



Health Status of Adolescents Residing in Sarjapur PHC Area near Bangalore: A Community-Based Study

Cency Baburajan¹, Avita Rose Johnson², Sulekha T³

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Author's Affiliation:

¹Postgraduate student; ²Assistant Professor; ³Professor, Dept of Community Health, St. John's Medical College, Bangalore

Correspondence

Dr. Sulekha T.
nakulsulekha13@gmail.com

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ABSTRACT

Background: Adolescent health and behaviour patterns in rural areas are changing with increasing exposure to media and internet. This study was conducted to assess health status of adolescents in rural areas covered by Sarjapur Primary Health Centre.

Methods: Community-based, cross-sectional study in 25 villages in Bangalore Urban District. Two-staged cluster sampling done. Interview schedule for socio-demographic details and information on illness and health-related behaviours, height and weight measured and haemoglobin estimated using Hemocue. 'Health status' measured by anaemia, nutrition status, reported illness, substance abuse, personal hygiene, diet and physical activity. Chi-square test for association between outcome variables and socio-demographic factors.

Results: Of 210 adolescents, 48.1% were anaemic, 63.8% underweight and 21.9% overweight. Anaemia or nutritional status were not associated with socio-demographic variables. Common illnesses were viral fever, respiratory infections and dengue. 16.2% of subjects used tobacco and 1.9% consumed alcohol. Bathing and brushing teeth were inadequate. Skipping meals, junk food, poor intake of fruits and vegetables were common, but physical activity was adequate.

Conclusion: Overall health status of rural adolescents was found to be poor. Community level workers must create awareness regarding adolescent health services, treat anaemia, counsel adolescents against tobacco use, and promote healthy diet.

Key Words: adolescent health status, rural, anaemia, dual burden malnutrition

INTRODUCTION

World Health Organization (WHO) defines adolescence as the ages of 10 to 19 years, with 87% adolescents residing in developing countries.¹ India has the largest adolescent population in the world, over 243 million adolescents who account for 21% of the country's population.² Adolescence is the period when an individual undergoes major physical and psychological changes. Social interactions and relationships also change at this time. This makes the adolescents most vulnerable to various health related issues. The top five causes of

morbidity among adolescents in the world are depressive disorders, iron deficiency anaemia, asthma, back and neck pain, anxiety disorders.¹ Behaviours like tobacco and alcohol use and conditions like underweight or overweight are important health problems affecting adolescents along conditions like fever, headache and common cold.²

Health of adolescents often get neglected as they neither come under the programs and policies meant for children, nor adults. Adolescents are usually regarded as healthy and few attempts have been made to systematically measure their health.

But adolescents do have health related issues that require attention from the health sector, particularly since many behaviours that start or are reinforced during adolescence, affect health across the life-course.³ With this background, the RMNCH+A program (Reproductive, Maternal, New born, Child and Adolescent Health) was launched in the year 2013.⁴ However, adolescent health services are not uniform across the health system and under-utilisation remains a challenge.⁵

With two thirds of the country residing in rural areas,⁶ it is important that we focus on adolescents in the rural area who are influenced by socio-cultural practices and beliefs followed by the rural community, yet also exposed to 'urban' health issues due to increasing exposure to media and the internet. While there has been research into the health of adolescent girls, very few studies have included adolescent boys, rural areas or ages across the entire adolescent group of 10-19 years. School-based studies tend to miss out on school-dropouts and older adolescents who have finished their schooling. Identifying the health status of adolescents will enable targeted interventions and provisions for promoting adolescent health in rural areas. Hence, this study was conducted to assess the health status and its associated factors among adolescents residing in a rural community setting.

METHODS

This community-based, cross-sectional study was undertaken among adolescents living in Sarjapur Primary Health Centre (PHC) area, Anekal Taluk, Bangalore Urban district, with a total population of 30,007 included under three sub-center areas – Mugalur, Kuthaganahalli and Handenahalli as well as Sarjapur town. Institutional Ethics approval was obtained and the study was conducted over a six month period in 2017.

Sampling frame: Adolescents aged 10-19 years of age residing in Sarjapur PHC area.

