Original Research Article

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Prevalence of ADHD and Its Association with Nutritional and Health Status among Special Children in Southwest Bangladesh

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ABSTRACT: *Background:* Attention-Deficit/Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder among children, often associated with nutritional deficiencies and health problems. Limited evidence exists on the prevalence of ADHD and its relationship with nutritional and general health status among children with special needs in Southwest Bangladesh. *Objective:* To assess the prevalence of ADHD and its association with nutritional and health status among special children in Southwest Bangladesh. *Methods:* A cross-sectional study was conducted from October 2023 to March 2024 among 219 children from Alo Child Care Special School and Ashar Alo, Khulna. ADHD diagnosis, type, and severity were assessed using standard diagnostic criteria. Nutritional status was evaluated using BMI-for-age, MUAC, and dietary intake patterns. General health indicators, including sleep disturbances, recurrent fever, seizures, and infections, were also recorded. Associations were analyzed using chi-square tests and ANOVA for continuous variables, with p<0.05 considered significant. *Results:* The overall prevalence of ADHD was 59.4% (n=130), with inattentive type (37.7%) being the most common. Moderate ADHD predominated (43.1%), followed by mild (31.5%) and severe (25.4%). ADHD children showed significant associations with sleep disturbances (40.8%, p=0.017), recurrent fever (36.9%, p=0.049), and seizure history (16.9%, p=0.042). Nutritional assessment revealed that 30.0% were underweight, 15.4% overweight/obese, and 27.7% malnourished based on MUAC (p=0.011). Protein deficiency (31.5%) and micronutrient deficiency (23.9%) were also significant. ANOVA indicated that children with severe ADHD had significantly lower BMI (16.1 ± 2.5 kg/m²) and MUAC (16.2 ± 2.0 cm) compared to mild ADHD. *Conclusion:* ADHD is highly prevalent among special children in Southwest Bangladesh and is associated with poor nutritional status and specific health problems. Early identification, integrated behavioral management, and nutritional interventions are essential to improve overall health and developmental outcomes in this population.

Keywords: ADHD, Prevalence, Nutritional Status, MUAC, Special Children, Bangladesh.

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders affecting children globally, characterized by persistent patterns of inattention, hyperactivity, and impulsivity [1]. While ADHD is widely studied in developed nations, there is a significant lack of research on its

prevalence and associated comorbidities in developing countries [2]. As a result, many children with ADHD in these regions remain undiagnosed and untreated, which can have profound long-term consequences on their academic performance, social relationships, and overall quality of life [3]. Understanding the unique profile of ADHD in this context is therefore critical for developing effective, culturally-sensitive interventions. Mounting evidence suggests that ADHD is not just a behavioral disorder but is often accompanied by various health and nutritional issues [4]. Studies have found associations between ADHD and problems such as sleep disturbances, recurrent infections, and seizures. Furthermore, the relationship between ADHD and nutritional status is complex. While some research points to a link between ADHD and obesity, possibly due to impulsive eating habits, other studies highlight the risk of undernutrition, which may be exacerbated by poor dietary habits, parental inattention to nutritional needs, or appetite-suppressing medication [5]. These findings underscore the need for a comprehensive, holistic approach to managing the disorder. In Bangladesh, a developing country with a high burden of malnutrition and health disparities, the specific health and nutritional challenges faced by children with ADHD are largely undocumented [6]. The limited research available has primarily focused on the broader population, leaving a significant gap in our understanding of how ADHD presents in special children, a group that may be at a disproportionately higher risk for these comorbidities [7]. The present study was conducted to address this critical gap. This study aimed to assess the prevalence of ADHD among special children in Southwest Bangladesh and to investigate its association with key nutritional and general health indicators. By examining the demographic, clinical, nutritional, and health profiles of this vulnerable population, we seek to provide empirical evidence that can guide the development of integrated healthcare policies and targeted interventions. The findings of this research will be instrumental in advocating for a more comprehensive care model that addresses both the neurodevelopmental and physiological needs of children with ADHD in similar settings.

