Research Article

Prevalence of Attention-Deficit/Hyperactivity Disorder and Its Associated Factors Among Schoolchildren: A Cross-Sectional Study Using The Conners' Teacher Rating Scale

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ABSTRACT

Background:
Attention Deficit Hyperactivity Disorder (ADHD) is considered to be one of the most common neurodevelopmental disorders in children and can continue into adulthood, and its incidence is seemed to have been on rise in the recent times. However, the frequency of ADHD differs significantly across countries. The current study aims to determine the prevalence rates of positive symptoms of ADHD, among children (5-15 years old) in Visakhapatnam, Andhra Pradesh, India as well as to raise awareness about ADHD among the teachers and the school. Thes study also aims to examine the association of ADHD with demographic, family, perinatal, academic, lifestyle and anthropometric factors.
Methods:
A descriptive cross-sectional study was conducted among 511 boys and girls aged 5–15 years enrolled in Classes 1–9 in selected schools in Visakhapatnam district, Andhra Pradesh, after obtaining the necessary permissions. Teachers completed the Conner's Teacher-Rating Scale Short (CTRS)-28 version questionnaire to screen ADHD symptom positivity. A structured demographic questionnaire was administered to collect participant characteristics and assess potential factors associated with ADHD symptom positivity. Associations between ADHD symptom positivity and potential correlates were examined using bivariate analyses and multivariable logistic regression.
Results:
The overall prevalence of ADHD was 7.6% (39 of 511; 95% CI 5.6 to 10.3). Significant associations were found with age (11.4% at 12 to 16 years versus 3.2% at 9 to 11 years; p = 0.007), rural residence (10.3% versus 4.2% in urban areas; p = 0.008) and father's education (18.9% when intermediate; p = 0.001). Type of delivery was borderline in unadjusted analysis (caesarean 10.3% versus 5.7%; p = 0.056). In the multivariable model, age of 12 years or older (adjusted OR 3.06, 95% CI 1.41 to 6.66), rural residence (2.45, 1.12 to 5.36), intermediate paternal education (2.94, 1.38 to 6.24) and caesarean delivery (2.18, 1.08 to 4.40) were independently associated with ADHD. No significant association was observed with gender, family type, mother's education, birth weight, grade in exams, television or phone use, sleep duration or BMI category.
Conclusion:
About one in thirteen schoolchildren screened positive for ADHD, with higher risk in early adolescence, rural areas and children of fathers with intermediate education. Screening in schools, followed by clinical confirmation, is recommended.

Keywords: Attention-Deficit/Hyperactivity Disorder; ADHD; Conners Teacher Rating Scale; prevalence; school children; India.

1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is characterised by age-inappropriate inattention, hyperactivity and impulsivity that interfere with functioning. It is one of the most prevalent chronic mental health conditions affecting school-aged children, with global pooled prevalence estimates of around 5% to 7% and wide variation between studies that is largely attributable to methodology, such as the informant, diagnostic criteria and case definition used(Ogundele & Ayyash, 2023; Salari et al., 2023; Wanni Arachchige Dona et al., 2023). Earlier reviews of community studies reported ranges from 2% to 17%, with 5% to 10% commonly cited for school-aged children(Sharma et al., 2020). Untreated ADHD is associated with poor academic performance, injuries, low self-esteem, conduct problems and substance use in later life(Gore & Morgan, 2025). A recent school-based study among primary schoolchildren in Kancheepuram district reported an overall prevalence of 8.8%, with significant associations with age, standard of education, birth order, caregiver, family income and family history of ADHD, but not with gender(Catherine et al., 2019). Awareness of ADHD among parents, teachers and educationists remains limited, and many affected children are never referred for assessment(Peasgood et al., 2016).
Most Indian studies have concentrated on a narrow age range, usually the primary school years, and have examined a limited set of demographic variables. Fewer have considered perinatal factors (term and type of delivery, birth weight), screen exposure, sleep and nutritional status in the same sample as demographic characteristics(Mahin et al., 2026). The present study therefore aimed to estimate the prevalence of ADHD

among schoolchildren from grades 1 to 10(5–15-year-olds) both girls and boys by using Conner's teacher rating questionnaire (Short version) and to examine its association with each of these factors.

