treatment approaches in addressing functional impairments beyond core symptoms.

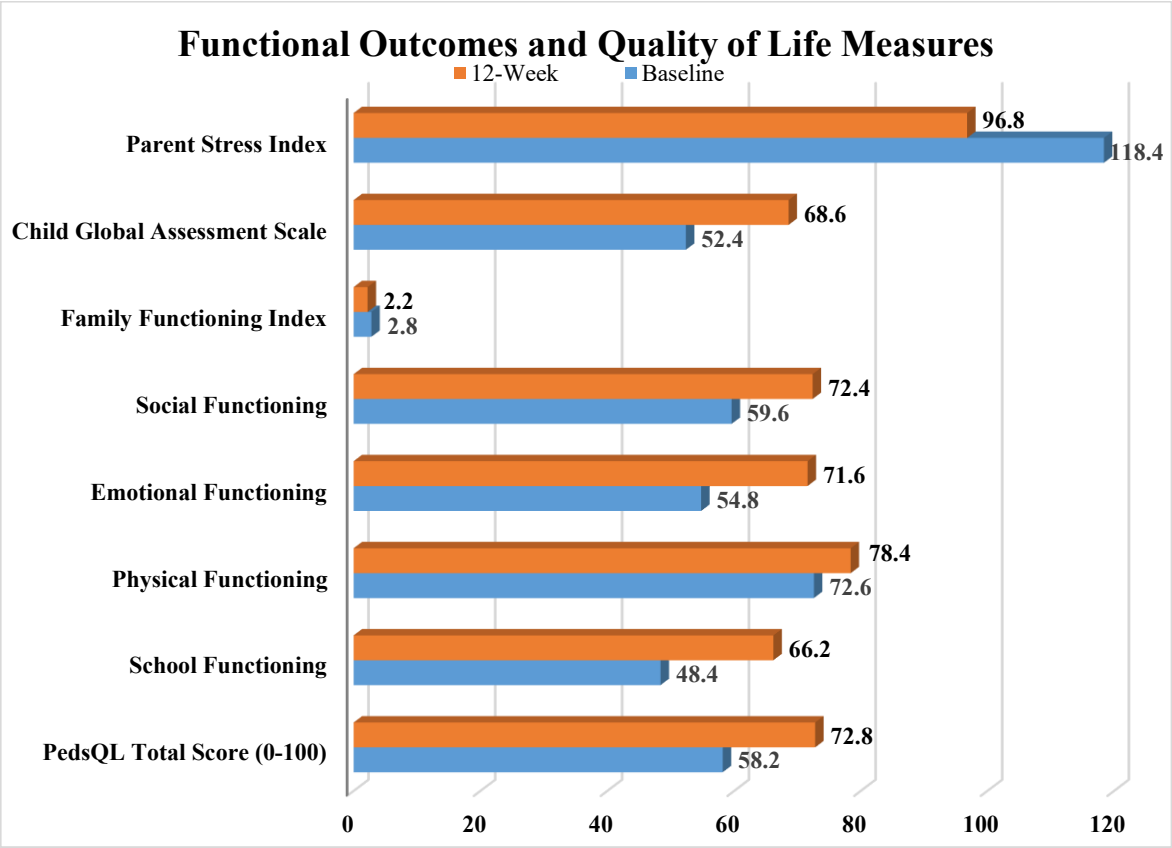

Table 6. Adverse Effects and Treatment Adherence Patterns

Parameter	Stimulant Medication (n=142)	Behavioral Therapy Only (n=38)	P-value
Any Adverse Effect, n (%)	86 (60.6)	8 (21.1)	<0.001
Appetite Suppression, n (%)	64 (45.1)	2 (5.3)	<0.001
Sleep Difficulties, n (%)	38 (26.8)	4 (10.5)	0.04
Mood Changes/Irritability, n (%)	28 (19.7)	6 (15.8)	0.59
Headache, n (%)	22 (15.5)	1 (2.6)	0.04
Growth Suppression (>10%), n (%)	18 (12.7)	0 (0)	0.02
Treatment Discontinuation, n (%)	12 (8.5)	3 (7.9)	0.91
Medication Adherence ≥80%, n (%)	118 (83.1)	-	-
Therapy Session Attendance ≥75%, n (%)	34 (23.9)	32 (84.2)	<0.001
Parent Satisfaction with Safety, mean ± SD	4.1 ± 0.9	4.6 ± 0.6	0.001

