

Morbidity profile and its relationship with the nutritional status, among adolescent school girls Bengaluru city: Cross-sectional study

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Received: August 25, 2016; Accepted: November 30, 2016

ABSTRACT

Background: Adolescence, a phase of transition both physically and mentally falls in the age group of 10-19 as per the WHO definition. Today, 1.2 billion adolescents stand at the crossroads between childhood and adulthood and majority of the world's adolescents (88%) live in developing countries. Any lack of knowledge regarding their health status, nutritional status, and needs, will affect the development of the individual as well as the nation as they are the building blocks of nation. Hence, the community has a collective responsibility to ensure that adolescence does, in fact, become an age of opportunity. **Objectives:** (i) To determine the proportion of morbidity among adolescent school girls of Bengaluru city-south zone. (ii) To assess the relationship between morbidity and nutritional status of adolescent school girls. **Materials and Methods:** A cross-sectional study was conducted among adolescent school girls for 4 months - September - December 2015. The study sample size was calculated as 500 based on the previous study, where the prevalence of morbidity among school girls was 45%. **Results:** The mean age of girls was 13.79 ± 0.85 years. Mean height of girls was 153.63 ± 9.95 cm, mean weight 42.7 ± 8.93 kg, and mean body mass index 18.03 ± 3.23 kg/m². 324 (64.8%) girls had healthy weight and 137 (27.4%) were underweight. Stunting in 67 (13.4%) girls. A total of 304 adolescent girls (60.8%) had morbidity at the time of our visit to schools. Significant morbidity history in the past 2 years was seen in 51 (10.2%) girls. **Conclusion:** Health education about consuming nutritious food and hygienic practices such as hand washing should be imparted. Clean toilets, hand wash facilities, adequate lighting and ventilation and supply of clean drinking water are some of the necessary things to be taken care in the school premises.


KEY WORDS: Adolescent Girls; Morbidity; Nutritional Status

INTRODUCTION

Adolescence, a phase of transition both physically and mentally falls in the age group of 10-19 as per WHO definition. It is the formative years of life of an individual.

Today, 1.2 billion adolescents stand at the crossroads between childhood and adulthood and majority of the world's adolescents (88%) live in developing countries.^[1] It emphasizes that more importance has to be given to the adolescent group as they are the future of our nation. India is home to more than 243 million adolescents, who account for nearly a quarter of the country's population (21.8%).^[1]

Usually, the main health indicator to health planning was mortality rates; adolescents who have the lowest mortality among the different age groups and have therefore received low priority.^[2] The lack of actions to protect their health status, understand their nutritional needs, will affect the

Access this article online	
Website: http://www.ijmsph.com	Quick Response code
DOI: 10.5455/ijmsph.2017.0851330112016	

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development of the individual as well as the nation as they are the building blocks of nation. Hence, the community has a collective responsibility to ensure that adolescence does, in fact, become an age of opportunity.

Many boys and girls in developing countries enter adolescence undernourished, making them more vulnerable to disease and early death.^[3] For example, a large proportion of India's adolescents are anemic: 56% of girls and 30% of boys. Anemia among adolescents adversely affects these young people's growth, resistance to infections, cognitive development and work productivity.^[1] Adolescent girls, constituting nearly one-tenth of the Indian population, form a crucial segment of the society.^[4] They are malnourished and end up in complications during childbirth leading to high maternal mortality or may give birth to low birth weight babies who then are malnourished in future and this vicious cycle continues.

Various programs to meet the nutritional needs of adolescent group is established in India. Iron and folic acid supplementation programs, deworming programs, Adolescent Reproductive and Sexual Health Programme, school health programs, etc., are all in the direction to achieve optimum health in adolescent age group. Developing healthy eating and exercise habits at this age are foundations for good health in adulthood. Reducing the marketing of foods high in saturated fats, trans-fatty acids, free sugars, or salt and providing access to healthy foods and opportunities to engage in physical activity are important for all but especially children and adolescents.^[3] With this background, our study aims to determine the morbidity and its relationship with the nutritional status of adolescent school girls.

Objectives

1. To determine the proportion of morbidity among adolescent school girls of Bengaluru city - South zone
2. To assess the relationship between morbidity and nutritional status of adolescent school girls.