2. Methods

a. Study Design and Setting

A cross-sectional study was performed in the schools among children in classes 1 to 10, belonging to the age range of (5-15 years old). The purpose of the study was the assessment of ADHD prevalence in schools by Conners' Teacher Rating Scale–Short Form (CTRS-28) questionnaire, and to find associated factors linked to ADHD symptoms. This study complies with the guidelines for cross-sectional studies according to STROBE.

b. Participants and Sampling

In all, 589 packages containing structured questionnaires were administered to class teachers that had known the allocated students for at least six months. In each package, there was the CTRS-R:S test, sociodemographic pro forma, and perinatal history. There were 511students that participated in the analysis. Schools were selected by cluster sampling method, and all eligible children in the selected classes were included based upon the inclusion and exclusion criteria. Participants in the study were school-aged children between the ages of about 5–15 years whose behavior had been adequately watched by their class teachers for a minimum time period of 6 months.

c. Measures

Section A: Structured questionnaire. A questionnaire designed for the study collected age, gender, class (standard), family type (nuclear or joint), area of residence (urban or rural), father's and mother's education, previous history of ADHD, comorbid conditions, term of delivery (pre-term, term or post-term), type of delivery (normal or caesarean), birth weight (<2.5 kg, >2.5 kg or unknown), grade in examinations (A to E), daily television and mobile-phone hours, daily sleep hours, and height and weight, from which BMI was calculated and categorised as underweight, normal, overweight or obese(Cheesman et al., 2022; Degroote et al., 2024; Deng et al., 2024; Hosseinnia et al., 2024; Hussein et al., 2025; Kim et al., 2020; Njardvik et al., 2025; Xu et al., 2023).

Section B: Conners' Teacher Rating Scale. The Conners' Teacher Rating Scale (28 items, each scored from 0 to 3) was completed by the class teacher who had known the child for at least 6 months and recorded behaviour observed in the classroom. Children whose scores exceeded the screening cut-off of t-score more than 60 were classified as ADHD-positive; the remaining children were classified as non-ADHD. Scores among ADHD-positive children ranged from 59 to 74. The test contained 28 items rated on a four-point Likert scale that ranged between 0 (Not at all true) and 3 (Very much true)(Conners et al., 1998; Erford, 1995; Purpura & Lonigan, 2009; Staff et al., 2021).

d. Data collection procedure

The purpose of the study was explained to school authorities, teachers and caregivers. Written informed consent was obtained from caregivers, and assent from older children. Confidentiality was assured, and participation was voluntary. Teachers completed the rating scales, and demographic information was provided by caregivers.

e. Ethical Considerations

The Institutional Ethics Committee of the university approved the study protocol (Approval Number: IEC-371/2024; Dated 26-02-25). This study complied with the ethical guidelines set forth by the Indian Council of Medical Research (ICMR) and the Declaration of Helsinki (2013 revision). Participation was voluntary and anonymous; only consenting individuals proceeded, with data securely stored, and accessible only to the investigator.

f. Statistical Analysis

Categorical data were summarised as frequency and percentage, and continuous data as mean and standard deviation (SD) or median. Prevalence was calculated as the number of ADHD-positive children divided by the total sample, with a Wilson 95% CI. The chi-square test was used to test the association between ADHD and each categorical variable, with Fisher's exact test for 2 × 2 tables with small expected counts. The chi-square test for linear trend was used for ordered categories (age, standard, grade, television, phone and sleep). Sparse categories were merged: age in three groups (5 to 8, 9 to 11 and 12 to 16 years), standard in three groups, grades C to E, television 3 or more hours, phone 2 or more hours, sleep under 8 hours and 9 or more hours, and overweight with obese. The Mann-Whitney U test compared age and BMI between groups. Unadjusted odds ratios (OR) with 95% CI were computed for selected comparisons. A multivariable logistic regression model was fitted with gender, age (12 years or older), family type, area, intermediate paternal education, type of delivery and normal BMI category entered together. A p-value below 0.05 (two-sided) was considered statistically significant.