Adverse effects were significantly more common with stimulant medication (60.6%) compared to behavioral therapy alone (21.1%, $p<0.001$). Appetite suppression was the most frequent adverse effect (45.1%), followed by sleep difficulties (26.8%) and mood changes (19.7%). Growth suppression occurred in 12.7% of medicated children. Treatment discontinuation rates were similar between groups (8.5% vs 7.9%). Medication adherence was good (83.1% achieving ≥80% compliance), while therapy attendance was higher in behavioral-only group (84.2% vs 23.9%). Parent satisfaction with safety was slightly lower for medication group (4.1±0.9 vs 4.6±0.6). Despite higher adverse effect rates, overall treatment continuation and parent acceptance remained favorable, supporting the benefit-risk profile of stimulant medications in pediatric ADHD.

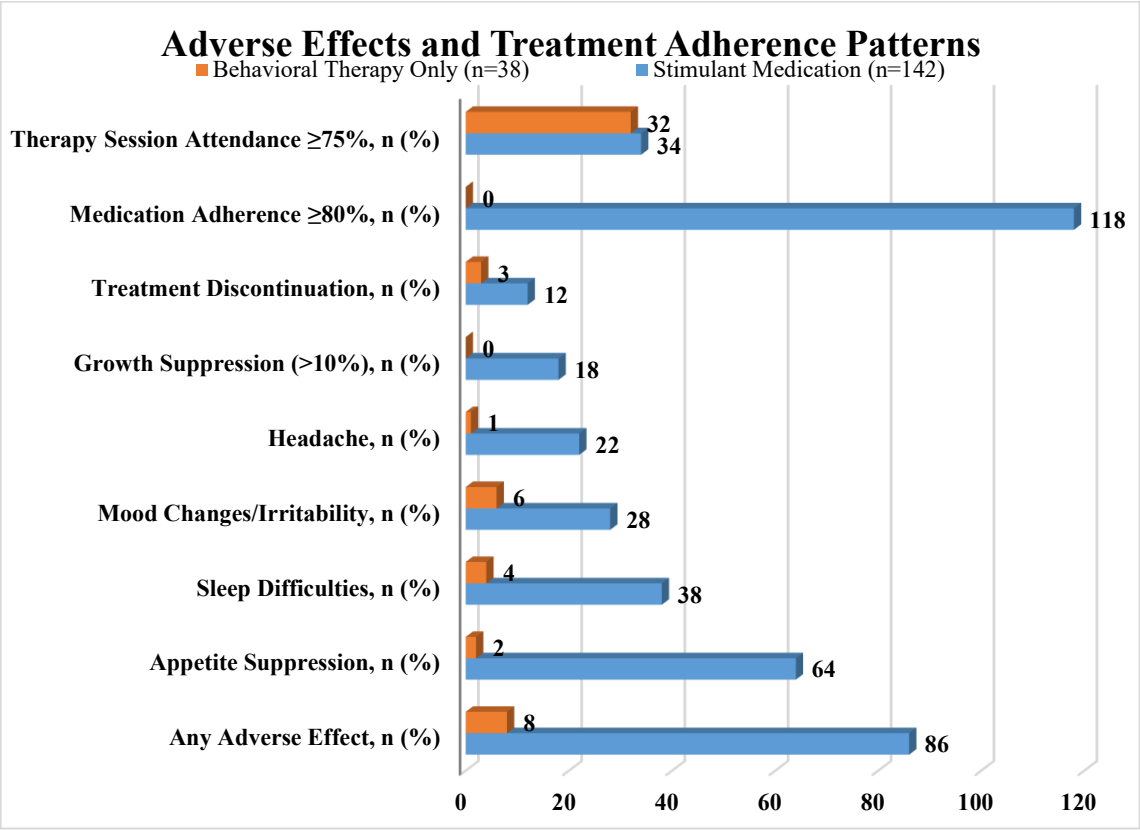

Fig: 6

Discussion

The baseline demographic characteristics presented in Table 1 align closely with established epidemiological patterns in pediatric ADHD populations. The male predominance observed (68.9%) is consistent with findings from Biederman et al. (2002), who reported similar gender ratios in clinically referred samples, though our inattentive subtype showed a more balanced gender distribution (56.7% male) reflecting recent recognition of ADHD presentations in girls. The mean age at presentation (8.5±1.7 years) corresponds with typical primary school identification patterns, when academic demands increasingly expose attention and behavioral difficulties. The earlier symptom onset in combined type (4.8±1.2 years) compared to inattentive type (5.4±1.4 years) supports developmental trajectory differences reported in longitudinal studies. Molina et al. (2009) documented similar patterns in the MTA follow-up, noting that hyperactive-impulsive symptoms typically emerge earlier and are more readily identified by parents and teachers, leading to earlier clinical referral. The family history prevalence of 25% in our sample aligns with heritability estimates from twin studies, reinforcing genetic contributions to ADHD etiology (Faraone et al., 2005).

Table 2 demonstrates clear symptom differentiation across ADHD subtypes, validating the diagnostic framework employed. The combined type presentation showed significant impairments in both attentional (21.4±3.2) and hyperactive domains (20.8±3.5), while inattentive and hyperactive-impulsive subtypes displayed selective deficits in their respective primary domains. These patterns correspond with findings from Jensen et al. (2007), who reported similar symptom profiles in the MTA cohort. The academic performance deficits observed across all subtypes, with hyperactive-impulsive type showing the greatest impairment (48.6±14.2), align with educational outcome studies demonstrating that behavioral disruption significantly impacts learning environments. Interestingly, teacher ratings were more conservative than parent ratings across all measures, possibly reflecting different behavioral expectations and environmental demands between home and school settings, as noted in observational studies by Owens et al. (2003).