METHODOLOGY

This cross-sectional observational study was conducted to determine the prevalence of Attention Deficit Hyperactivity Disorder (ADHD) and its association with nutritional and health status among children in Southwest Bangladesh. The study took place over six months, from October 2023 to March 2024, at two specialized child care centers in Khulna: Alo Child Care Special School and Ashar Alo, which cater to children with developmental and learning needs. The study population consisted of children aged 6–12 years enrolled in the selected institutions. Children with previously diagnosed severe neurological disorders or chronic illnesses unrelated to ADHD were excluded. A total of 130 children were included through purposive sampling. Data were collected using a structured questionnaire and clinical assessments. Demographic information such as age, sex, family background, and socioeconomic status was recorded. ADHD diagnosis and severity were determined using standardized tools based on DSM-5 criteria and validated ADHD rating scales, with input from teachers and caregivers regarding behavioral symptoms. Nutritional status was assessed by measuring height and weight to calculate Body Mass Index (BMI) and categorizing it according to World Health Organization growth standards. Dietary patterns and nutrient intake were evaluated using a 24-hour dietary recall and caregiver interviews. Health status was assessed through a brief medical history, including previous illnesses, hospitalizations, and comorbid conditions, along with basic clinical examinations to identify any visible health problems. Informed consent was obtained from the parents or legal guardians of all participants. Participation was voluntary, and confidentiality was strictly maintained. Data were analyzed using SPSS version 26. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated. Associations between ADHD and nutritional and health status were examined using Chi-square tests for categorical variables and t-tests or ANOVA for continuous variables, with a p-value of <0.05 considered statistically significant.

RESULTS

Table 1: Socio-Demographic Characteristics of the Study Population (n=219)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	6–8	72	32.9
	9–11	89	40.6
	12–14	58	26.5
Sex	Male	128	58.4
	Female	91	41.6
Socioeconomic Status (SES)	Low	75	34.2
	Middle	101	46.1
	High	43	19.6
Father's Occupation	Doctor	18	8.2
	Engineer	15	6.8
	Business	62	28.3
	Private Service	54	24.7
	Labor	70	32.0
Mother's Occupation	Doctor	10	4.6
	Homemaker	118	53.9
	Business	34	15.5
	Private Service	57	26.0

The majority of participants were aged 9–11 years (40.6%), with a higher proportion of males (58.4%). Nearly half of the families belonged to the middle socioeconomic group (46.1%). Fathers were predominantly engaged in labor (32.0%) and business (28.3%), while most mothers were homemakers (53.9%)
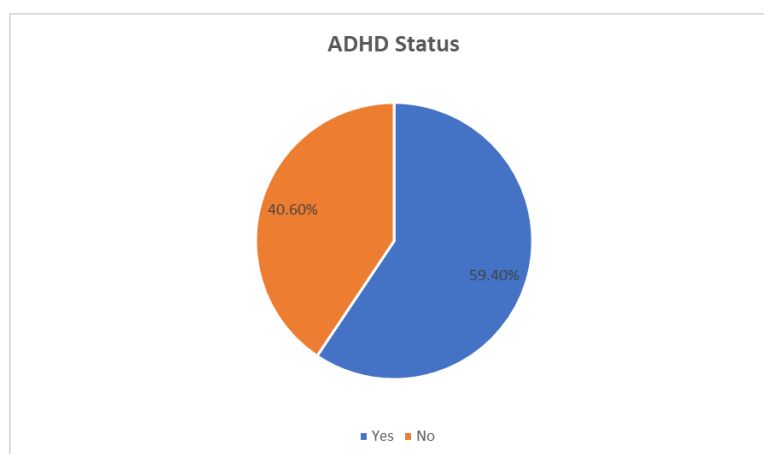

Figure 1: ADHD Status of Participants (n=219)

As shown in Figure 1, 130 participants (59.4%) were identified with ADHD, whereas 89 participants (40.6%) did not present with ADHD.
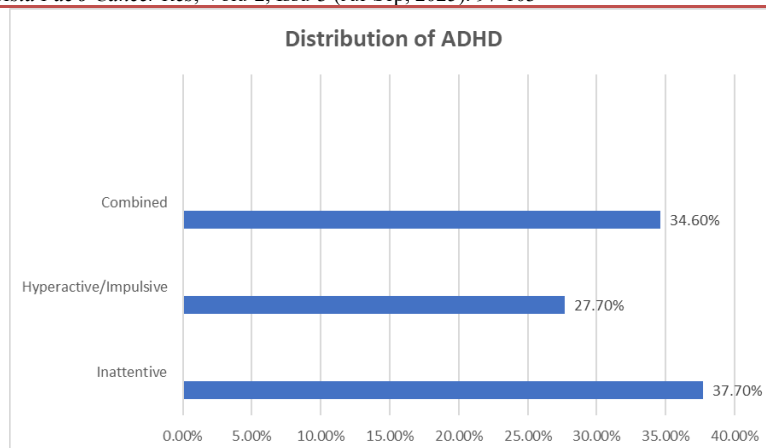
Figure 2: Distribution of ADHD Types (n=130)

