

Original Research Article

A comparative study on health risk behaviours among adolescent high school students of urban and rural areas of Raichur district, Karnataka

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ABSTRACT

Background: Objectives of the study were to compare the prevalence and pattern of health risk behaviours among adolescent high school students in urban and rural areas of Raichur district, and to assess associated socio-demographic factors influencing these behaviours.

Methods: A pre-tested WHO GSHS-based questionnaire was used in a school-based cross-sectional comparative study with 560 kids from August to October of 2025.

Results: The sociodemographic features of the two groups were comparable. Students from urban areas had greater levels of screen usage, poor eating habits, and physical inactivity. Students in rural areas were more physically active but also had higher absence and sleep deprivation rates. Overall, drug use was minimal, but in rural areas, it was marginally higher. There was a lot of academic stress in both groups.

Conclusions: Adolescent risk behaviors varied significantly across urban and rural areas, underscoring the need for focused, school-based interventions.

Keywords: Adolescents, Health risk behaviour, Academic stress, Dietary habits, Physical activity

INTRODUCTION

Anyone between the ages of 10 and 19 is considered to be in their adolescent years. One in six individuals on Earth is a teenager, making up over 1.2 billion people. Although most of them have healthy lives, there are several serious diseases and accidents that might limit their capacity for growth and development.¹ With an estimated 49.8 million students in India (2013–14) and a gross enrolment ratio of 78.53 %, high school pupils in India range in age from thirteen to sixteen years old. Of them, around 2.6 million were from the state of Karnataka (2011–2012).² Adolescents begin to make their own decisions and may engage in risky behaviours such as drinking and smoking, not getting enough exercise, having sexual relations without protection, being around violent people, unhealthy eating habits, and behavioural issues, all of which can have an effect on their health now and in the future.³ Health issues in adulthood may have a significant impact on a country's future and growth, thus it's crucial to encourage

healthy behaviours throughout adolescence and prevent people from getting into harmful ones. With a human development index of 0.547 in 2001, Raichur district is considered one of Karnataka's most underdeveloped regions.⁴ The study set out to fill a gap in the literature by investigating the prevalence of health risk factors among high school students in Raichur, India, specifically those pertaining to physical activity, alcohol and tobacco use, food and eating habits, and school-related issues.⁵

It is a transition between the childhood and adult stage where lifelong habits, behaviours and attitudes towards health are formed. Adolescents make up almost a quarter of the world population, and their health has become a significant area of focus for public health concern.⁶ The World Health Organisation suggests that a variety of preventable adult diseases, like cardiovascular illnesses, diabetes, obesity, substance dependence, and some mental disorders, have their roots in adolescence-initiated behaviours.⁷ To record the health-seeking behaviour of

school-aged teenagers and examine patterns of morbidity, the stage is characterized by the growing autonomy, peer pressure and media and technological exposure of adolescents that can overtake their lifestyle decisions.⁸ Although this stage presents a chance of adopting healthy behaviours, the stage is also linked with predisposition to risky behaviours (tobacco and alcohol consumption, poor dietary habits, physical inactivity, violence and unsafe sex).⁹ Such behaviours may trigger both short-term effects such as injuries, infections, and psychological torment, and long-term morbidity and early death.

In third world countries such as India, there are other factors such as socio-economic disparities in adolescents, weak access to health provisions that cater to the adolescents, poor nutrition, and poor health awareness.¹⁰ Digital exposure, behavioural patterns and urbanization also impact behavioural patterns further. Thus, the prevention of unhealthy adolescent health conditions and related risk behaviours require knowledge of the adolescent health status to be effective in designing prevention activities, school-based health programs and community interventions to encourage healthy adolescent transitions to adulthood.¹¹

Concept of health risk behaviours

Health risk behaviours represent activities or lifestyles that subject one to the likelihood of morbidity, death or psychosocial issues. These are tobacco use, alcohol use, substance use, unhealthy eating habits and lack of exercise, increasing screen time, violence, and dangerous sexual activities among adolescents.¹²