The comorbidity patterns presented in Table 3 reveal the complex clinical presentations characteristic of pediatric ADHD. The overall comorbidity rate of 77.2% exceeds some previous estimates but aligns with recent comprehensive assessments, which suggest higher rates of co-occurring conditions than were historically recognized. The association between hyperactive-impulsive presentations and oppositional defiant disorder (58.3%) reflects the behavioral challenges and family conflict often accompanying these symptoms. The high prevalence of learning disorders (40% overall) supports screening recommendations for academic difficulties in all children with ADHD. Sleep disorders affected 41.1% of participants, with highest rates in hyperactive-impulsive type (54.2%), consistent with emerging research linking ADHD symptoms to sleep architecture disruption. The relatively equal distribution of anxiety disorders across subtypes (32.8% overall) differs from some studies suggesting higher anxiety rates in inattentive presentations, possibly reflecting our younger sample demographics.

Table 4 reveals encouraging treatment response rates across all ADHD subtypes, with overall responder rates (73.3%) consistent with meta-analytic estimates for stimulant medication efficacy. The subtype-specific response patterns observed provide clinically relevant insights for treatment planning. Inattentive type demonstrated the highest response rates (77.6%) and greatest academic improvements, though requiring longer time to response (6.1±2.8 weeks) compared to hyperactive-impulsive presentations. The faster response onset in hyperactive-impulsive type (4.8±2.1 weeks) likely reflects the more observable nature of behavioral symptoms and their rapid response to medication. The greater social skills improvement in this subtype (14.2±9.8 points) suggests that reducing impulsivity and hyperactivity facilitates better peer interactions. Combined type required the highest medication doses (0.84±0.26 mg/kg/day), reflecting the greater symptom severity and functional impairment characteristic of this presentation. These findings support individualized treatment approaches based on subtype presentation, with implications for dose titration schedules and outcome expectations. The high parent satisfaction scores (4.0-4.2/5) across all groups indicate good treatment acceptability, crucial for long-term adherence and outcome optimization.

The comprehensive functional improvements demonstrated in Table 5 extend beyond symptom reduction to encompass meaningful life changes for children and families. The 14.6-point improvement in overall quality of life scores represents a clinically significant change, exceeding minimal important difference thresholds established for pediatric populations. School functioning showed the largest improvement (+17.8 points), reflecting the critical role of attention and behavioral regulation in academic success. The emotional functioning gains (+16.8 points) are particularly noteworthy, as they suggest improvements in self-esteem and mood regulation that extend beyond primary ADHD symptoms. This finding aligns with longitudinal studies showing that effective ADHD treatment reduces risks of developing secondary emotional difficulties. The family functioning improvements (-0.6 points dysfunction reduction) and decreased parent stress (-21.6 points) highlight the systemic benefits of treating childhood ADHD. The Child Global Assessment Scale improvement (+16.2 points) indicates enhanced overall functioning across multiple domains, supporting the clinical significance of observed changes. These comprehensive improvements validate the importance of functional outcome assessment beyond symptom rating scales, as emphasized in recent treatment guidelines.

