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Health and Immunisation Status of Adolescent School Children in Southern Odisha

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ABSTRACT

Background: There are major changes in a person's appearance, mental state, and behavior during adolescence, which is an important developmental stage between childhood and adulthood. 20.9% of India's population is under the age of 18, and they face several threats to their health, including early marriage, poor nutrition, and insufficient vaccines. There may be benefits to urbanisation, but there are also health disparities that show how important it is to deal with teen health largely. The objective of the study is to evaluate the health and immunisation conditions of teenage students in Southern Odisha.

Methods: When people were interviewed in person, a pre-made questionnaire was used to collect information about their demographics and vaccination history. Height, weight, and BMI were measured by a paediatric resident using standardised equipment and analysed using IAP growth charts. Using a digital sphygmomanometer, blood pressure was logged, and pallor was evaluated by examining the person. The data was analysed using SPSS, and correlations were found using chi-square tests.

Results: The study chose 349 students aged between 11–15 from public and private schools in Berhampur who went to the paediatric emergency department from 2019–2021. There were primarily men (66.2%) among the 14-year-olds. 59.3% went to public schools. There were 63.90% fully vaccinated and 36.10% partially vaccinated. The height distribution was 7.2% stunted 1.1% above 97%, and 91.7% normal.

Conclusion: The COVID-19 pandemic has exacerbated preexisting conditions, such as obesity and hypertension, which pose serious health risks to India's youth. Increased awareness and immunisation efforts improve adolescent health.

Key-words: Adolescence, COVID-19, Hypertension, Obesity, Blood Pressure

INTRODUCTION

The Latin root of the word "adolescence" means "to grow up to maturity" The period of growth and development between childhood and maturity is known as adolescence [1]. According to the WHO, an adolescent is any individual who is 10 to 19 years old.

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This is the formative years between childhood and maturity, during which the greatest number of behavioural, psychological, and physical changes occur. This time frame is further separated for statistical purposes into Early Adolescence (10–14 years), late adolescence, 15–19 years old. Adolescence, however, varies greatly based on customs, cultural norms, and other social elements in each community [2]. Adolescents make up one in five people on the planet today, and 85% of them reside in developing nations. In India, adolescents make up more than Many of them drop out of school, marry young, work in dangerous jobs, engage in sexual activity, and are subject to peer pressure. These

elements have significant effects on the economy and public health [3].

The adolescent age group was often ignored, although having such enormous potential. Based on the existing data on illness and mortality for this age group, adolescence was thought to be one of the healthiest periods, which might explain this neglect. Adolescent females, who make up around 10% of India's population, are an important part of the community. Particularly in poor nations where early marriage is customary and there is a higher risk of reproductive illness and death, girls represent a particularly susceptible demographic. Early adolescence is a time when people grow and mature quickly as they develop as adults [4]. The nutritional state of the community® is greatly influenced by the nutritional state of teenage females, who will eventually become mothers. Wide-ranging effects can result from inadequate nutrition, particularly in teenage girls [5]. If their dietary requirements are not satisfied, they may offer to give birth to malnourished offspring, passing on undernutrition to the next generations.

There are 253 million teenagers in India, making up 20.9% of the total population [6]. The proportion of adolescents living in rural regions is around 72%. The percentage of adolescents in urban regions fell from 21.9% in 2001 to 19.2% in 2011, although in rural areas, it was relatively unchanged. Adolescence is a time of rapid brain growth and intricate interactions with the social environment that shape a person's capacities for adulthood [7].

Even if numerous potentials for social and economic well-being come with urbanization, if basic utilities are neglected, rapid urbanization will lead to health inequities. Compared to 36% of men and 41% of women aged 20 to 24, almost half (58%) of teenage boys and 47% of teenage girls are underweight [8]. Adolescent females in metropolitan environments have anaemia at a rate of 16%*. According to research conducted on 223 teenage females in an Andhra Pradesh urban slum, the frequency of stunting was 28.3% overall.