This can be as a result of peer pressure, curiosity, and media influence, family set up or as a result of socio-economic factors all these risk behaviours usually intersect and may have both short-term effects, including injuries and infections, and long-term effects, including cardiovascular diseases, diabetes, obesity, and mental health issues.¹³

Urban-rural inequality in adolescent health

Urban and rural environments have different environmental, cultural and socio-economic backgrounds that affect adolescent behaviour. The adolescents in the urban areas might also be exposed to fast foods more frequently, digital media, availability of substances and teens leading very sedentary lives.¹⁴ On the contrary, teens in rural settings might be denied access to health services, health education, recreational centres and mental health services.¹⁵

Other causes of differences in health behaviours are differences in parental supervision, access to education, wealth, and cultural practices. Such differences can lead to varied prevalence patterns of risk behaviours among the urban and rural adolescents and comparative studies are therefore required.¹⁶

Rationale of the study

The population of adolescents in India is high, and the health risk behaviours of the adolescents should be comprehended in order to make adequate planning of the population health. Nonetheless, the comparative data at the district level of the urban and rural school-going adolescents are not available, especially in such states as Raichur District, Karnataka.

The development of the behavioural patterns and the socio-demographic factors identified and used to design the targeted school-based interventions, awareness programs and policy measures. The study helps produce some local evidence to justify preventive interventions and reinforce the health services of adolescents.

Aim and objectives

Aim

The aim of the study was to compare prevalence and trend of health risk behaviours in adolescent high school students in urban and rural high school in Raichur District, Karnataka.

Objectives

The objectives were to identify the prevalence of the chosen health risk behaviours among the adolescents studying in the city high schools, to establish the extent of identified health risk behaviours in the rural high school adolescents, to contrast the trend and the degree of the risk behaviours among the urban and rural students, and to evaluate the relationships between the socio-demographic factors (age, gender, parental education, socio-economic status) and the health risk behaviours.

METHODS

Study period

The selected study design is a school-based cross-sectional comparative study that carried out between 10 August 2025 and 10 October 2025 on adolescent high school students in Raichur District, Karnataka.

Study design

The research was conducted four randomly chosen high schools in the urban parts of the city of Raichur. The schools were randomly selected in accordance with the strength of students enrolled in them so that there was sufficient representation.

Study population

The sample was students in classes VIII to X in the sampled high schools.

Sample size and sampling method

A total of 560 students (N=560) took part in the study. Four high schools were chosen at random depending on the strength of the students. The method of census sampling was adopted in the chosen schools, whereby all the students who reported on the day of data collection were incorporated in the study. The sample selection was done on the basis of research that has been previously performed by Sadiq et al and practical census sampling has been used instead of a prospective statistical calculation.¹⁷

Inclusion criteria and exclusion criteria

Inclusion criteria

Students learning in class VIII and X and students who have attended during the data collection date were included.

Exclusion criteria

Late students who were missing when the data was collected and the visit were made were excluded.

Ethical considerations

The Institutional Ethics Committee of the Navodaya Medical College Hospital and research center, Raichur Karnataka gave ethical clearance. The consent to carry out the study was sought to the headmasters of the high schools selected. All the participants were informed about their participation in the data collection through a verbal informed consent. The respondents were allowed to stay anonymous and confidential during the study.

Data collection procedure and data collection tool

A semi-structured questionnaire that had been pre-tested was used in the collection of data. Various health risk behaviours were measured using the expanded version of the "Global School-Based Health Survey (GSHS)" questionnaire that was developed by the World Health Organization.

The questionnaire contained questions on: dietary habits, physical activity, eating of high energy food and drinks, and health risk behaviours of substance use and other chosen risk behaviours.

Students were informed to fill the questionnaire in their classes under the supervision in order to avoid discussions between classmates and in order to be clear.

Operational definitions

Fruit intake

Meaning of minimum 100 grams/day or at least one serving/day in the previous 30 days was a sufficient result.