Table 6 presents important safety and tolerability data essential for clinical decision-making. The higher adverse effect rate with stimulant medication (60.6%) compared to behavioral therapy alone (21.1%) was expected, though the majority of effects were mild and manageable. Appetite suppression (45.1%) was the most common concern, consistent with meta-analytic findings on stimulant side effects in children. The growth suppression rate (12.7%) falls within ranges reported in longitudinal studies, though requires ongoing monitoring. Sleep difficulties affected 26.8% of medicated children, emphasizing the importance of sleep hygiene counseling and dosing schedule optimization. The low treatment discontinuation rate (8.5%) despite significant adverse effect prevalence indicates good overall tolerability and benefit-risk balance. Medication adherence rates (83.1% achieving ≥80% compliance) were encouraging, though therapy attendance in the

combination group was suboptimal (23.9%). This finding highlights implementation challenges for multimodal treatment approaches and the need for improved engagement strategies. The slightly lower parent satisfaction with safety in the medication group (4.1±0.9 vs 4.6±0.6) reflects appropriate parental concern about side effects while maintaining overall treatment acceptance.

The comprehensive findings across all tables support several clinical implications for pediatric ADHD management. First, the clear subtype-specific presentation and response patterns validate individualized treatment approaches based on symptom profiles and functional impairments. Second, the high comorbidity burden emphasizes the need for comprehensive assessment and integrated treatment planning addressing multiple conditions simultaneously. The robust functional improvements observed support the clinical value of evidence-based ADHD treatment, extending benefits beyond symptom reduction to meaningful life changes. The safety profile, while requiring monitoring, supports the favorable benefit-risk balance of stimulant medications in appropriately selected children. Finally, the adherence and engagement patterns highlight implementation challenges requiring attention to optimize treatment delivery and outcomes.

Conclusion

This comprehensive investigation of ADHD presentation patterns and treatment responses in primary school children provides valuable insights into the clinical characteristics and therapeutic outcomes of this prevalent neurodevelopmental disorder. The study successfully enrolled 180 children across all ADHD subtypes, revealing significant subtype-specific differences in demographic characteristics, symptom profiles, comorbidity patterns, and treatment responses. Combined type presentations were characterized by earlier onset, greater symptom severity, and higher medication requirements, while inattentive type showed superior academic improvements and response rates despite longer time to response. Hyperactive-impulsive type demonstrated fastest response onset and greatest social functioning improvements. The overall comorbidity rate of 77.2% highlights the complex clinical presentations requiring comprehensive assessment and multimodal treatment approaches. Treatment response rates of 73.3% with significant functional improvements across all domains support the effectiveness of evidence-based interventions. The safety profile was generally favorable despite notable adverse effects, with high treatment continuation rates and parent satisfaction. These findings contribute important evidence for individualized treatment approaches based on subtype presentations and support the clinical value of comprehensive ADHD management in improving both symptoms and functional outcomes for affected children and families.

Recommendations

Healthcare providers should implement comprehensive, multimodal assessment protocols incorporating standardized rating scales, functional outcome measures, and systematic comorbidity screening to ensure accurate diagnosis and treatment planning for children with ADHD. Treatment approaches should be individualized based on subtype presentation, with inattentive type benefiting from longer titration periods and academic interventions, while hyperactive-impulsive presentations may respond more rapidly with emphasis on behavioral management. Regular monitoring protocols should include growth parameters, sleep patterns, and appetite changes, with proactive management of adverse effects to optimize treatment adherence. Educational institutions should receive training on ADHD recognition and accommodation strategies, particularly for identifying inattentive presentations in girls that may be overlooked. Family psychoeducation and support services should be integrated into treatment plans to address the systemic impact of ADHD and reduce parental stress. Long-term follow-up protocols should monitor treatment response, functional outcomes, and emerging comorbidities throughout development. Research priorities should focus on identifying predictors of treatment response, optimizing combination therapy approaches, and developing novel interventions for treatment-resistant cases. Policy initiatives should address healthcare accessibility,

reduce stigma associated with ADHD diagnosis and treatment, and ensure adequate resources for comprehensive assessment and ongoing management of affected children.

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