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Original Research Article

Comparison of attention-deficit/hyperactivity disorder and socioeconomic status among school-going children

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ABSTRACT

Background: Attention-deficit/hyperactivity disorder (ADHD) was a common neurodevelopmental disorder among school-going children, with Indian prevalence estimates ranging widely (5–25%) depending on setting and screening tools. Socioeconomic status (SES) had been proposed as a key determinant of ADHD risk, acting through chronic stress, reduced healthcare access and inconsistent parenting. To determine the prevalence of ADHD among school-going children aged 7–12 years and to examine its association with socioeconomic status.
Methods: A cross-sectional study was conducted from April 2024 to October 2025 among 400 children aged 7–12 years, recruited from Government/Government-aided schools around Chidambaram (community-based) and a tertiary hospital paediatric OPD (hospital-based confirmation) using multistage cluster sampling. ADHD was screened using the Vanderbilt Assessment Scale (teacher-completed), with positive screens confirmed via CBCL evaluation and psychiatric assessment. SES was classified using a standard composite scale. Associations were assessed using chi-square testing and multivariate logistic regression ($p<0.05$ considered significant).
Results: Overall ADHD prevalence was 11.0% (44/400), with a significant association found between ADHD and SES ($p=0.041$); prevalence rose as SES declined, from 6.3% in the upper class to 12.5% in the lower-middle and upper-lower classes. Adjusted odds remained elevated for lower-middle (AOR 1.72), upper-lower (AOR 1.65) and lower-class (AOR 1.58) children relative to the upper class but did not retain significance after adjustment for gender, family type and parental education.
Conclusions: Approximately one in ten children had ADHD, with a consistent gradient of higher prevalence among lower and lower-middle socioeconomic strata. SES appeared to act alongside other familial and psychosocial factors rather than independently, supporting broader, multi-factorial intervention strategies.

Keywords: Attention-deficit/Hyperactivity disorder, ADHD, Cross-sectional study, Child mental health, Prevalence, Socioeconomic status, School children, Vanderbilt assessment scale

INTRODUCTION

ADHD is among the most frequently diagnosed neurodevelopmental disorders of childhood, characterised by persistent patterns of inattention, hyperactivity and impulsivity that interfere with academic, social and behavioural functioning.[1,2] Epidemiological characterization of ADHD conventionally relies on measures of incidence and prevalence, along with its distribution across age, sex and demographic strata, to gauge the population-level burden of the disorder and to guide health and educational planning.[3]

Because ADHD frequently emerges before school age and may persist into adolescence, understanding its occurrence across broad populations before narrowing to specific risk groups is essential for designing early-

identification strategies. At the global level, pooled estimates from cross-sectional surveys and meta-analyses indicate that a substantial proportion of school-aged children exhibit clinically significant ADHD symptoms, with prevalence figures commonly reported in the mid-single-digit to low-double-digit range depending on the diagnostic framework applied.[4,5] A recent global burden of disease analysis spanning 204 countries between 1990 and 2019 confirmed that both the incidence and prevalence of ADHD have risen over this period, alongside greater clinical recognition of the disorder.[6] Boys are consistently reported to be affected more often than girls and estimates tend to be higher in earlier childhood and the school-going years compared with adolescence.

Regional variation in prevalence reflects differences in genetic, environmental, cultural and methodological factors, including the degree of clinical awareness and the rigor of screening protocols employed in a given setting.

Within India, prevalence estimates for ADHD show wide variability, ranging from below 5% to above 25% depending on whether the sampling frame was school-based or hospital-based and depending on the screening instrument used.[7] A systematic review and meta-analysis of the burden of ADHD among Indian children similarly highlighted considerable heterogeneity across states and study designs, while confirming that ADHD represents a substantial and under-recognised component of the paediatric mental health burden in the country.[8] Despite this heterogeneity, the cumulative evidence points to ADHD affecting a meaningful proportion of Indian schoolchildren, reinforcing the case for systematic surveillance, teacher sensitization and accessible referral pathways for suspected cases.