Vegetable intake

The intake of 300 grams daily or three servings daily of vegetables in the past 30 days was taken to be efficient.

Energy-dense/carbonated beverages

Have taken beverages (e.g., Coca-Cola, pepsi, and limca) in the past 30 days.

High-energy snacks/fast foods

Street foods, pizza, burgers, fast foods like samosa, pakoda, and noodles have been eaten within the last 7 days.

Frequent physical exercise

At least 60 minutes of moderate to vigorous exercise every day involving sports or physical education lessons.

Statistical analysis

The data were inputted in the Microsoft Excel 2007 and analyzed through the Epi Info version 7 software. The descriptive statistics were in the form of frequencies, percentages, and proportions. Categorical variables were used to evaluate the relationship between them using the Chi-square test. The p value was taken to be significant at value less than 0.05.

RESULTS

The study comprised 560 teenage students from both urban and rural locations, and the sociodemographic features were similar between the two groups. Significant variations were found in lifestyle risk factors, with urban students having higher levels of physical inactivity and screen time, whereas rural students had higher levels of physical activity but less sleep. Dietary habits also differed significantly, with urban students reporting higher consumption of fruits, fast foods, and soft drinks, while rural students had lower fast-food intake, though soft drink consumption remained high in both groups, and vegetable intake was high in both settings. Overall, substance usage was modest, with no reported use among urban students and a small minority of rural students experimenting with smoke and alcohol. Psychosocial factors found that academic stress was common in both groups, although bullying was uncommon and primarily detected among rural children.

Socio demographic characteristics

There is a similar distribution of urban and rural pupils in the study participants' sociodemographic profile. The age of both groups was similar with most students being in the 14-year-old age group followed by students in the 16- and 13-year-old age group and it had the least number of students in the 15-year-old age category. Gender balance was also similar with women slightly winning over men in

both settings implying equal representation. Class VIII contained the largest number of pupils with classes IX containing the second-largest number and classes X contained the smallest number of pupils. In general, similarity of sociodemographic characteristics fits well the two groups leading to the comparability of health-risky behaviors.

Table 1: Socio demographic characteristics.

Characteristics	Urban (n=280)	Rural (n=280)
Age (years)		
13	66	66
14	102	102
15	41	41
16	71	71
Gender		
Male	113	115
Female	167	165
Class		
VIII	118	125
IX	83	96
X	79	59

Interpretation

The table compares socio-demographic characteristics of urban and rural students, and the distribution of the two categories is very close. Both settings have similar age distribution comprising mostly of pupils of 14 years old, then 16 and 13 years old with the fewest being 15 years old. The ratio of females to males is also equal with females slightly higher than males across urban and rural settings showing an equitable figure. Academically-wise the distribution of the pupils is slightly higher in class IX and class 8, with the least in class X; in both urban and rural classrooms, the same groups are well-matched and comparable, and thus, it became possible to compare the health risk behaviors of urban and rural youth meaningfully.

Lifestyle risk factor

The study found that the lifestyle risk factors of teenagers in rural and urban areas differed significantly. The majority of urban students engaged in irregular physical activity and showed greater levels of physical inactivity, suggesting a more sedentary lifestyle. On the other hand, students in rural areas demonstrated greater engagement in consistent physical activity. Urban children were more likely to spend more than four hours a day on digital devices, while rural pupils were more likely to spend less time on screens. Sleep patterns varied, nevertheless, with rural students more likely than urban students to suffer from sleep deprivation. Overall, these results show that teenagers in urban areas are more likely to engage in sedentary behavior, whereas adolescents in rural areas struggle with sleep deprivation, indicating different lifestyle risk behaviors in both groups.

Table 2: Distribution of lifestyle risk factors.