MATERIALS AND METHODS

A cross-sectional study was conducted among adolescent school girls for 4 months (i.e.,) September to December 2015. Study sample size was calculated as 500 based on the study by Dr. Kaviraj Motakpalli, where the prevalence of morbidity among school girls was 45%.^[5] Permission was taken from the principals of the schools to conduct the study. Five schools were selected in Bengaluru city - South zone by convenience. In each school, data were collected in different high schools through population probability sampling method till the desired sample was met. Institutional Ethical Committee approval was obtained. Permission for the study was obtained from the Block Educational Officer, Bengaluru

South zone. Approval for health checkup was taken from the school principal. Nutritional health status and morbidity were assessed using anthropometric measurements (height, weight), general physical examination, systemic examination, and significant morbidity history in the past 2 years.

Data were entered into Microsoft Excel sheet and analyzed using SPSS 21 software. Descriptive statistics and inferential statistics were used to analyze the data and results depicted in the form frequency tables, pie diagrams, and bar charts.

RESULTS

Mean age of girls was found to be 13.79 ± 0.85 years. Distribution based on religion given in Figure 1.

Mean height of girls was 153.63 ± 9.95 cm, mean weight 42.7 ± 8.93 kg and mean body mass index (BMI) 18.03 ± 3.23 kg/m². According to the WHO growth charts,^[6] 5-19 years, 5th percentile to 85th percentile was considered healthy weight (BMI), <5th percentile as underweight, 85th to 95th percentile as overweight and >95th percentile as obesity. Accordingly, 324 (64.8%) girls had a healthy weight and 137 (27.4%) were underweight as shown in Figure 2. Height for age was <3rd percentile (stunting) in 67 (13.4%) girls.

In our study, it was seen that out of 500, 304 adolescent girls (60.8%) had morbidity at the time of our visit to schools. Different morbidities such as dental caries, respiratory symptoms (cough, cold), skin manifestations (acne, pigmentation), and menstrual problems (irregular cycles, dysmenorrhea) are depicted in Table 1.

Significant morbidity history in the past 2 years was seen in 51 (10.2%) girls. Among them history of typhoid fever in 23 (45.1%) of the girls and 15 (29.4%) had injuries. History of dengue fever and jaundice was also given by few adolescent girls as shown in Table 2.

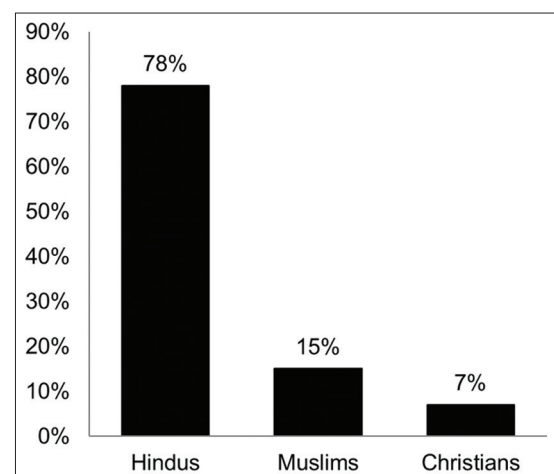


Figure 1: Distribution of adolescent girls according to religion ($n = 500$)

Table 1: Proportion of different types of morbidity* ($n=304$)

Type of morbidity	Number of girls (%)
Dental caries	85 (27.9645)
Respiratory symptoms	61 (20.06)
Skin manifestations	45 (14.80)
Pallor	42 (13.81)
Menstrual problems	36 (11.84)
Refractive error	35 (11.51)

*Multiple type of morbidity was seen in few of them

Table 2: Morbidity history in past 2 years ($n=51$)

Past morbidity history	Number of girls (%)
Typhoid fever	23 (45.10)
Injuries	15 (29.40)
Jaundice	7 (13.72)
Dengue fever	6 (11.76)

436 out of 500 (87.21%) had attained menarche. Among that 27 (6.2%) girls had irregular menstrual cycle, and 20 (4.6%) had dysmenorrhea.

Association between underweight and morbidity as shown in Table 3 ($P = 0.26$). A significant association was found between history morbidity and underweight with $P < 0.045$ is shown in Table 4.

DISCUSSION

In our study, based on the WHO standards of BMI for age for adolescent age group, 27.4% of the girls were found to be underweight and based on height for age standards for adolescent girls by WHO, 13.4% of the girls were stunted. Morbidity at the time of visit was seen in 53.6% of the girls. Morbidity profile distribution was dental caries in 27.96%, proportion of girls with skin manifestations was 13.81%, respiratory symptoms such as cold and cough was seen in 20.06% of the girls and refractive errors (proportion of girls with spectacles) were seen in 11.51% of girls. Significant association found between past history of morbidity and underweight with $P < 0.045$, which shows the vicious cycle of morbidity and undernourishment.