Sample size estimation: Sample size was based on the most common adolescent health problem in India, that is anaemia. With 50.8% prevalence of anaemia from a previous study in Chandigarh,⁷ 95% confidence interval, 10% absolute precision, design effect of 2 for cluster sampling and 10% non-response rate, the sample size was estimated as 210.

Sampling Technique: The WHO 30x7 or two-staged cluster sampling technique was used.⁸ The clusters were first selected using probability proportionate to size. Villages were listed sub-centre-wise and population of all 25 villages and town were noted from PHC records. Sampling interval

was calculated by dividing the cumulative population by the number of clusters needed. A random number less than the sampling interval was generated using Microsoft Excel to identify the village in which the first cluster would be located. The next cluster was selected by adding the sampling interval to the random number. 30 such clusters were thus identified, with larger villages and Sarjapur town having more than one cluster. To select seven study subjects in each cluster, the researcher went to the centre of the village, numbered the streets and using lottery method, and randomly selected the street to go house-to-house. If adolescents were not available at their houses on the day of visit, an attempt was made to contact them at a subsequent visit, failing which they were replaced by another adolescent in the same cluster selected thus.

Inclusion criteria: Adolescent between 10-19 years, male or female, married or unmarried, including pregnant or physically disabled adolescents.

Exclusion criteria: Adolescents who were not available at home over two consecutive visits or not able to comprehend questions due to mental disability. *Data Collection:* Written informed consent was obtained from parent/guardian and assent obtained from the participant. Socio-demographic details and information on reported illness, substance abuse, personal hygiene, diet and physical activity were collected using a pre-tested, face-validated, structured interview schedule in the local language Kannada. Socio-economic status was determined using Modified BG Prasad socio-economic classification.⁹ Hemoglobin (Hb) estimation was done by HemoCue Hb30 (HemoCue, India), a portable photometric analyzer, which has a sensitivity of around 80% and a specificity of more than 90% as compared to laboratory based autoanalyzer.¹⁰ Anthropometric assessment of height and weight was done. Height was measured to the nearest 0.1cm using a portable stadiometer (Seca, Germany) and weight was recorded to the nearest 100g using a calibrated digital weighing scale (Salter, India). Body Mass Index (BMI) was calculated by dividing weight in kilograms by the square of height in metres. Nutritional status was categorized according to WHO BMI-for-age z-scores.¹³

Operational Definitions: Early adolescence: 10-14 years of age. Late adolescence: 15-19 years of age.¹¹ Anaemia: Hb value < 12g/dl¹² Underweight: WHO BMI-for-age z-score \leq -2. Overweight: WHO BMI-for-age z-score $>$ +1.¹³

Statistical analysis: The data was entered in a Microsoft Excel spreadsheet and analyzed using Statistical Package for the Social Sciences (SPSS) version 20. Data was checked for normality using Shapiro Wilk test and Normality Probability Plot.

The variables were described by calculating frequencies, proportions, mean, median and standard deviation. 'Health status' in this study was measured by separate outcome variables: anaemia, nutrition status, and reported illness in the last six months, substance abuse, personal hygiene, diet and physical activity. Chi-square test was done to look for association between the outcome variables and socio-demographic factors. A p value of <0.05 was considered to be statistically significant.

RESULTS

Socio-demographic details: Of the 210 adolescents in the study, there were slightly higher number of girls (56.7%). Majority (72.9%) were early adolescents (Table 1). Most (95%) were Hindu by religion, and belonged to nuclear families (70%). Majority (94.3%) were attending school or college, 68.1% of whom were studying in government education institutions. 110 (52.4) were studying in middle school, 70 (33.3) in high school and 30 (14.3%) were studying in PUC or college. 12 (5.7%) had dropped out of school, of whom 2 were male and were working and the rest were females who were married homemakers.

Health status of adolescents was assessed by assessing anaemia, nutrition status, reported illness, substance abuse, personal hygiene, diet and physical activity.