Narrowing further from these population-level patterns, a substantial body of literature has examined the psychosocial and contextual determinants that modulate the risk of ADHD, of which SES is one of the most consistently studied. Family income, parental education, occupation and related indices of socioeconomic disadvantage have been proposed to interact with genetic predispositions through mechanisms such as chronic psychosocial stress, reduced access to early stimulation and healthcare, inconsistent parenting environments and delayed identification of behavioural symptoms.

Socioeconomic disadvantage may therefore not only elevate the risk of ADHD but also delay its recognition and management, compounding the disorder's functional impact.[1,9,10] Against this backdrop, the present article synthesizes data from a cross-sectional analytical study of 400 school-going children aged 7-12 years to specifically examine the relationship between socioeconomic status and ADHD occurrence and situates these findings within the broader landscape of comparable Indian and international studies.

Aim

To determine the prevalence of ADHD among school-going children aged 7–12 years and to examine its association with SES.

Objectives

To estimate the prevalence of ADHD among school-going children aged 7–12 years, using community-based screening (Government/Government-aided schools around Chidambaram) with hospital-based confirmation.

To classify study participants according to socioeconomic status using a standard composite scale. To assess the association between ADHD and socioeconomic status using chi-square testing. To identify independent predictors of ADHD (including SES, gender, family type and parental education) through multivariate logistic regression analysis.

METHODS

Study design and setting

A cross-sectional analytical study was conducted over a period from April 2024 to October 2025, spanning both community and hospital settings. Government and Government-aided schools located around Chidambaram were included to capture community-based occurrence, while children attending the paediatric outpatient department of a tertiary care Government medical college and hospital were recruited for hospital-based confirmation.

Study population and eligibility

The study population comprised children aged 7 to 12 years enrolled in the selected schools or attending the paediatric outpatient department. Children with a documented history of seizure disorder or developmental delay, pre-existing neurological or endocrine disease or chronic illness requiring prolonged medication were excluded to minimize confounding of the behavioural assessment.

Sample size and sampling method

The minimum required sample size was derived using the formula $n=Z^2PQ/d^2$, based on a reference prevalence of 9.6% reported by Nazar and Suguna, a 95% confidence interval ($Z=1.96$) and 3% absolute precision, yielding a base sample of 370; after adjusting for a 10% anticipated non-response rate, the final sample size was rounded to 400 children.[1]

A multistage cluster sampling technique was used to select schools and subsequently children within each school; those who screened positive were referred to the hospital arm for confirmatory evaluation.

Tools and data collection

A pretested, semi-structured questionnaire was used to record sociodemographic information, including age, sex, class/grade, family type, parental education and socioeconomic status (classified using a standard composite scale). ADHD symptoms were screened using the Vanderbilt Assessment Scale, completed independently by class teachers following structured sensitisation and hands-on training, with parental input obtained during the hospital visit. Children who screened positive underwent evaluation for behavioural and emotional comorbidities using the child behaviour checklist (CBCL) and were subsequently referred for confirmatory psychiatric assessment.

Study variables

ADHD status (present/absent), based on confirmed diagnosis, constituted the primary dependent variable. Independent variables included age, sex, parental education, family type and socioeconomic status, all of which were evaluated for their association with ADHD occurrence.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethics Committee prior to initiation of the study and written informed consent was obtained from the parents or legal guardians of all participating children. Confidentiality of participant data was maintained throughout data collection, analysis and reporting.

Statistical analysis

Data were entered in Microsoft Excel and analysed using SPSS version 26. Categorical variables, including socioeconomic status and ADHD status, were summarised as frequencies and percentages.

The association between ADHD and socioeconomic status was tested using the chi-square test and independent predictors of ADHD were further examined using multivariate logistic regression, with adjusted odds ratios (AOR) and 95% confidence intervals reported. A p value of less than 0.05 was considered statistically significant.

RESULTS

The largest proportion of participants belonged to the lower middle class (32.0%, n=128), followed by the upper lower class (28.0%, n=112). Upper middle class and lower-class participants accounted for 19.0% (n=76) and 13.0% (n=52), respectively, while the smallest proportion (8.0%, n=32) belonged to the upper class. Overall, 73.0% of the sample was drawn from the lower middle, upper lower and lower socioeconomic strata combined, reflecting the composition expected of a Government and Government-aided school-based sample.