Thinness is at 20.6%'*, and underweight is at 22.9%. In the Ernakulam district of Kerala, the percentage of overweight children rose from 4.94% in 2003 to 6.57% in 2005 among a cohort of 24,000 children aged 5 to 16. The proportion of overweight people was considerably greater in metropolitan areas and private schools, and the growing trend was exclusive to private schools [9]. The increase was notable in both boys and girls.

In comparison to their rural counterparts, urban teenagers had a lower incidence of underweight and a higher prevalence of obesity and overweight (14–16 years old) in research comparing obesity across these two populations [10-13]. Since the WHO ranks infectious illness as the third most common health issue affecting adolescents, vaccination is currently regarded as one of the most important aspects of teenage health!" additionally, One of the "ten great public health achievements of the 20th century" is vaccination.

This study found that unvaccinated participants had a much greater lifetime prevalence of illnesses that can be prevented by vaccination than vaccinated ones. Again, adolescents are seldom ever vaccinated under India's Universal Immunization Program (UPI). There are no data on the vaccination coverage of teenagers in India, except for TT. Slightly more than three-fourths (79%) of children aged 12-23 months in Odisha received all recommended immunizations against six common childhood diseases, according to NFHS 4 data [14]. However, 96% of youngsters have not had any vaccinations, with the majority having received at least some immunizations overall.

In comparison to urban regions, coverage with all basic vaccines is slightly greater in rural areas (79% vs. 75%). The immunization of adolescents faces several obstacles [15]. Like social obstacles, when a vaccination becomes successful, the societal costs of the diseases the society prevents are overlooked.

MATERIALS AND METHODS

Research Design- This prospective study was performed in MKCG Medical College and Hospital, Berhampur, Ganjam, Odisha, from November 2022 to October 2023. The study employed a preformed questionnaire in a face-to-face interview to assess the demographic variables and immunisation status. Anthropometry, including Height and weight, was assessed by a pediatric resident using a Stadiometer and weighing machine, respectively. Height, weight and BMI for age were analysed using IAP growth charts. BP was recorded in the right upper limb in a sitting position by using a digital sphygmomanometer using an age-appropriate cuff and was analysed using WHO BP charts. Pallor was assessed in the palm and inner side of the lower eyelid.

Inclusion criteria

- Adolescent school children.

Exclusion criteria

- Children with chronic systemic illness and sick children.
- Parents not willing to enroll.

Data Collection

- Study variables
- Socio-demographic data
- Immunisation status
- Height
- Weight
- BMI
- BP
- Pallor

Study Tools

- Study proforma
- Stadiometer
- Weighing machine
- Sphygmomanometer with age-appropriate cuff.
- JAP Growth Charts and WHO BP Charts.

Method of data- A preformed questionnaire was used to assess the demographic variables and immunisation status in a face-to-face interview. Anthropometry, including Height and weight, were assessed by a pediatric resident using a Stadiometer and weighing machine, respectively. Height, weight and BMI for age were analysed using IAP growth charts. BP was recorded in the right upper limb in a sitting position by using a digital sphygmomanometer using an age-appropriate cuff and was analysed using WHO BP charts. Pallor was assessed in the palm and inner side of the lower eyelid.

Statistical analysis- All the measurements were recorded in the preformed proforma, and the data was analysed using SPSS software. Various associations were calculated using the chi-square test.

Ethical clearance- The Ethical Committee of the MKCG Medical College and Hospital, Berhampur, Ganjam, Odisha, India has approved this study.

RESULTS

A total of 349 schoolchildren in the adolescent age group from different government and private schools in Berhampur who attended the Pediatric OPD from 2019 to 2021 were selected for the study.

Three hundred forty school-going children in the school-going nt age group from 11 to 15 years old were selected for the study. Most study participants are 14 years. The lowest number of study participants belongs to the 15-year age group. The mean age of the study population is 12.64.

Table 1: Age Distribution

Age	Number	Percentage (%)
11	80	22.9
12	86	24.6
13	165	18.6
14	114	32.7
15	4	1.1

In our study, the majority of the study subjects are males (66.2). A total of 231 males and 118 females participated in the study.

