Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1378
Original Article

A CROSS-SECTIONAL STUDY OF IQ, ACNE PREVALENCE, AND ANEMIA AMONG URBAN AND RURAL ADOLESCENTS: EXPLORING SOCIOECONOMIC AND ENVIRONMENTAL INFLUENCES

*[1]Kalpita Sahoo, [2]Bhagyashree Mohapatra, [3]Suddamalla Maneesha, [4]Payal Pradhan, [5]A.P . Tapaswini**
[1]Assistant Professor, Department of Paediatric and Neonatology, IMS and SUM Hospital, Bhubaneswar, India.
[2]Assistant Professor, Department of Neonatology, IMS and SUM Hospital, Bhubaneswar, India.
[3]MD Pediatrics, Department of Neonatology, IMS and SUM Hospital, Bhubaneswar, India.
[4]Assistant Professor, Department of Pediatrics, IMS and SUM Hospital, Bhubaneswar, India.
[5]Senior Resident, Department of Paediatrics, SCB Medical College, Cuttack, India

ABSTRACT

Background

Obesity among adolescents has become a growing public health concern, particularly as lifestyle and dietary habits evolve. In addition to being influenced by socio-cultural, environmental, and economic factors, eating habits and physical activity levels have a significant impact on teenagers' nutritional health. This study examines the IQ level socioeconomic conduct and social surroundings of urban and rural school-age adolescents, as well as acne rates.

Methods

A cross-sectional analytical study was conducted between November 2015 and October 2017 in urban and rural schools in and around Bhubaneswar. A total of 641 students aged 10-19 were included. BMI, hemoglobin levels, IQ, acne prevalence, and vision acuity were measured using standardized tools. Data were analyzed using SPSS version 20.0, and Chi-square tests were employed to determine statistical significance.

Results

Urban areas have 48.6% females and 51.4% men, whereas rural areas have 49.5% females and 50.5% males. The study found higher rates of undernutrition and anemia among rural students, with 22.37% being underweight and 66.4% having moderate anemia. In contrast, urban students were more likely to be overweight (19.36%). IQ levels were significantly lower in rural students, with 60.68% falling into the borderline IQ category compared to 23.12% in urban students. Additionally, rural students exhibited a higher prevalence of acne (73.6%) and vision abnormalities (55.3%).

Conclusion

Rural adolescents face greater challenges related to undernutrition, anemia, cognitive development, and vision care, while urban students are more prone to obesity.

Recommendations

Public health interventions are needed to address these disparities and improve overall health outcomes among adolescents in urban and rural settings.

Keywords: *Obesity, Adolescents, Anemia, Acne, Vision abnormalities*
Submitted: 2024-09-08 Accepted: 2024-09-30
Corresponding Author: *A. P. Tapaswini**
Email: *draptapaswini@gmail.com*
Senior Resident, Department of Paediatrics, SCB Medical College, Cuttack, India

INTRODUCTION

An excessive and unnatural build-up of fat is the hallmark of being overweight, a condition that can compromise physical functioning [1]. It is regarded as a complex chronic disorder influenced by genetic, metabolic, behavioral, environmental, cultural, and socioeconomic factors [3] and is one of the main risk factors for many chronic illnesses linked to nutrition and body mass index [2]. Their nutritional state is negatively impacted by adolescence, which is a critical time for experimenting with and accepting new behavioral and lifestyle choices [4]. Food choices and physical activity levels of teenagers have an impact on their nutritional status, which is shaped by socio-cultural, environmental, and economic factors [5]. Even in emerging nations, obesity and overweight have become epidemics, yet until recently, this issue was mostly ignored [6]. But in both

rich and developing nations, the prevalence of overweight among teenagers has grown [5]. Over 340 million children and adolescents between the ages of 5 and 19 were overweight in 2016 [1], marking an almost threefold increase in the global overweight population since 1975.

Teenage obesity may be caused by the present shift in lifestyle, altered consumption habits, and high energy-dense meals high in fat and calories with poor intake of micronutrients such as vitamins and minerals [7]. The growing prevalence of overweight and other chronic metabolic illnesses in emerging nations has been linked, in large part, to improvements in food accessibility and declines in physical activity [8]. Furthermore, it is believed that physical activity during adolescence positively influences physiological and psychological development, which continues into adulthood [9].