3. Results

a. Section A: Frequency and percentage distribution of demographic variables

Of the 511 children, the mean age was 10.9 years (SD 2.3; range 5 to 16). With regard to gender, 209 (40.9%) were male and 302 (59.1%) were female. By standard of education, 193 (37.8%) were in grades 1 to 5, 286 (56.0%) in grades 6 to 8 and 32 (6.3%) in grades 9 and 10. With regard to family type, 361 (70.6%) were from nuclear and 150 (29.4%) from joint families. A total of 271 (53.0%) children lived in rural areas and 240 (46.8%) in urban areas. Paternal education was intermediate in 74 (14.5%), Xth standard in 130 (25.4%), degree or undergraduate in 154 (30.1%), postgraduate in 46 (9.0%) and other in 107 (20.9%). Regarding perinatal factors, 386 (75.5%) were born at term, 73 (14.3%) pre-term and 52 (10.2%) post-term; 214 (41.9%) were born by caesarean section; birth weight was above 2.5 kg for 264 (51.7%), below 2.5 kg for 197 (38.6%) and unknown for 50 (9.8%). A previous diagnosis of ADHD was reported for 13 (2.5%). Most children (308; 60.3%) used a phone for 0 to 1 hour and 239 (46.8%) watched television for 0 to 1 hour per day. Sleep of 8 to 9 hours was most common (236; 46.2%). By BMI category, 315 (61.6%) were underweight, 151 (29.5%) normal, 22 (4.3%) overweight and 23 (4.5%) obese.

b. Section B: Determination of the prevalence of ADHD among schoolchildren

The presence of ADHD symptoms was determined from the Conners' Teacher Rating Scale screening. A total of 472 (92.4%) children were categorized as normal (non-ADHD) and 39 (7.6%) children were ADHD-positive. The overall prevalence of ADHD was 7.6% (95% CI 5.6 to 10.3). Among the ADHD-positive children, the mean score was 65.0 (SD 4.3; median 63.5; range 59 to 74; score available for 38 children). Cases were concentrated in the upper classes: 19 of the 39 (48.7%) were in the 7th standard, and 15 (38.5%) were aged 13 years. The age-specific prevalence peaked at age 13 (15 of 84; 17.9%).

c. Section C: Association of ADHD with the selected variables

The analysis revealed a significant association with age, area of residence and father's education. There was no significant association with gender, standard of education, family type, mother's education, previous history of ADHD, comorbid conditions, excess sugar intake, term of delivery, type of delivery, birth weight, grade in exams, television hours, phone hours, BMI category or sleep hours. This is represented in Table 1.

Table 1. Association of ADHD among schoolchildren with the selected variables (n = 511)

Variable	Normal n (%)	ADHD n (%)	χ^2, df, p
Age (years)			10.06, 2, 0.007 (S)*
5 to 8	80 (93.0)	6 (7.0)	
9 to 11	182 (96.8)	6 (3.2)	
12 to 16	210 (88.6)	27 (11.4)	
Gender			0.48, 1, 0.488 (NS)
Male	191 (91.4)	18 (8.6)	
Female	281 (93.0)	21 (7.0)	
Standard of education			2.65, 2, 0.266 (NS)
1st to 5th	183 (94.8)	10 (5.2)	
6th to 8th	260 (90.9)	26 (9.1)	
9th to 10th	29 (90.6)	3 (9.4)	
Family type			1.69, 1, 0.194 (NS)
Nuclear	337 (93.4)	24 (6.6)	
Joint	135 (90.0)	15 (10.0)	
Area of residence (n = 510)			6.96, 1, 0.008 (S)*
Urban	230 (95.8)	10 (4.2)	
Rural	243 (89.7)	28 (10.3)	
Father's education			18.15, 4, 0.001 (S)*
Postgraduate	45 (97.8)	1 (2.2)	
Degree/UG	147 (95.5)	7 (4.5)	
Others	101 (94.4)	6 (5.6)	
Xth	119 (91.5)	11 (8.5)	
Intermediate	60 (81.1)	14 (18.9)	
Mother's education			3.73, 4, 0.443 (NS)