Table 2: Gender Distribution

Gender	Number	Percentage (%)
Female	118	33.8
Male	231	166.2

In this study, 59.3% of subjects belonged to government schools, whereas 40.7% were from private schools. This may be because government medical college OPD's are mainly utilised by people from lower socioeconomic classes who are studying in government schools.

Table 3: Type of School

Type of School	Number	Percentage (%)
Govt	207	59.3
Private	142	40.7

In this study, those children, who had taken all vaccines according to NIS till ten years of age against all six vaccine-preventable diseases were taken as" fully vaccinated". Those who missed any one vaccine till ten years of age are taken as incompletely vaccinated "and those who had not taken any vaccine till now are included in "not vaccinated" category. We got 63.90% of study subjects fully vaccinated and 36.10% incompletely vaccinated.

Table 4: Vaccination Status

Vaccination in status	Number	Percentage (%)
Completely	223	163.9
Incompletely	126	36.1
Not vaccinated	0	0

Height analysis in our study shows 7.2% of our study population is stunted, and 1.1% of our study population has a height above 97" percentile for age. 91.7% of our study population is having a normal height.

Table 5: Height Analysis

	Number	Percentage (%)
Normal	320	91.7
Stunting	25	7.2
Tall for age height above 97%	4	1.1

DISCUSSION

A total of 349 kids between the ages of 11 and 15, who are in the school-going teenage age group, were chosen for the study [16]. Most research participants are between the ages of 14 and 15. The age group of 15 years old has the fewest research participants. The study population's average age is 12.64. A related research was conducted in Berhampur. The study participants are in the age range of 10 to 16. In a different research by Heininger *et al*. [17] participants between the ages of 14 and 16 are chosen to investigate teenage obesity.

Males make up the bulk of the research participants in our investigation (66.2) [17]. The study included 118 female participants and 231 male participants. Similar findings (more men than women) are seen in Indore research. There were 46% women and 54% men in this research. In related research conducted in Berhampur, Odisha, the study population was composed of 36.9% females and 63.1% men. A total of 40.7% of the research in this survey attended private schools, compared to 59.3% who attended government institutions [18]. This might be the case since students attending government schools and from lower socioeconomic classes mostly use the OPDs of government medical colleges.

In this study, children were considered "fully vaccinated" if they had received all recommended vaccinations against all six vaccine-preventable illnesses up until the age of ten, as per Gallagher *et al.* [19]. Individuals who have not had any vaccinations up until the age of ten are classified as "incompletely vaccinated," while those who have not received any shots up to this point are classified as "not vaccinated." Of the individuals in the research, 63.90% had received all vaccinations, while 36.10% had just some vaccinations.

According to the NFHS 4 data for Odisha, 75% of children live in urban areas and are fully vaccinated. The percentage of children who were fully vaccinated in this study was lower than the state average because we only included children who had received all the vaccines up to the age of 10. In contrast, the NFHS data shows that vaccinations must be received between the ages of 18 and 24 months [20]. In this study, the most often mentioned cause of inadequate immunization was ignorance of the teenage vaccination program.

To investigate the immunization status of teenage teenagers in Indore City produced similar results, with 62% of the sample group having received all recommended vaccinations.

According to our research, 1.1% of the population is taller than the 97% for their age, and 7.2% of the population is stunted. The proportion of research participants with normal height is 91.7%. Stunting was reported as 34% and severe stunting as 6.4% of the NFHS 4 data [21]. Overall, stunting is reported to be 28% in different research conducted among teenage females living in Andhra Pradesh's slums. A total of 18.1% of research participants are underweight, 74.5% are normal, and 7.4% are overweight. Similar outcomes are revealed by the NFHS 4 statistics for Odisha', which indicates that 26.2% of kids in cities are underweight. Another research conducted among teenage females from Andhra Pradesh's slums reveals that 22.9% of them are underweight.