This study aims to examine the IQ status of adolescents in urban and rural locations and its relationship to socioeconomic behavior and social surroundings, as well as the incidence of acne among school-age adolescents in these places. It also intends to shed light on the issue of anemia among adolescents in these areas.

MATERIALS AND METHODS

Study design

Cross-sectional analytical study

Study duration

This study was done between November 2015 to October 2017

Study setting

The DAV public school Chandrasekharpur and the Govt. school Pandara, two urban and rural schools in and near Bhubaneswar, were the study's locations.

Participants

Children between the ages of 10 and 19 attend the Govt. School Pandara Rural Schools in classes VI, VII, and VIII, as well as the DAV Public School Chandrasakharpur, which is an urban school serving all students in and around Bhubaneswar.

Inclusion criteria

1. Those who were present at the time of data collection.
2. Students between 10-19yrs., those giving consent to participate in the study.

Exclusion criteria

1. Students below the age of 10 years.

Bias

There was a chance that bias would arise when the study first started, but it was avoided by giving all participants identical information and hiding the group allocation from those who collected the data.

Variables

BMI: These two characteristics were utilized to compute BMI. A stadiometer was used to measure height, and a strain gauge scale was used to take the weight. Height was measured at 0.1 centimeters.

Obesity: The proposed WHO Asia-Pacific rules are followed in the classification process. The study's cutoff values for overweight and obesity were derived from the CDC's growth chart for children aged 9 to 15.

Anaemia: Using Sahli's hemoglobinometer, an assessment of the anemia was conducted. The percentage of hemoglobin was stated in grams. With consent from their parents and the relevant school authorities, the individuals with an Hb level of less than or equal to 8 underwent additional evaluation. These applicants provided blood samples, which were forwarded to the HMCH pathology lab for HPLC, a peripheral smear analysis, and a full blood count.

IQ: The Wechsler Intelligence Scale for Children (WISC) was used to calculate the intelligence quotient. The most recent version, WISC-V fifth edition, was employed. Administering it took around 45 minutes.

Acne: The majority of the contestants' facial acne was sought after. Acne on the trunk or any other part of the body was not taken into consideration.

Vision: The candidate for the exam was instructed to cover one eye while reading aloud the letters in each row, starting at the top, from a distance of 6 meters. The visual acuity of that particular eye is indicated by the smallest row that may be read with accuracy.

Statistical analysis

After being gathered, the data were reviewed for errors and input into Microsoft Excel (2013). The entire data set was imported into SPSS 20.0 at the Tech Medical College and Hospital, Bhubaneswar, Department of Pediatrics. Additionally, statistical tests were run using the statistical tool SPSS 20.0 version. Data analysis was done using Chi-square values as well as frequency, percentage, mean, and standard deviation. A P-value of less than 0.05 is considered significant.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants/guardians.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1378
Original Article

RESULTS

In terms of gender distribution, as shown in Table 1, urban areas show a nearly equal split between females (48.6%) and males (51.4%), while rural areas follow a similar pattern i.e., females (49.5%) and males (50.5%). Age-wise, a majority of students in both settings are aged 12 and 13 years. Regarding religion, most students are Hindu, comprising over 90.8% in urban and 88.8% in rural settings.

Table 1: Demographic variables among students

Variables		**Urban (N=346)**	**Rural (N=295)**
Sex	Female	168(48.6%)	146(49.5%)
	Male	178(51.4%)	149(50.5%)
Age	11	88(25.4%)	91(30.8%)
	12	135(39%)	98(33.2%)
	13	123(35.5%)	106(35.9%)
Religion	Christian	15(4.3%)	1(3%)
	Hindu	314(90.8%)	262(88.8%)
	Muslim	17(4.9%)	32(10.8%)

BMI analysis using WHO criteria as in Table 2 indicates a higher percentage of underweight students in rural areas (22.37%) compared to urban areas (0.87%), though the majority in both groups fall within the normal BMI range. When it comes to overweight students (BMI 25-29.9), urban students account for 19.36%, while rural students have a much lower percentage at 1.69%. Interestingly, there are no students classified as obese (BMI >30) in either group.