Variable	Normal n (%)	ADHD n (%)	χ^2, df, p
Postgraduate	25 (96.2)	1 (3.8)	
Degree/UG	125 (91.9)	11 (8.1)	
Others	98 (96.1)	4 (3.9)	
Xth	136 (91.3)	13 (8.7)	
Intermediate	88 (89.8)	10 (10.2)	
Previous history of ADHD			
No	460 (92.4)	38 (7.6)	Fisher p = 1.000 (NS)
Yes	12 (92.3)	1 (7.7)	
Comorbid condition (n = 151)			
No	119 (94.4)	7 (5.6)	Fisher p = 1.000 (NS)
Yes	24 (96.0)	1 (4.0)	
Excess sugar intake (n = 151)			
No	107 (95.5)	5 (4.5)	Fisher p = 0.426 (NS)
Yes	36 (92.3)	3 (7.7)	
Delivery term			
Pre-term	65 (89.0)	8 (11.0)	3.00, 2, 0.223 (NS)
Term	361 (93.5)	25 (6.5)	
Post-term	46 (88.5)	6 (11.5)	
Type of delivery			
Normal	280 (94.3)	17 (5.7)	3.66, 1, 0.056 (NS)
Caesarean	192 (89.7)	22 (10.3)	
Birth weight (kg)			
<2.5	182 (92.4)	15 (7.6)	2.69, 2, 0.261 (NS)
>2.5	241 (91.3)	23 (8.7)	
Unknown	49 (98.0)	1 (2.0)	
Grade in exams			
A	255 (91.4)	24 (8.6)	2.17, 2, 0.337 (NS)
B	174 (92.6)	14 (7.4)	
C to E	43 (97.7)	1 (2.3)	
TV (hours/day)			
0 to 1	221 (92.5)	18 (7.5)	0.23, 3, 0.972 (NS)
1 to 2	118 (92.9)	9 (7.1)	
2 to 3	83 (91.2)	8 (8.8)	
3 or more	50 (92.6)	4 (7.4)	
Phone (hours/day)			
0 to 1	283 (91.9)	25 (8.1)	0.38, 2, 0.826 (NS)
1 to 2	112 (92.6)	9 (7.4)	
2 or more	77 (93.9)	5 (6.1)	
BMI category			
Underweight	295 (93.7)	20 (6.3)	4.20, 2, 0.122 (NS)
Normal	134 (88.7)	17 (11.3)	
Overweight/obese	43 (95.6)	2 (4.4)	
Sleep (hours/day)			
Under 8	116 (95.1)	6 (4.9)	1.83, 2, 0.400 (NS)
8 to 9	217 (92.0)	19 (8.1)	
9 or more	139 (90.8)	14 (9.2)	

NS: not significant; (S)*: significant at $p < 0.05$. Percentages are row percentages

Age. Children with ADHD were older (mean 11.6 years, SD 2.4; median 13) than children without (mean 10.8, SD 2.3; median 11; Mann-Whitney p = 0.011). The test for linear trend was significant ($\chi^2 = 4.57$, p = 0.033), though the pattern was not monotonic, with the lowest prevalence at 9 to 11 years. Children aged 12 years or older had higher odds than younger children (11.4% versus 4.4%; OR 2.81, 95% CI 1.39 to 5.67). Each additional year of age was associated with an OR of 1.17 (95% CI 1.00 to 1.36; p = 0.050).

Gender. ADHD was similar in boys (8.6%) and girls (7.0%) (OR 1.26, 95% CI 0.65 to 2.43; p = 0.49).
Sleep, screen time and BMI. Sleep duration showed no significant association or linear trend (p = 0.400; trend p = 0.200), although prevalence was lowest in children sleeping under 8 hours (4.9%; OR 0.56, 95% CI 0.23 to 1.37). Television (p = 0.972) and phone use (p = 0.826) were unrelated to ADHD, and no dose-response was seen (television 2 or more hours OR 1.13, 0.56 to 2.30; phone 2 or more hours OR 0.75, 0.29 to 1.99). Median BMI was slightly higher in children with ADHD (17.9 versus 17.1 kg/m²; Mann-Whitney p = 0.046), but the OR per BMI unit was not significant (1.03, 95% CI 0.98 to 1.09; p = 0.27), and BMI categories did not differ significantly (p = 0.122). Prevalence was highest in the normal-weight category (11.3%) and lowest among overweight or obese children (4.4%).
Type of delivery. The prevalence was 10.3% after caesarean delivery and 5.7% after normal delivery (OR 1.89, 95% CI 0.98 to 3.65; χ^2 p = 0.056; Fisher p = 0.064), a borderline association. Pre-term and post-term births each had a prevalence of about 11% compared with 6.5% for term births, which was not statistically significant (p = 0.223).

d. Section D: Factors independently associated with ADHD

In the multivariable model (510 children with complete data; 38 events; area under the ROC curve 0.74), age of 12 years or older, rural residence, intermediate paternal education and caesarean delivery remained significantly associated with ADHD (Table 2). Gender, family type and normal BMI were not significant.