As presented in Figure 2, the inattentive type was the most frequently observed subtype of ADHD 49 (37.7%), followed by the combined type 45 (34.6%) and the hyperactive/impulsive type 36 (27.7%).
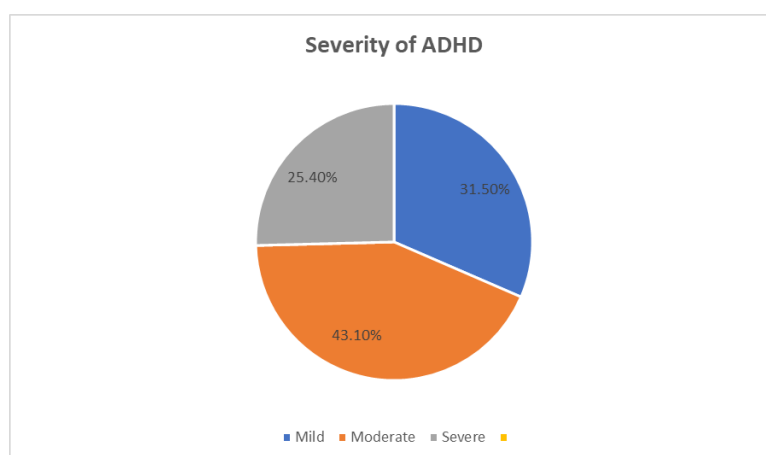

Figure 3: Severity of ADHD Among Participants (n=130)

As illustrated in Figure 3, the majority of ADHD cases were of moderate severity 56 (43.1%), while 41 cases (31.5%) were mild and 33 cases (25.4%) were severe.

Table 2: General Health Indicators among ADHD Children (n=130)

Indicator	Category	Frequency (n)	Percentage (%)	χ^2, df	p-value
History of Seizure	Yes	22	16.9	4.12, 1	0.042*
	No	108	83.1		
Recurrent Fever	Yes	48	36.9	3.88, 1	0.049*
	No	82	63.1		
Respiratory Infections	Yes	42	32.3	2.15, 1	0.142
	No	88	67.7		
Gastrointestinal Issues	Yes	29	22.3	1.94, 1	0.163
	No	101	77.7		
Sleep Disturbances	Yes	53	40.8	5.71, 1	0.017*
	No	77	59.2		

*Significant at p<0.05

Table 2 presents that among 130 children with ADHD, sleep disturbances (40.8%, p = 0.017) and recurrent fever (36.9%, p = 0.049) were found to be significantly associated with the condition. A history of seizures (16.9%) showed a marginally significant association (p = 0.042). Although respiratory and gastrointestinal problems were more frequently reported, these associations did not reach statistical significance.

Table 3: Nutritional Status of ADHD Children (n=130)

Indicator	Category	Frequency (n)	Percentage (%)	χ^2, df	p-value
BMI-for-Age	Normal	71	54.6		
	Underweight	39	30.0	8.91,2	0.012*
	Overweight/Obese	20	15.4		
MUAC (Mid Arm Circumference)	Normal	94	72.3		
	Malnourished	36	27.7	6.44,1	0.011*
Dietary Intake Pattern	Balanced Diet	58	44.6		
	Protein Deficient	41	31.5	9.23,2	0.010*
	Micronutrient Deficient	31	23.9		

*Significant at p<0.05

Table 3 shows that 30.0% of children with ADHD were underweight, while 15.4% were overweight or obese. The association between BMI and ADHD was statistically significant (p = 0.012). Based on MUAC assessment, 27.7% of the children were identified as malnourished (p = 0.011). Dietary pattern analysis revealed protein deficiency in 31.5% and micronutrient deficiency in 23.9%, both of which demonstrated significant associations with ADHD (p = 0.010).