Anaemia: Nearly half (48.1%) of the adolescents were found to be anaemic (Table 1). The prevalence of anaemia was found to be higher among early adolescents, females and those from upper socioeconomic class, but these findings were not statistical significant. The mean Hb values for the age group of 10-14 years for males was 11.8 \pm 1.2 g/dl (Range=9.2-15.2) and for females was 11.8 \pm 0.9 g/dl (Range=9.0-14.0). The mean Hb values for males aged 15-19 years was 12.7 \pm 1.5 g/dl (Range=9.6-15.5) and for females were 11.4 \pm 1.66 g/dl (Range=7.3 -13.9)

Nutritional status: Based on BMI-for -age, nutritional status was determined to be normal in only 14.3%. Nearly two thirds (63.8%) were underweight and 21.9% were overweight (Table 2). There was no significant association between nutritional status and socio-demographic factors, neither was there any association between nutritional status and anaemia.

Table 1: Anaemia among study subjects and association with socio demographic factors (n=210)

Variables	Total (n=210)(%)	Anaemia (n=101)(%)	P value
Age			
10-14 years (Early adolescence)	153 (72.9)	75 (49)	0.66
15-19 years (Late adolescence)	57 (27.1)	26 (45.6)	
Gender			
Male	91 (43.3)	43 (47.3)	0.83
Female	119 (56.7)	58 (48.7)	
Socio economic status			
Lower middle / Middle class	102 (48.6)	44 (43.1)	0.162
Upper middle class / Upper class	108 (51.4)	57 (52.8)	

Numbers in parentheses indicate row percentages, except in the total column where it indicates column percentages

Table 2: Nutritional Status of study subjects and association with socio-demographic factors (n=210)

Variable	Nutritional Status			P value
	Underweight (n=134) (63.8)	Normal (n=30) (14.3)	Overweight (n=46) (21.9)	
Age category				
Early adolescence	97 (63.4)	24 (15.7)	32 (20.9)	0.59
Late adolescence	37 (64.9)	6 (10.5)	14 (24.6)	
Gender				
Male	63 (69.2)	11 (12.1)	17 (18.7)	0.36
Female	71 (59.7)	19 (16)	29 (24.4)	
Socio economic status				
Lower middle / Middle class	64 (62.7)	18 (17.6)	20 (19.6)	0.353
Upper middle class / Upper class	70 (64.8)	12 (11.1)	26 (24.1)	
Type of family				
Nuclear	101 (68.7)	18 (12.2)	28 (19)	0.078
Others	33 (52.4)	12 (19)	18 (28.6)	
Anaemia				
Absent	60 (50.8)	29 (50.9)	20 (57.1)	0.794
Present	58 (49.2)	28 (49.1)	15 (42.9)	

Numbers in parentheses indicate row percentages

Table 3: Substance abuse among the study population (N=210)

Variable	Adolescents (%)
Ever used tobacco	
Yes	34 (16.2)
Form of tobacco ever used	
Chewing tobacco	31 (14.8)
Smoking tobacco	3 (1.4)
Frequency of tobacco use	
Tried only once	25 (11.9)
Less than once a month	0 (0)
Once or more in last month	9 (4.3)
Ever consumed alcohol	
Yes	4 (1.9)
Frequency of alcohol consumption	
Tried only once	4 (1.9)
Less than once a month	0 (0)
Once or more in last month	0 (0)
Ever consumed recreational drugs	
Yes	0 (0)

Table 4: Diet and Physical activity among the study population (N=210)

Variable	Adolescents (%)
Source of lunch	
Home	98 (46.6)
School	112 (53.4)
Number of meals a day	
Less than 3 meals	17 (8.1)
Habit of skipping meals	
Yes	146 (69.5)
Daily intake of breakfast	
No	44 (20.9)
Type of diet	
Vegetarian	20 (9.5)
Non-vegetarian	190 (90.5)
Consumption of meat/fish/eggs (n=190)	
Once a week or less	183 (96.3)
Daily consumption of fruits	
No	195 (92.8)
Daily consumption of vegetables	
No	47 (22.3)
Daily consumption of milk	
No	117 (55.7)
Regularly consume packaged snacks	
Yes	172 (81.9)
Physical activity for ≥ 60 min/day (in the last week)	
Daily	150 (71.4)
At least 5 days	30 (14.3)
Less than 5 days	20 (9.5)
Never	10 (4.8)