Based on the WHO standards of BMI for age for adolescent age group, 27.4% of the girls were found to be underweight which is similar to a study by Singh et al.^[4] conducted in a rural area of Varanasi district where it was found to be 26.6% and also to a study by Anand et al.^[2] conducted in a secondary school of Chandawli village of Haryana where 30.10% of adolescent girls were underweight. Based on height for age standards for adolescent girls by WHO, 13.4% of the girls were stunted which is on par with the study by Kumar.^[7] conducted in rural areas of Kancheepuram district

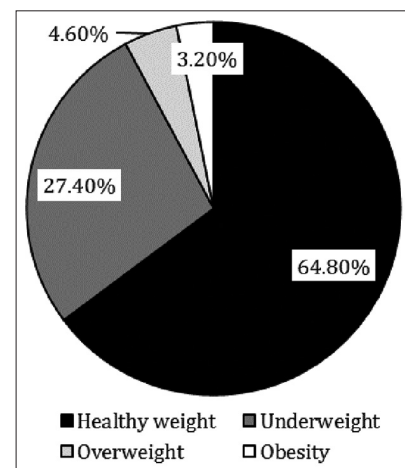
Table 3: Association between underweight and morbidity

Underweight	Morbidity		Total
	Yes	No	
Yes	79	58	137
No	189	174	363
Total	268	232	500

Table 4: Association between past morbidity and underweight

Significant past history	Underweight		Total
	Yes	No	
Yes	20	31	51
No	117	332	449
Total	137	363	500

$P < 0.045$

**Figure 2:** Nutritional status of adolescent girls (body mass index for age) ($n = 500$)

of Tamil Nadu where stunting seen in 19.2% of adolescent girls. In our study, morbidity at the time of visit was seen in 53.6% of the girls which is lower than that found in a study conducted among school children of Ludhiana city by Panda et al.^[8] where it was found to be 72.4% which may be because this study in Ludhiana city was conducted among the age group of 5-16 years which involve more vulnerable age group for infections. The proportion of girls with dental caries (27.96%) and skin manifestations (13.81%) coincides with that found in a study by Ananthakrishnan et al.^[9] where dental caries was 27.90%, and skin manifestations was 8.7%. Respiratory symptoms such as cold and cough was seen in 20.06% of the girls which is similar to that found in a study by Singh et al.^[10] conducted among adolescent girls of slums of Lucknow city where it was 25.80%. Refractive errors (proportion of girls with spectacles) were seen in 11.51% of girls which is slightly higher than that found in a study among school children of Ludhiana city by Panda et al.^[8] where it was 5.6%, which might be probably because of difference in sample size where it was 776 when compared to our study sample size of 500.

The strength of this study was that it was conducted by a sample taken from different schools (5 schools) in Bengaluru south zone. Limitations of the study were that no laboratory investigations were done for nutritional assessment and recall bias in morbidity history of the past 2 years.

CONCLUSION

To conclude, in this study many adolescent girls were underweight which need to be given priority. Immediate measures like supplementary nutrition for undernourished girls, anemia correction by iron and folic acid distribution and periodic deworming should be undertaken. Health education about consuming nutritious food, reducing consumption of junk foods and hygienic practices like hand washing should be imparted. The importance of balanced diet and nutritious food should be included and stressed upon in the school curriculum. Overcrowding in schools being a risk factor for the spread of various infections like respiratory and dermal, needs to be focused and prevented by methods like adequate spacing in between the students, proper ventilation and cross ventilation in classrooms. Clean toilets, hand wash facilities, adequate lighting and ventilation, encouraging using soap for hand wash and supply of clean drinking water are some of the necessary things to be taken care in the school premises. Accidental injuries in schools are another area of concern. Proper precautions should be taken by the school authorities in avoiding such unfortunate incidents among children.

ACKNOWLEDGMENTS

The authors would like to thank the following for their invaluable support and guidance. Dean cum Director BMCRI, Bengaluru, all the faculty and postgraduates of Department of Community Medicine, BMCRI, Bengaluru and to all Principals, teachers, and students of the schools for their contribution in carrying out the study.

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How to cite this article: Swetha NB, Ranganath TS, Shobha, Shireen N, Ramya MS. Morbidity profile and its relationship with the nutritional status, among adolescent school girls Bengaluru city: Cross-sectional study. *Int J Med Sci Public Health* 2017;6(4):720-723.

Source of Support: Nil, **Conflict of Interest:** None declared.