Overall, 44 of the 400 children screened were confirmed to have ADHD, giving a point prevalence of 11.0%, indicating that approximately one in every ten children in the study population was affected. This estimate falls within the range commonly reported in Indian school-based studies (Table 5) and provides the baseline against which the socioeconomic distribution of cases is compared.

A statistically significant association was observed between socioeconomic status and ADHD occurrence (p=0.041). Prevalence rose progressively as socioeconomic status declined, from 6.3% in the upper class and 7.9% in the upper middle class, to 12.5% in both the lower middle and upper lower classes, before settling at 11.5% in the lower class. This gradient indicates that children from the lower and lower-middle socioeconomic strata carried a disproportionately higher burden of ADHD compared with their more affluent counterparts.

On multivariate logistic regression, the odds of ADHD were consistently higher for children from the lower middle class (AOR 1.72), upper lower class (AOR 1.65) and lower class (AOR 1.58) relative to the upper class, mirroring the gradient observed on univariate analysis.

However, none of these associations retained statistical significance after adjustment for age, gender, family type and parental education (all p>0.05), suggesting that socioeconomic status may act together with, rather than entirely independently of, other correlated psychosocial and familial factors.

Table 1: Socioeconomic status distribution of study participants (n=400).

Socioeconomic status	Frequency (N)	(%)
Upper class	32	8.0
Upper middle class	76	19.0
Lower middle class	128	32.0
Upper lower class	112	28.0
Lower class	52	13.0
Total	400	100.0

Table 2: Prevalence of ADHD among study participants (n=400).

ADHD status	Frequency (N)	(%)
ADHD present	44	11.0
ADHD absent	356	89.0
Total	400	100.0

Table 3: Association between ADHD and socioeconomic status (n=400).

Socioeconomic status	ADHD present N (row %)	ADHD absent N (row %)	Total (N)	P value
Upper class	2 (6.3)	30 (93.7)	32	0.041*
Upper middle class	6 (7.9)	70 (92.1)	76	
Lower middle class	16 (12.5)	112 (87.5)	128	
Upper lower class	14 (12.5)	98 (87.5)	112	
Lower class	6 (11.5)	46 (88.5)	52	
Total	44 (11.0)	356 (89.0)	400	

*Statistically significant at $p<0.05$ (chi-square test).

Table 4: Multivariate analysis of socioeconomic status and other factors associated with ADHD (n=400).

Variable	Adjusted OR	95% confidence interval	P value
Lower middle class (ref: upper class)	1.72	0.94 - 3.14	0.078
Upper lower class (ref: upper class)	1.65	0.90 - 3.02	0.104
Lower class (ref: upper class)	1.58	0.82 - 3.03	0.171
Male gender	1.36	0.71 - 2.60	0.351
Low parental education	1.51	0.83 - 2.74	0.182

DISCUSSION

The present findings confirm a statistically significant association between socioeconomic status and ADHD occurrence, with prevalence rising as socioeconomic position declined, from 6.3% in the upper class to a peak of 12.5% in the lower-middle and upper-lower classes. This pattern is closely mirrored in the wider literature. Venkata et al and Panicker et al in a considerably larger sample of 770 primary school children in Coimbatore, reported an almost identical overall prevalence of 11.3% and a comparable socioeconomic gradient, with 16.3% prevalence among children from lower socioeconomic groups against 6.8% among those from middle socioeconomic groups.[10] The concordance between these two South Indian, school-based studies strengthens confidence that the SES-ADHD relationship observed here is not an artefact of a single sampling frame.

Similarly, Sindhuprasath et al studying children with confirmed ADHD in a rural tertiary care centre in Tamil Nadu, found that the majority of affected children belonged to lower socioeconomic strata and nuclear family settings, reinforcing that socioeconomic disadvantage frequently co-occurs with confirmed ADHD diagnoses in Indian clinical populations.[11] Outside India, Benti et al reported an ADHD prevalence of 8.4% among Ethiopian children attending paediatric outpatient departments and specifically identified low family income as an independent, statistically significant predictor of ADHD on multivariate analysis (AOR 3.47, 95% CI 1.25-10.10), a considerably stronger effect size than the corresponding, non-significant adjusted estimates obtained in the present study (AOR range 1.58-1.72).[9] This difference may reflect the more extreme range of income deprivation captured in the Ethiopian cohort compared with the composite SES classification used locally.