Reported illness: Illness in the last 6 months was reported by 38.1%, the commonest being viral fever (21.9%), acute respiratory infections (4.3%), dengue (4.3%) and typhoid (3.8). Refractive error (2.4%), gastroenteritis (1%), female reproductive tract infection (1%) and congenital heart disease (0.5%) were less commonly. All (100%) of the subjects sought treatment for their illness, either from Sarjapur PHC or from private clinics, but none of the adolescents in the study were aware of the exis-

tence of adolescent health services (Sneha Clinic) at Sarjapur PHC, which runs on weekday afternoons.

Substance Abuse: Tobacco (ever) use among the study subjects was 16.2% (Table 3). Prevalence of tobacco (ever) use among boys was 13 (19.7%) and among girls were 21 (17.6%), among early adolescents was 18 (11.8%) and among late adolescents was 16 (28.1%). Prevalence of alcohol (ever) use among boys was 1 (1.1%) and among girls was (2.5%). While none of the early adolescents had ever consumed alcohol, 4 (7%) of late adolescents had ever consumed alcohol. None of the study subjects had ever tried recreational drugs.

Personal Hygiene: Only half (50.5%) of the study subjects had a daily bath, with the rest bathing once every two or three days. While 68.6% brushed teeth twice a day, 30% brushed once daily and 1.4% did not brush daily. Handwashing practice was found to be adequate. Hand washing before eating was regularly performed by 86.7% and regularly after using the toilet by 99%.

Diet and Physical Activity: More than half of the study subjects received their lunch from the school mid-day meal program (Table 4). Unhealthy dietary habits found were: skipping meals, not having breakfast, poor daily intake of fruits and vegetables, and consumption of junk food. Physical activity was found to be adequate (≥ 60 minutes per day, at least 5 days a week) 85.7% of the subjects.

DISCUSSION

As there is no single measure of health status of adolescents, our study assessed various health conditions and health behaviours among rural adolescents. Nearly half of the adolescents in our study were found to be anaemic. This is important as anaemia features among the top five causes of adolescent mortality in India, and poor cognitive and physical development of children, poor academic performance or physical performance, reduced work productivity and frequent infections are the result of anemia.¹⁴ Studies among adolescents in Chandigarh⁸ and Nepal¹⁵ reported similar prevalence of anaemia, 50.8% and 52% respectively. However, both studies showed higher prevalence among girls than boys, as compared to our study which showed equal prevalence among girls and boys. This could have been due to the larger proportion of early adolescents in our study, an age at which difference in anaemia levels between boys and girls may not be apparent due to the fewer years of exposure to menstruation among the younger adolescent girls.

One in five adolescents was overweight. The prevalence of overweight is nearly catching up

with that of urban adolescent populations, as seen in a study in urban Bangalore which found 27.8% overweight school-going adolescents.¹⁶ The dual burden of malnutrition among adolescents has been similarly demonstrated in rural West Bengal.¹⁷ Nearly two thirds of our study population were underweight, which could have been due to the habit of eating less than three meals in a day, skipping meals and lack of a nutritious diet as evinced by the poor intake of fruits, vegetables and eggs in our study.

Common illnesses suffered by adolescents in our study were viral fever, acute respiratory infections, dengue and typhoid. This was similarly seen among adolescents visiting an urban health centre in Tamil Nadu which reported mainly upper respiratory tract (78.2%) and (22.5%) gastrointestinal infections,¹⁸ but very different from a study conducted in West Bengal among school going adolescents where dental caries, refractive errors, worm infestation, skin infections and ENT problems were commonly seen.¹⁹ This difference may be due to the fact that in Sarjapur PHC area, the school-going adolescents are regularly checked by the Rashtriya Bal Swasthya Karyakaram (RBSK) teams as well as annual school check-ups by the medical college, whose field practice area it is, with regular deworming, prompt treatment and referral of common conditions like refractive error.