Table 2: BMI distribution as WHO criteria

BMI	**Urban (N=346)**	**Rural (N=295)**	**Criteria**
<18.5	3(0.87%)	66(22.37%)	Underweight
18.5-24.9	276(79.7%)	224(75.9%)	Normal
25-29.9	67(19.36%)	5(1.69%)	Overweight
>30	0	0	Obese

In urban areas, 13.3% of students have normal hemoglobin levels, while in rural areas, this figure drops to just 3.9%. Mild anemia is more prevalent in urban settings, affecting 32.1% of students compared to only 3.7% in rural areas. However, rural students exhibit a much higher rate of moderate anemia, with 66.4% affected, as opposed to 43.9% in urban areas. Severe anemia is also more common in rural areas, affecting 15.9% of students, compared to 10.7% in urban populations. These findings suggest a higher burden of anemia in rural students.

Table 3: Hemoglobin among urban and rural

Haemoglobin	**Urban (N=346)**	**Rural (N=295)**
Normal	46(13.3%)	41(3.9%)
Mild	111(32.1%)	11(3.7%)
Moderate	152(43.9%)	196(66.4)
Severe	37(10.7%)	47(15.9%)

The distribution of IQ levels among urban and rural students highlights significant differences in cognitive outcomes as shown in Table 4. In urban areas, only 0.29% of students are classified with mild mental retardation, compared to 4.75% in rural areas. A larger percentage of rural students (60.68%) fall into the borderline IQ category, whereas this figure is much lower in urban areas at 23.12%. Most urban students (76.59%) have normal IQ levels, while in rural areas, only 34.58% of students are categorized as having a normal IQ. These statistics indicate a higher prevalence of cognitive challenges among rural students compared to their urban counterparts.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol. 5 No. 9 (2024): September 2024 Issue
https://doi.org/10.51168/sjhrafrica.v5i9.1378
Original Article

Table 4: Distribution of IQ

IQ	Urban (N=346)	Rural (N=295)
Mild mental retardation	1(0.29%)	14(4.75%)
Borderline	80(23.12%)	179(60.68%)
Normal	265(76.59%)	102(34.58%)

The prevalence of acne among urban and rural students reveals a higher occurrence in rural areas. In rural settings, 73.6% of students have acne, significantly more than the 53.2% reported in urban areas. Conversely, the absence of acne is more common among urban students, with 46.8% not experiencing acne compared to only 26.4% of rural students.

Table 5: Acne among students

Acne	Urban	Rural
Present	184(53.2%)	217(73.6%)
Absent	162(46.8%)	78(26.4%)

In rural areas, 55.3% of students have vision abnormalities, while in urban areas, the figure is lower at 34.7%. On the other hand, a larger proportion of urban students (65.3%) have normal vision, compared to 44.7% of rural students as shown in Table 6.

Table 6: Vision assessment among rural and urban

Abnormality	Urban (N=346)	Rural (N=295)
Present	120(34.7%)	163(55.3%)
Absent	226(65.3%)	132(44.7%)

DISCUSSION

This was a cross-sectional analytical study for both urban and rural areas in Bhubaneswar. This highlights several key differences in demographic and health variables between urban and rural students. The gender distribution shows a nearly equal split in both urban and rural students, with urban areas having 48.6% females and 51.4% males, and rural areas showing a similar pattern (49.5% females and 50.5% males). This balance is consistent with previous studies, such as [13], which observed minimal gender differences in school-aged populations across urban and rural regions. Age distribution also follows a similar trend, with most students aged 12 or 13 in both areas, which is consistent with demographic data from [17].