Characteristics	Urban, N (%)	Rural, N (%)	Chi-square (p value)
Physical activity			
Irregular	214 (76.4)	119 (42.5)	0.000
Regular	66 (23.6)	161 (57.5)	
Screen time (hours)			
<4	33 (11.8)	128 (45.7)	0.000
>4	245 (88.2)	152 (54.3)	
Sleep per day (hours)			
<5	184 (65.7)	248 (88.6)	0.000
7–8	96 (34.3)	32 (11.4)	

Interpretation

As table 2 demonstrates, there is statistically significant difference in lifestyle behaviors of urban and rural students ($p=0.000$). The irregular physical activity was dramatically higher among the urban students (76.4 percent) than the rural students (42.5 percent), whereas the regular physical activity was high among the rural students (57.5 percent) as opposed to the urban students (23.6 percent). The number of urban students spending over 88.2 hours per day on screens was much greater compared to a larger proportion of rural students (45.7) who indicated wearing less than 4 hours a day. The less than 5 hours of sleep per day is defined as sleep deprivation which was more prevalent among rural students (88.6) compared to urban students (65.7).

Dietary risk behaviour

The study showed that adolescents from urban and rural areas had significantly different dietary risk behaviors. In addition to consuming much more energy-dense snacks, fast food, and soft beverages, urban students also reported consuming more fruits, suggesting a propensity for bad eating habits. While soft drink consumption remained high in both categories, fast food consumption was comparatively lower among rural students. Both urban and rural pupils regularly consume large amounts of vegetables, indicating a sufficient intake in this area. Overall, the results show that while rural kids still have significant dietary risk behaviors despite somewhat better patterns, urban teenagers are more likely to develop unhealthy eating habits.

Interpretation

In present study it can be seen that a substantial difference exists in eating risk behaviors in urban and rural youth among pupils. Consumption of fruits was significantly higher in urban students where 95.7% served 1-3 portions of fruit per week as opposed to 3.6% of rural students where a smaller proportion of both students reported not consuming fruits. The percentage of vegetables consumed by both groups reached more than 99%. All urban students (100%) and less rural students (55.4) consumed energy-

dense snacks and fast foods, showing that urban students have a better diet in this respect. The percentage of soft drink consumption was almost similar in stands of both groups with 100 percent and 99.6 percent of urban and rural students respectively consuming soft drinks. In general, the results suggest that urban adolescents are more predisposed to adverse food practices, though the risk behaviors of dietary habits are also considerable in rural school children.

Table 3: Distribution of dietary risk behaviors.

Characteristics	Urban, N (%)	Rural, N (%)	Chi- square (p value)
Fruit consumption			
1–3 servings/ week	268 (95.7)	10 (3.6)	0.000
No consumption	12 (4.3)	13 (4.6)	
Vegetable consumption			
1–3 servings/ week	278 (99.3)	279 (99.6)	0.000
No consumption	2 (0.7)	1 (0.4)	
Energy-dense snacks/fast food			
1–2 days/week	280 (100)	154 (55.4)	0.000
No consumption	0	1 (0.4)	
Soft drinks			
1–2 days/week	280 (100)	279 (99.6)	0.000
No consumption	0	1 (0.4)	

Substance abuse

In both urban and rural settings, low rates of substance use among adolescents were determined. Consumption of tobacco and alcohol was relatively low, only a small proportion of students had experimented with them, especially in rural areas. There was little or no involvement of urban students in substance use. The behaviours, although limited in number, are important to recognize and should be explored as possible behaviours to prevent in our young people. While the numbers were small, this reporting of these behaviours is an important reminder of the need for early prevention intervention and awareness programs for teen youth.

Interpretation

It is demonstrated in the table that substance use among adolescents is very low both in urban and rural area which indicates that there is a generally positive behavior tendency. The entire urban population (100 percent) reported that had never smoked or used alcohol, which means that were not exposed to any substances. Comparatively, a small percentage of students from the country (3.2) had tried tobacco or alcohol (1.1%), and the overwhelming majority had never used either. Even though the prevalence is minimal, the eventuality of substance use in rural communities implies the existence of early exposure and suggests the necessity of prevention

education and awareness programs among teenagers. On the whole, the statistics highlight the necessity to combat substance addiction even though it is not prevalent to avoid potential risk behavior in the future.