Table 4: Mean BMI and MUAC by ADHD Severity (n=130)

Nutritional Indicator	Mild (n=41) Mean ± SD	Moderate (n=56) Mean ± SD	Severe (n=33) Mean ± SD	F-value	p-value
BMI (kg/m²)	17.9 ± 2.0	17.2 ± 2.3	16.1 ± 2.5	4.28	0.016*
MUAC (cm)	17.6 ± 1.8	17.0 ± 2.1	16.2 ± 2.0	3.95	0.024*

*Significant at p<0.05

Table 4 demonstrates that ANOVA revealed significant differences in mean BMI and MUAC across ADHD severity groups. Children with severe ADHD had markedly lower BMI and MUAC compared to those with mild ADHD. However, the differences between mild and moderate groups were not statistically significant.

DISCUSSION

This study investigated the prevalence of ADHD and its association with nutritional and general health status among a specific cohort of special children in Southwest Bangladesh. Our key finding is the high prevalence of ADHD in this population (59.4%), which is higher than many global estimates and highlights the significant burden of this condition in the region. The prevalence was higher among males (58.4%), and the most common subtype was the inattentive type (37.7%), followed by the combined type (34.6%), a finding that aligns with some international research indicating a growing recognition of the inattentive presentation of ADHD [8]. The age distribution, with a majority of children aged 9–11 years, is also consistent with the typical age of ADHD diagnosis. A central objective of this study was to explore the comorbidities associated with ADHD. The results revealed a significant link between ADHD and specific health issues [9, 10]. We found a strong association with sleep disturbances (40.8%,

p=0.017), corroborating extensive literature that identifies sleep problems as a common and impactful comorbidity in children with ADHD. Additionally, recurrent fever (36.9%, p=0.049) and a history of seizures (16.9%, p=0.042) were also significantly associated with ADHD, suggesting a need for routine health screening beyond psychiatric evaluation.

Our analysis of the children's nutritional status provided a unique and critical insight. While much of the global literature, particularly from Western countries, has focused on the association between ADHD and obesity, our study revealed a different and significant concern: undernutrition [11, 12]. A substantial proportion of ADHD children were found to be underweight (30.0%) based on BMI and malnourished (27.7%) based on MUAC. These findings were statistically significant (p=0.012 for BMI; p=0.011 for MUAC), highlighting that undernutrition, rather than overnutrition, is a critical comorbidity in this specific demographic. This is further supported by the high prevalence of protein (31.5%) and micronutrient deficiencies (23.9%) among the children, both significantly associated with ADHD (p=0.010). This may be due to the specific socioeconomic and dietary context of Southwest Bangladesh, or it may be related to appetite-suppressing medication, a factor that should be explored in future studies. The ANOVA analysis further supported the link between ADHD severity and nutritional status. We found a clear trend showing that children with more severe ADHD had significantly lower mean BMI (16.1 ± 2.5 kg/m²) and MUAC (16.2 ± 2.0 cm) compared to those with mild ADHD (BMI 17.9 ± 2.0 kg/m²; MUAC 17.6 ± 1.8 cm). This finding suggests a potential dose-response relationship where more severe symptoms may lead to greater nutritional impairment, possibly due to increased behavioral challenges that interfere with eating habits or due to more aggressive medication regimens [13-15].

CONCLUSION

this study provides compelling evidence that ADHD is highly prevalent among children with special needs in Southwest Bangladesh and is significantly associated with undernutrition and specific health problems like sleep disturbances. These findings underscore the urgent need for a multi-faceted approach to ADHD management in this region. Interventions should not be limited to behavioral and pharmacological therapies but must be integrated with comprehensive nutritional counseling, routine health monitoring, and public health initiatives aimed at addressing malnutrition and other health comorbidities. Early identification and a holistic management strategy are crucial to improving the overall well-being and developmental outcomes of these children.

Limitations

This study has several limitations. First, the sample was drawn only from two special schools in Khulna, which may limit the generalizability of the findings to all special children in Southwest Bangladesh. Second, the cross-sectional design prevents establishing causal relationships between ADHD and nutritional or health status. Third, data on dietary intake and health indicators were based on caregiver reports, which may introduce recall bias. Finally, certain potential confounding factors, such as genetic predisposition, environmental influences, and detailed psychosocial parameters, were not assessed, which may affect the observed associations.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study.

Author Contributions

Rubayet Islam Rishad: Conceptualization, study design, statistical analysis, and manuscript drafting.
Robuyat Jahan: Supervision, data interpretation, manuscript revision, and final approval.
Zannatun Tuba: Assistance in data collection, literature review, and manuscript preparation.
Farhana Ferdaus: Study oversight, methodology guidance, and critical revision of the manuscript.

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