Table 2. Unadjusted and adjusted odds ratios for ADHD

Variable (reference)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted p
Male (female)	1.26 (0.65 to 2.43)	1.51 (0.74 to 3.09)	0.260
Age 12 years or older (younger)	2.81 (1.39 to 5.67)	3.06 (1.41 to 6.66)	0.005
Joint family (nuclear)	1.56 (0.79 to 3.07)	1.47 (0.72 to 3.00)	0.287
Rural area (urban)	2.64 (1.25 to 5.55)	2.45 (1.12 to 5.36)	0.024
Father's education intermediate (others)	3.85 (1.89 to 7.81)	2.94 (1.38 to 6.24)	0.005
Caesarean delivery (normal)	1.89 (0.98 to 3.65)	2.18 (1.08 to 4.40)	0.029
Normal BMI category (other categories)	1.95 (1.00 to 3.79)	1.43 (0.69 to 2.94)	0.333

4. Discussion

ADHD is a highly prevalent condition among schoolchildren, and this study indicates the importance of early identification of this neurodevelopmental disorder in school settings. The prevalence in the present study was 7.6% (95% CI 5.6 to 10.3), which lies within the 5% to 10% range commonly cited for school-aged children and is above the pooled worldwide estimates of about 5% to 7%. It is also close to the 8.8% reported among primary schoolchildren in Kancheepuram district using parent and teacher versions of the Conners' scale confirmed by DSM-5 interview, although that study was confined to children aged 8 to 11 years. Published Indian estimates range from under 4% to over 15%, and the differences are largely explained by the informant, instrument, cut-off and the use of clinical confirmation. As our estimate rests on a single teacher-rated screen, it represents screen-positive prevalence and may overestimate the prevalence of the clinical disorder, because teacher ratings capture behavioural problems other than ADHD (Kim et al., 2020; Kuppili et al., 2017; Peasgood et al., 2016)
There was an almost equal proportion of ADHD among boys (8.6%) and girls (7.0%), and the difference was not significant. This agrees with the model study, which also found no association with gender, and is consistent with the view that the male excess seen in clinic samples reflects referral bias and the under-recognition of inattentive presentations in girls. The preponderance of girls in our sample (59.1%) may also have reduced the power to detect a sex difference.
Age was significantly associated with ADHD. Prevalence was highest in the 12 to 16 year group (11.4%), and 15 of the 39 cases were 13 years old. This differs from the model study, in which the highest rate was in children aged 9 years, but that study did not include children older than 11 years. Because ADHD begins in childhood, a higher teacher-rated prevalence in early adolescence is unlikely to reflect new-onset disorder. Plausible explanations include rising academic and organisational demands in the middle school years, the overlap of ADHD items with oppositional and conduct behaviours that increase in adolescence, and differences in rating between teachers. The finding that nearly half of the cases (19 of 39) were in the 7th standard suggests clustering within particular classes or raters, which could inflate the age association and which we could not adjust for. The

same concern applies to the difference between the 5-to-8-year group (7.0%) and the 9-to-11-year group (3.2%), which was not monotonic.

Rural children had about 2.6 times the odds of ADHD compared with urban children (10.3% versus 4.2%), and the association persisted after adjustment. This may reflect poorer access to health care and early developmental services, nutritional and environmental exposures, and socioeconomic disadvantage, as the model study and others have linked lower economic status to higher prevalence. We did not collect family income, so parental education may be partly acting as a proxy. Father's education was significantly associated with ADHD, but not in a stepwise manner: the highest risk was in children whose fathers had intermediate education (18.9%), and the lowest in those with postgraduate fathers (2.2%). We consider the intermediate category finding exploratory, given the number of categories compared and the small cell counts. Mother's education was not significant, in line with the model study, which found no association with the caregiver's educational status.

Neither sleep duration nor screen time was associated with ADHD. Short sleep and early or heavy television exposure have been linked to inattention in earlier studies, but the range of exposure in our sample was narrow: almost half of the children watched television for 1 hour or less, and few children used the phone or television for long hours. Sleep-related associations in the literature are largely based on objective measures, whereas sleep in our study was reported, with potential recall error. The absence of a relationship in this sample should not be interpreted as proof of no relationship, particularly given that only 39 children were affected.