Malik and Rouf, examining clinically diagnosed children and adolescents attending a specialist ADHD clinic in Kashmir, likewise reported a higher concentration of cases among children from lower-middle and upper-lower socioeconomic classes and explicitly proposed that financial and related environmental stressors underlie this vulnerability.[12] Massoodi et al studying primary school children in Babol, Iran, did not classify SES directly but found that parental illiteracy a closely correlated marker of socioeconomic disadvantage was significantly associated with ADHD occurrence and reported an overall prevalence of 9.9%, close to the present estimate.[2] Nazar and Suguna's Chennai-based study, which formed the basis for the sample size calculation of the present study, similarly examined socioeconomic status as a correlate of ADHD-associated comorbidity and reported a baseline prevalence of 9.7%.[1]

Taken together, these comparative findings suggest a fairly consistent cross-cultural pattern: irrespective of whether socioeconomic disadvantage is operationalized

through composite SES scales, parental literacy or household income, children from disadvantaged backgrounds appear to carry a disproportionately higher burden of ADHD. Several overlapping mechanisms have been proposed to explain this pattern, including chronic psychosocial stress within low-income households, greater exposure to environmental risk factors such as poor prenatal care and neurotoxin exposure, reduced access to early childhood stimulation and healthcare and inconsistent parenting environments that may compound underlying genetic vulnerability. Additionally, socioeconomic disadvantage may influence the pathway to diagnosis itself: children in lower-resource settings may be identified later or through cruder screening tools, while those from higher-resource families may benefit from earlier private consultation, potentially introducing ascertainment differences alongside true differences in occurrence.

Notably, while the univariate chi-square analysis in the present study showed a statistically significant SES-ADHD association, this significance did not persist after multivariate adjustment for gender, family type and parental education, indicating that socioeconomic status likely operates in combination with, rather than entirely independently of, these correlated psychosocial variables. This mirrors the broader pattern in the literature, where SES is rarely an isolated risk factor and is more often embedded within a cluster of interrelated familial and environmental determinants.[1,2,9] Consequently, interventions aimed at reducing the ADHD burden among disadvantaged children may need to address this broader constellation of psychosocial risk rather than socioeconomic status in isolation.

The consistency of these findings across geographically and culturally distinct settings South India, Ethiopia, Iran and Kashmir lends weight to the generalisability of the SES-ADHD gradient, while also highlighting that the strength of the association may vary with the specific measure of socioeconomic disadvantage used and the population studied (school-based versus clinic-based samples).

It is also useful to situate the present prevalence estimate against studies that did not specifically stratify by socioeconomic status but nonetheless add context to the overall burden of ADHD in comparable populations. Karki et al in a clinic-based record review of 585 diagnosed children in Nepal, reported a marked male predominance (85.6%) and a high burden of neurodevelopmental comorbidity, broadly consistent with the clinical profile of the ADHD cases identified in the present study, although their sample was restricted to children already referred for specialist care rather than a community-screened cohort.[13] Jain et al in a community-based sample of 100 primary school children in Pune, reported a prevalence of 12.0%, closely matching the present estimate of 11.0%, with the combined subtype again predominating.[14] Conversely, Chandel et al studying 100 elementary school children in Jaipur, reported a considerably lower prevalence of 6.0%, illustrating that even within India, methodological differences in screening tools and sampling frames can produce a wide prevalence range even before socioeconomic stratification is considered.[15] These comparisons reinforce that while the direction of the SES-ADHD association is remarkably consistent, absolute prevalence figures remain sensitive to setting and methodology, underscoring the importance of standardised, socioeconomically stratified screening protocols in future multi-centric research.[8,16]

CONCLUSION

ADHD affected approximately one in ten school-going children in the present study population and its occurrence showed a significant association with socioeconomic status, with a consistent gradient of higher prevalence among children from lower and lower-middle socioeconomic strata.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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