Table 4: Distribution of substance abuse.

Characteristics	Urban, N (%)	Rural, N (%)
Tobacco use		
Never tried	280 (100.0)	271 (96.8)
Tried	0	9 (3.2)
Alcohol use		
Never tried	280 (100.0)	277 (98.9)
Tried	0	3 (1.1)

Psychosocial factor

Teens in both urban and rural areas were reported to have psychosocial issues like poor school attendance, bullying and academic stress. A large proportion of students reported suffering academic stress, indicating that there is tremendous pressure on them to study. Bullying and physical conflicts were generally rare but were significantly more common in rural areas. The absenteeism of school children was also noted and more rural children tended to abscond from school than the urban children.

Table 5: Distribution of psychosocial factors.

Characteris- tics	Urban, N (%)	Rural, N (%)	Chi- square (p value)
Bullied/physical fight			
Yes	0	12 (4.3)	0.892
No	280 (100)	268 (95.7)	
Academic stress			
Yes	261 (93.2)	278 (99.3)	0.702
No	19 (6.8)	2 (0.7)	
Frequently skipped school			
Yes	196 (70.0)	241 (86.0)	0.000
No	84 (30.0)	39 (14.0)	

Interpretation

In present study distribution of psychosocial elements by adolescent students in cities and rural areas. 4.3% of rural pupils reported a bullying incident or physical fight, compared to none of the urban pupils, without this difference being statistically significant ($p=0.892$). Academic stress was prevalent in groups with 93.2% (urban) and 99.3% (rural) of the teenagers experiencing it, but this difference was not statistically significant ($p=0.702$). The difference in school attendance ($p=0.000$) was statistically significant, however. Some 86% of rural children said there were absent from school more often than some 70% of urban children. Overall, the results suggest that bullying and academic stress is a common problem in both settings; however, school absence is a significant issue in rural settings specifically.

DISCUSSION

This study confirms that socio-demographic factors of the students in the urban and the rural regions were similar with the same age group, the same gender balance, and almost equal representation in the various classes in the school curriculum thereby providing a balanced comparison of the two groups. Logan et al describe those Urban and rural students had similar socio-demographic features, including the same age distribution, gender composition, and approximately equal representation across academic classes, showing group consistency.¹⁸

The study indicates that lifestyle risk factors differ significantly across urban and rural students, with urban students exhibiting higher physical inactivity and screen time, whereas rural students exhibit higher physical activity levels but greater sleep deprivation. Regis et al in this study this cross-sectional study looked at physical activity and sedentary behavior among 6,234 teenagers between the ages of 14-19 years. Compared to urban counterparts, rural teenagers were significantly less sedentary, with lower screen time and a lower sedentary sitting rate and were more physically active. However, non-employed teenagers in the countryside were more likely to be engaged in non-physical activity.¹⁹

The research establishes that nutritional risk behaviors vary markedly between urban and rural students. Urban pupils demonstrated a significantly greater consumption of fruits alongside ubiquitous ingestion of energy-dense snacks and soft beverages. Conversely, rural students exhibited relatively decreased consumption of fast food, while soft drink intake remained comparably elevated. Vegetable intake remained consistently elevated in both groups. Heinen et al reported that this cross-sectional study is comprehensive in terms of covering 123,100 children across 19 countries and examined the differences between urban and rural food practices. Unhealthy eating habits were also common with many of the children not taking fruits and vegetables daily with a significant percentage of them regularly taking soft drinks. The differences in urban to rural disparities varied across countries and only a small number of countries had poor nutrition practices among rural children.²⁰