Body mass index was not significantly associated with ADHD. Although median BMI was slightly higher in ADHD (17.9 versus 17.1 kg/m²; p = 0.046), BMI categories did not differ, and the overweight or obese children (n = 45) had the lowest prevalence (4.4%). Meta-analytic evidence links ADHD with obesity, but with only two ADHD-positive children in the overweight or obese category our power to detect this was limited. In addition, 61.6% of the children were classified as underweight, which is higher than expected and suggests that either undernutrition is highly prevalent in this population or that BMI was categorised using adult cut-offs rather than age- and sex-specific reference standards. This should be checked and, if necessary, reclassified using the WHO growth reference before the BMI results are finalised.

Caesarean delivery was independently associated with ADHD in the multivariable model (adjusted OR 2.18, 95% CI 1.08 to 4.40), although the unadjusted association was borderline (p = 0.056). This agrees in direction with a meta-analysis reporting a modest increase in the risk of neurodevelopmental disorders, including ADHD, in children born by caesarean section, but the effect size seen here is larger than reported there and may be inflated by chance or confounding by indication (such as maternal or fetal complications that also raise the risk of ADHD).

Pre-term and post-term births each had a higher prevalence (about 11%) than term births (6.5%), which is in the direction of the evidence for prematurity, though not statistically significant. Birth weight showed no clear association, with the lowest prevalence (2.0%) among children with unknown birth weight, indicating that missing birth data may bias comparisons. Neither a history of ADHD nor a family history could be examined in a meaningful way: only 13 children reported a previous diagnosis, of whom one screened positive. This suggests underdiagnosis in the community or an unreliable parental report, whereas in the model study a previous diagnosis of ADHD was strongly associated with current symptom.

Examination grade was not significantly associated with ADHD, although none of the groups showed the expected inverse gradient: prevalence was 8.6% for grade A, 7.4% for B and 2.3% for C to E. The small number of children in the lower grade categories (n = 44) limited this comparison.

5. Strengths and limitations

The strengths of this study include the inclusion of children across the whole school age range from 5 to 15 years, use of a standardized teacher-rated instrument, and assessment of a wide range of factors, including perinatal, lifestyle and anthropometric characteristics, in the same sample.

The limitations of the study are as follows. First, classification was based on a single teacher-rated screening scale; there was no parent report and no confirmation by clinical interview using DSM-5, so the estimate refers to screen-positive children. Second, the study was cross-sectional, so temporal and causal inferences cannot be drawn. Third, only 39 children were classified as ADHD-positive; confidence intervals for adjusted estimates are wide, the multivariable model contained seven covariates for 38 events (about 5 events per variable) and its estimates should be regarded as exploratory, and non-significant findings do not exclude real effects. Fourth, many associations were tested without correction for multiple comparisons. Fifth, the concentration of cases in specific classes suggests clustering by teacher or school that could not be modelled. Sixth, perinatal, sleep and screen-time information was reported by caregivers and may be subject to recall bias, and comorbidity and sugar-intake information was available for only 151 children (29.6%). Finally, area of residence was missing for one child

and the screening score for one ADHD-positive child, and the study was limited to selected schools, which may limit generalizability.

6. Conclusion

The overall prevalence of ADHD among the 511 schoolchildren was 7.6% (95% CI 5.6 to 10.3). Age of 12 years and above, rural residence, intermediate paternal education and caesarean delivery were independently associated with ADHD, whereas gender, family type, mother's education, birth weight, examination grade, screen time, sleep duration and BMI were not significantly associated. The findings point to the importance of school-based screening, especially in early adolescence and rural schools, followed by clinical confirmation and referral. Larger multi-informant studies with clinical diagnosis and with modelling of school and teacher clustering are needed.

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CRediT authorship contribution statement

Samson K Wilson: Writing-review & editing, original draft, Investigation, Data curation.

Srinivas Singisetti: Supervision, Validation, Methodology.

Amit Kundu: Conceptualisation, Supervision, Resources, Project administration.

Competing interests

The authors declare that they have no financial or non-financial conflicts of interest related to the research, authorship, and/or publication of this article.

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Data availability statement

Data shall be provided upon reasonable request to the corresponding author.

Participant consent

Consent was obtained prior to participation in the study.

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