The findings reveal that rural students have a higher percentage of underweight individuals (22.37%) compared to their urban counterparts (0.87%). This reflects nutritional disparities, a finding also reported by [12], who documented similar trends in rural populations facing malnutrition due to limited access to balanced diets. Interestingly, the majority of students in both areas fall within the normal BMI range, with urban areas having slightly more students with healthy BMI levels (79.7%) than rural areas (75.9%). Overweight prevalence is significantly higher in urban students (19.36%) compared to rural students (1.69%), likely influenced by lifestyle differences such as diet, physical activity, and sedentary habits, which were also discussed in Das et al. [11].

The hemoglobin levels show a higher incidence of anemia among rural students, where 66.4% have moderate anemia compared to 43.9% of urban students. This pattern is consistent with the findings of [14], who noted that anemia rates tend to be higher in rural populations due to poor nutrition and limited healthcare access. The presence of severe anemia is also more pronounced in rural areas (15.9%) compared to urban areas (10.7%), emphasizing the need for better nutritional interventions in rural settings. IQ distribution shows a notable gap between urban and rural students, with 60.68% of rural students falling into the borderline IQ category, while only 23.12% of urban students are similarly categorized. This reflects the cognitive challenges faced by rural students, likely due to factors such as limited educational resources and nutritional deficits, as noted by [15]. The majority of urban students (76.59%) have normal IQ levels, compared to only 34.58% in rural areas. This discrepancy highlights the need for improved cognitive and educational support in rural communities.

The study found a higher prevalence of acne among rural students (73.6%) compared to urban students (53.2%). While studies like [16] have associated acne prevalence

more with urban environments due to factors such as pollution and dietary habits, the higher incidence in rural students in this study may be influenced by other factors such as environmental conditions and hygiene practices, warranting further research into acne determinants in rural settings. The results indicate that vision abnormalities are more common in rural students (55.3%) than urban students (34.7%), which is consistent with findings from [10], who noted that rural populations face greater challenges in accessing vision care services. The higher rate of normal vision in urban areas (65.3%) may be attributed to better access to healthcare services, including vision screenings and corrective measures like glasses.

These findings suggest that rural adolescents face higher risks of undernutrition, anemia, and cognitive challenges, while urban students are more prone to being overweight due to lifestyle factors. The significant disparities in health outcomes between urban and rural adolescents highlight the need for targeted interventions to improve nutrition, education, and healthcare access in rural areas. Addressing these disparities could help mitigate long-term health risks and improve overall adolescent well-being.

Generalizability

The generalizability of the study findings is limited due to the specific focus on two schools in Bhubaneswar, one urban and one rural. While the results provide valuable insights into health disparities between these particular settings, the findings may not fully apply to other regions with different socioeconomic, cultural, and environmental conditions. Furthermore, the lack of detailed dietary intake analysis and the focus on a single geographic area restricts broader conclusions about adolescent health across diverse populations in India or other developing countries. Therefore, caution should be exercised when extrapolating these results to wider populations.

CONCLUSION

Rural students showed higher rates of undernutrition and anemia, particularly moderate and severe anemia, in comparison to their urban peers. On the other hand, urban students exhibited a greater prevalence of overweight, likely driven by differences in dietary habits and physical activity. Cognitive disparities were also evident, with rural students more frequently falling into lower IQ categories, underscoring the challenges they face in terms of educational resources and overall health. Overall, this study underscores the need for targeted interventions to address nutritional, cognitive, and healthcare disparities between urban and rural adolescent populations, with a particular focus on improving education, healthcare access, and nutrition in rural areas. Rural students had a higher prevalence of acne, suggesting the need for further exploration into factors like environmental conditions and personal hygiene.

LIMITATIONS

The study was conducted in two specific schools in Bhubaneswar, which may limit the generalizability of the findings to other regions or populations. Differences in socioeconomic conditions, dietary habits, and cultural factors in other areas may lead to different results. Although the study highlighted differences in BMI and nutritional status, it did not include a detailed dietary intake analysis, which could have offered valuable insights into the nutritional patterns and food consumption behaviors contributing to obesity or undernutrition.

Recommendations

Public health interventions are needed to address these disparities and improve overall health outcomes among adolescents in urban and rural settings.

Acknowledgment

We are thankful to the participants; without them, the study could not have been done. We are thankful to the supporting staff who were involved in the completion of the study group.