The study confirms that substance usage among adolescents was negligible, with urban students reporting no tobacco or alcohol consumption, whereas a minor percentage of rural students engaged in tobacco and alcohol experimentation, suggesting a marginally elevated exposure to substances in rural regions. Warren et al explain how this large-scale project on more than 500,000 students examined the differences in substance use among adolescents in rural and urban regions. Findings showed that the differences depended on grade level, and the rural middle school students had more alcohol and tobacco use, and urban high school students had higher illegal drugs use.²¹

The study confirms that 4.3% of rural students reported experiences of bullying or violent altercations, whereas no incidents were reported among urban pupils, with no statistically significant difference ($p=0.892$). Academic stress was very prevalent, impacting 93.2% of urban students and 99.3% of rural students ($p=0.702$). A notable disparity was detected in school attendance ($p=0.000$), with 86% of rural kids regularly absent compared to 70% of urban children. Cabrera et al reported that in the research investigated disparities in bullying between rural and urban settings among 1,094 pupils. The overall incidence of bullying was comparable in both environments; however, victimization and physical bullying were more prevalent in urban schools. Rural victims exhibited heightened suffering, suggesting that geographical location affects bullying experiences and underscoring the necessity for customized therapies.²²

The study confirms that teenagers exhibited greater sedentary and bad dietary habits, whereas rural adolescents demonstrated increased sleep deprivation and absenteeism. Both cohorts encountered significant academic stress, underscoring the necessity for focused school-based health treatments. Ansarin et al a cross-sectional study was performed including 1459 adolescents aged 14 to 19 years from Tabriz (urban) and Hadishahr (semiurban), two cities with differing environmental characteristics.

Urban adolescents were more likely to have short sleep ($OR=0.63$) or sleep deprivation ($OR=0.66$) while semiurban adolescents had an average of approximately 20 minutes more sleep. Worse sleep outcomes were significantly associated with age, smoking status, chronic cough, low family income and daytime sleepiness.²³

Limitations

Cross sectional design

The cross-sectional design of the study makes it difficult to draw any firm conclusions on the causes and effects of health risk behaviors and their antecedents. It merely shows behaviors as there were at a specific moment in time.

Self-reported data

A self-administered questionnaire was used to gather the data, which means that it could be influenced by biases including social desirability and recall. When asked about their food habits or substance usage, students may have either under-or over reported.

Limitation geographical coverage

The generalizability of the findings to other places or populations may be limited because the study was conducted exclusively in selected schools of Raichur district, Karnataka.

School based sample

There was a lack of representativeness in the data since only adolescents who were enrolled in school were considered. This is because out-of-school adolescents can have different or risky behaviors.

Limitation variables assessed

Mental health issues, family dynamics, peer pressure, and socioeconomic status were not thoroughly investigated, however key risk behaviors were.

CONCLUSION

There is great prevalence of health risk behaviors among adolescent high school students in Raichur district urban and rural regions. The two groups had pronounced differences even though they had similar socio-demographic factors. It was also evident that physical activity was more deficient in urban students, and there are more screen time and intake of energy-rich meals and soft beverages, suggesting a more sedentary and inactive lifestyle. Instead, rural students were more physically active but more influenced by sleep deprivation and no school attendance. Rural teens, by contrast, did slightly more physical exercise, but were more susceptible to sleep deprivation, more prone to skipping school and a little more indulgent in substance experimentation (nicotine, alcohol). These statistics indicate that, although the rural setting might have protective variables of physical activity, are related to other developing health and behavioral disorders. Moreover, the issue of psychosocial problems, at least academic stress, was revealed to be common both among urban and rural students, meaning that teenagers are subjected to overwhelming academic pressure irrespective of their residential address. Adolescent health risks are multifaceted and influenced by environment, social and behavioral factors. That is why there is an urgent necessity to have comprehensive and contextual solutions. Health promotion programs in schools ought to focus on promoting physical exercises, eating in moderation and balanced foods, limitation of screen time, promotion of sleep hygiene, and increasing awareness about the adverse effects of drug abuse. In addition, schools need to enhance their mental support networks (counseling services, and stress management programs).

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