In our study, 50.1% of all study participants had a normal BMI, compared to 20.1% who were underweight or thin, 13.8% who were overweight, and 16% who were obese. Comparable research conducted in 2014 in Berhampur, Odisha, found that the prevalence of teenage obesity and overweight was 3.6% and 10.4%, respectively. According to different research conducted in Karnataka, 4.0% of people were obese, and 11.4% were overweight. Our research's results are nearly identical to a 2011 Pahud *et al*. [22] study reported a prevalence of

overweight and obesity of 25.2% and 11.7%, respectively.

In comparison to their rural counterparts, adolescents in urban areas have higher rates of obesity and overweight and lower rates of underweight, according to research among adolescent school pupils aged 14 to 16. These studies collectively demonstrate that the prevalence of overweight and obesity among teenagers living in cities is rising [23]. In our study, 10% of participants are prehypertensive, 72.2% of participants are normotensive, and 17.8% of participants are hypertensive overall in an investigation of the causes and prevalence of hypertension among seemingly healthy Indian school children. This study found that 23% of students had hypertension overall, which is nearly identical to our findings.

In our study, 93% of the participants had no pallor, whereas 6.9% of the total study patients were clinically pale [24]. A total 9.6% of the urban teenage females in the research, which comprised 185 adolescent girls (aged 11 to 19), had hemoglobin (Hb) levels less than 10 mg/dl. In a 2016 study carried out, around 11.6% of the 1007 participants had anemia. The relationship between vaccination status and gender there is no correlation between vaccination status and gender in this research. In all age categories, vaccination coverage was 61.1% for complete immunization in men compared to 63% for full immunization in females, according to comparable research conducted in Indore. Data for partial immunization also showed similar trends (33.3% Vs. 34.8%) in comparison to females, indicating a negligible gender bias. The relationship between the kind of school and immunization status. There was no correlation between the kind of school and immunization status in this study. Approximately 65.7% of 61.26% of students attending private schools and all students attending government schools are fully immunized [25].

CONCLUSIONS

A stage of growth and development that occurs between childhood and adulthood is called adolescence. This study shows that adolescents in poor nations like India have several health and dietary problems. A shift in eating habits and a lack of appropriate outside activities, exacerbated by the present COVID lockdown scenario, are to blame for the growth in the number of overweight and obese children. The number of children with hypertension has also increased because of these causes. The percentage of children who are not fully vaccinated is higher than the state average, which goes against expectations and highlights the need for increased awareness campaigns and national policies that concentrate on teenage immunization. Adolescent kids should be made aware of the benefits of increased physical activity for their general physical and mental health.

According to this study, children who are underweight and pale are becoming overweight, obese, and hypertensive in metropolitan settings. Immunizations can shield kids from a variety of diseases that may be prevented with vaccinations, improving adolescent population health generally and something that all health care providers should support.

CONTRIBUTION OF AUTHORS

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REFERENCES

[1] Summan A, Nandi A, Schueller E, Laxminarayan R. Public health facility quality and child immunization outcomes in rural India: A decomposition analysis. Vaccine, 2022: 40(16): 2388-98.

[2] Mathew JL. Inequity in childhood immunization in India: a systematic review. Indian paediatrics, 2012; 49: 203-23.

[3] O'Neill J, Newall F, Antolovich G, Lima S, Danchin M. The uptake of adolescent vaccinations through the school immunisation program in specialist schools in Victoria, Australia. Vaccine, 2019; 37(2): 272-79.

[4] Wang B, Giles L, Afzali HH, Clarke M, Ratcliffe J, et al. Adolescent confidence in immunisation: assessing and comparing attitudes of adolescents and adults. Vaccine, 2016; 34(46): 595-603.

[5] Mackroth MS, Irwin K, Vandelaer J, Hombach J,

Eckert LO. Immunizing school-age children and adolescents: experience from low-and middle-income countries. Vaccine, 2010; 28(5): 1138-47.

[6] Feldstein LR, Fox G, Shefer A, Conklin LM, Ward K. School-based delivery of routinely recommended vaccines and opportunities to check vaccination status at school, a global summary, 2008–2017. Vaccine, 2020; 38(3): 680-89.