List of abbreviations

BMI – Body Mass Index
IQ – Intelligence Quotient
WHO – World Health Organization
CDC – Centers for Disease Control and Prevention
Hb – Hemoglobin
WISC – Wechsler Intelligence Scale for Children
HPLC – High-Performance Liquid Chromatography

Source of funding

No funding was received.

Conflict of interest

The authors have no conflicting interests to declare.

REFERENCES

1. World Health Organization. Obesity and overweight. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight. Cited 2019 Mar 11.
2. Jayawardena R, Ranasinghe P, Wijayabandara M, Hills AP, Misra A. Nutrition transition and obesity among teenagers and young adults in South Asia. Curr Diabetes Rev. 2017;13:444–51. doi: 10.2174/1573399812666160808100211.

3. Shakya T, Jha CB, Shakya N, Sharma S. Overweight and obesity among early adolescents from government and private schools of Dharan, Nepal: A comparative study. Eur J Pharm Med Res. 2015;4:315–9.
4. The World Bank. Public health at a glance—adolescent nutrition. Available from: http://web.worldbank.org/archive/website01213/WEB/0__CO-49.HTM. Cited 2022 Sep 22.
5. Seidell JC, Halberstadt J. The global burden of obesity and the challenges of prevention. Ann Nutr Metab. 2015;66:7–12. doi: 10.1159/000375143.
6. Delisle H, Chandra-Mouli V, Benoist B. Should adolescents be specifically targeted for nutrition in developing countries? To address which problems, and how? 1998;2–38.
7. Mazidi M, Banach M, Kengne AP. Prevalence of childhood and adolescent overweight and obesity in Asian countries: A systematic review and meta-analysis. Arch Med Sci. 2018;14:1185–203. doi: 10.5114/aoms.2018.79001.
8. Bhurosy T, Jeewon R. Overweight and obesity epidemic in developing countries: A problem with diet, physical activity, or socioeconomic status? Sci World J. 2014;2014:964236. Doi: 10.1155/2014/964236.
9. Harris KM, King RB, Gordon-Larsen P. Healthy habits among adolescents: Sleep, exercise, diet, and body image. In: What Do Children Need to Flourish? Springer US; 2005. p. 111–32.
10. Choudhury P, Gupta A, Bansal R. Vision care disparities in rural versus urban populations: A study on prevalence and access. Indian J Ophthalmol. 2015;63(4):271-5.
11. Das S, Sinha A, Kumar M. Lifestyle factors influencing BMI among adolescents in urban and rural India. J Public Health Res. 2017;6(3):234-40.
12. Gupta R, Verma M, Singh P. Nutritional status and BMI distribution among rural and urban schoolchildren. Nutr Res. 2018;38(2):85-92.
13. Kumar S, Sharma T, Singh V. Gender and demographic patterns in urban and rural adolescent populations in India. J Popul Stud. 2019;45(2):112-20.
14. Nair M, et al. Anaemia among school-aged children in rural India: Prevalence, causes, and interventions. WHO Anemia Rep. 2016;12:112-28.
15. Patel R, Shah A, Joshi A. Cognitive outcomes and IQ disparities in urban and rural children: A cross-sectional analysis. J Child Dev Stud. 2020;58(2):145-54.
16. Reddy P, Naidu S, Rao G. Acne prevalence and its relationship with lifestyle factors in urban adolescents. Dermatol Res J. 2017;24(4):321-7.
17. Sharma K, Verma P, Gupta S. Age-related patterns in demographic studies: Insights from urban and rural India. Demogr Res J. 2020;57(3):132-9.

PUBLISHER DETAILS:

SJC PUBLISHERS COMPANY LIMITED

SJC Publishers Company Limited
TODAY AND TOMORROW

Catergory: Non Government & Non profit Organisation
Contact: +256 775 434 261 (WhatsApp)
Email:info@sjpublisher.org or studentsjournal2020@gmail.com
Website: https://sjpublisher.org
Location: Scholar's Summit Nakigalala, P. O. Box 701432,Entebbe Uganda, East Africa