In the present study, one in six adolescents had ever used tobacco, similar to a school-based study in Karnataka,²⁰ where 15.1% of students had used tobacco at least once in their life, but higher compared to a study conducted among adolescents in Kerala (6.9%).²¹ This difference maybe because of the fact that tobacco chewing is culturally more accepted in rural Karnataka, which was the common type of tobacco use in our study. The cultural sanction of tobacco use can also explain the high prevalence of smoking in schools (25.3%) as seen in a study from Nepal.²² Cultural norms and social sanction also influence alcohol consumption as found in a study in Amritsar where 31.6% adolescents had consumed alcohol,²³ in contrast to less than 2% in our study. The higher prevalence of tobacco use rather than alcohol use among adolescents in our study could be attributed to easy accessibility to tobacco in small shops which also sell sweets and snacks, as compared to liquor stores, where adolescents may hesitate to visit. Even though we had only four participants in our study who ever consumed alcohol, they all belonged to the late adolescence group. This was similarly found in a study in Kerala where alcohol consumption among adolescents increased with age.²⁴

Personal hygiene practices like taking bath daily and hand washing are important to prevent diar-

rhoal disease and respiratory illnesses. However, personal hygiene was found to be inadequate in our study, with only half of the adolescents taking daily bath and two thirds not brushing teeth twice a day. Handwashing was adequate, similar to a study conducted in Puducherry.²⁵ However, in the Puducherry study, 68% adolescents bathed daily, a higher proportion than in our study, as it is a common practice among the rural community in our study area, to bathe on alternate days, a practice that needs to change.

Adolescence is a nutritionally critical period of life. Rapid physical growth creates an increased demand for energy and nutrients, which if not provided can retard physical growth and reduce intellectual capacity by affecting concentration, learning and academic performance.² Even though more than half of the study subjects received their lunch from the school mid-day meal program, daily intake of fruits and vegetables was found to be poor. The commonest cause of anemia is iron deficiency, and this iron-deficient diet may be a contributory factor to the anaemia levels in our study. Unhealthy dietary habits found were: skipping meals, not having breakfast, and consumption of junk food, which mimics dietary patterns found among urban school students in Bangalore city¹⁶ and Baroda city.²⁶

According to WHO, adolescents should have at least 60 minutes of moderate to vigorous intensity physical activity every day, which includes playing games and sports, transportation, chores, physical education, recreation or planned exercise. Physical activity was found to be adequate in our study, similar to adolescents in rural West Bengal²⁷ but much higher than the low levels of physical activity among students in urban Bangalore,¹⁶ indicating that while dietary patterns of rural adolescents follow the trends of urban areas, rural adolescents still retain physically active lifestyles.

In spite of the health issues faced by rural adolescents, none of the study subjects were aware of the existence of adolescent-friendly health services (Sneha Clinic) at the PHC. This indicates a gap between service delivery and service utilisation that needs to be bridged by creating awareness among adolescents about the existence and scope of these services. Community level workers like ASHA, ANM and Anganwadi worker may create awareness regarding available adolescent services, treat anaemia with iron and folic acid tablets and focus on counselling adolescents against tobacco use, and promote healthy eating habits and iron-rich foods.

Limitations: Reported illness over the last six months may have introduced a recall bias in the study. There were no records to verify the reported

illness. Also, this study did not capture information on sexually transmitted diseases among adolescents.

CONCLUSION

This rural community-based study assessed health status of adolescents by assessing anaemia, nutrition status, reported illness, substance abuse, personal hygiene, diet and physical activity.

Overall the health status of adolescents were found to be poor. Nearly half of the adolescents were anaemic. Dual burden of malnutrition was found with nearly two thirds underweight and one in five overweight. Anaemia or nutritional status were not determined by socio-demographic variables. Common reported illnesses were viral fever, acute respiratory infections, dengue and typhoid. 16.2% of subjects had ever used tobacco and 1.9% ever consumed alcohol. Personal hygiene was inadequate with regards to bathing and brushing teeth. Unhealthy dietary practices like skipping meals, poor daily intake of fruits and vegetables, and consumption of junk food were common, but physical activity was adequate. Community level workers may create awareness regarding available adolescent services, treat anaemia with iron and folic acid tablets and focus on counselling adolescents against tobacco use, and promote healthy eating habits and iron-rich foods.

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