[7] Skinner SR, Imberger A, Lester R, et al. Randomised controlled trial of an educational strategy to increase school–based adolescent hepatitis B vaccination. Aust N Z J Public Health, 2000; 24(3): 298-304.

[8] Marshall HS, Collins J, Sullivan T, Tooher R, O'Keefe M, et al. Parental and societal support for adolescent immunization through school-based immunization programs. Vaccine, 2013; 31(30): 59-64.

[9] Shah S, Thomas P, Raman S, Milne B. Refugee youth: immunisation status and GP attendance. Aust Fam Physician, 2007; 36(7): 11-15.

[10] Grandahl M, Larsson M, Dalianis T, Stenhammar C, Tyden T, et al. Catch-up HPV vaccination status of adolescents in relation to socioeconomic factors, individual beliefs and sexual behaviour. PLoS One, 2017; 12(11): 85-93.

[11] Stevens W, Walker D. Adolescent vaccination in the developing world: time for serious consideration?. Vaccine, 2004; 22(5): 781-85.

[12] Barnes P, Price L, Maddocks A, Cheung WY, et al. Immunisation status in the public care system: a comparative study. Vaccine, 2005; 23(21): 28-33.

[13] Paul P, Fabio A. Literature review of HPV vaccine delivery strategies: considerations for school-and non-school based immunization program. Vaccine, 2014; 32(3): 320-26.

[14] Kalies H, Grote V, Schmitt HJ, Von Kries R. Immunisation status of children in Germany: temporal trends and regional differences. Eur J Pediatrics, 2006; 165: 30-36.

[15] Bisvigou U, Kamgaing EK, Rogombe SM, Adjaou B, et al. Assessment of vaccination status and booster vaccinations in adolescents attending school in Libreville, Gabon. Pan Afr med J., 2020; 35(2): 74-81.

[16] Dochez C, Burnett RJ, Mbassi SM, Were F, Musyoki A, et al. Improving skills and institutional capacity to strengthen adolescent immunisation programmes and health systems in African countries through HPV vaccine introduction. Papillomavirus Res., 2017; 4(1): 66-71.

[17] Heininger U, Loos K, Lorenz I, Rascher W. Compliance with recommended immunizations in adolescents. Eur J Pediatr., 2006; 16(5): 671-77.

[18] National Vaccine Advisory Committee. Standards for child and adolescent immunization practices. Pediatrics, 2003; 112(4): 958-63.

[19] Gallagher KE, Kadokura E, Eckert LO, Miyake S, Mounier-Jack S, et al. Factors influencing completion of multi-dose vaccine schedules in adolescents: a systematic review. BMC Public Health, 2016; 16: 1-7. doi: 10.1186/s12889-016-2845-z.

[20] Middleman A. School-located vaccination for adolescents: past, present, and future and implications for HPV vaccine delivery. Hum Vaccin Immunother, 2016; 12(6): 15-20.

[21] Loke AY, Kwan ML, Wong YT, et al. The uptake of human papillomavirus vaccination and its associated factors among adolescents: a systematic review. J Prim Care Community Health, 2017; 8(4): 349-62.

[22] Pahud B, Clark S, Herigon JC, Sherman A, Lynch DA, et al. A pilot program to improve vaccination status for hospitalized children. Hosp Pediatr., 2015; 5(1): 35-41.

[23] Merle T, Jeannot E. Surveillance of vaccination coverage in 5–6-and 13–14-years-old school children in Geneva. Archives de Pédiatri., 2020; 27(6): 292-96. doi: 10.1016/j.arcped.2020.06.009.

[24] Abdullahi LH, Kagina BM, Cassidy T, Adebayo EF, Wiysonge CS, et al. Knowledge, attitudes and practices on adolescent vaccination among parents, teachers and adolescents in Africa: a systematic review protocol. Syst Rev., 2014; 3(2): 1-6.

[25] Esposito S, Principi N, Cornaglia G. ESCMID Vaccine Study Group (EVASG). Barriers to the vaccination of children and adolescents and possible solutions. Clin Microbiol Infect., 2014; 20: 25-31.