

# Nutritional Status of Adolescent Girls in Tribal Blocks of Maharashtra

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## Abstract

**Context:** Undernutrition among adolescents in tribal areas is an area of concern in India. **Aims:** This study aims to assess nutritional status of adolescent girls and to study their hygienic practices and awareness regarding adolescent programs. **Settings and Design:** Two blocks (Palghar and Dahanu) in Palghar district of Maharashtra. **Subjects and Methods:** The present study was a community-based cross-sectional study conducted among 240 unmarried adolescent girls in ten villages of the study area. **Results:** The mean age of adolescent girls was  $14.5 \pm 1.62$  years. Mean body mass index was  $18.13 \pm 7.11$  kg/m<sup>2</sup>; 55% of them were wasted and 67% were stunted. Mean hemoglobin was  $9.57 \pm 1.4$  g/dl and 81.6% had moderate anemia. Ninety-two percent reported hand washing with soap after defecation. Only 2.5% had awareness regarding adolescent government programs. **Conclusion:** The present study indicated very poor nutritional status among tribal adolescent girls. Interventions to reduce the prevalence of malnutrition and anemia in this age group is the need of the hour.

**Keywords:** Adolescent, anemia, hemoglobin, malnutrition, nutritional status

## INTRODUCTION

Adolescents categorized in the age group of 10–19 years according to the World Health Organization (WHO) comprise one of the most important components of any population and is also one of the most vulnerable age group.<sup>[1]</sup> Adolescents in India comprise around 21% of the total population, and the sex ratio in this age group is 898.<sup>[1-3]</sup> In India we face a big challenge regarding the nutritional status of adolescents with some studies showing that around half of them are wasted and 40% are stunted.<sup>[4]</sup> According to UNICEF, malnutrition in the form of anemia is present in large proportion of India's adolescents with 56% of girls and 30% of boys being anemic.<sup>[5]</sup> Anemia among adolescents adversely affects growth, resistance to infections, cognitive development, and work productivity. Chronically malnourished adolescents are more likely to remain undernourished during adulthood and pregnancy and thus are more likely to deliver low birthweight babies creating a vicious cycle.<sup>[1]</sup>

Prevention of malnutrition at every stage of the life cycle can improve socioeconomic status of a country and will reduce the healthcare costs and increase adult productivity. To break

the intergenerational cycle of malnutrition, a special focus for overcoming adolescent malnutrition is needed. As a first step, a review of the nutritional status of adolescents is needed.

Many studies suggest that rural and tribal areas of India face the problem of undernutrition as these areas are underprivileged in terms of many basic and health facilities.<sup>[6,7]</sup> Studies have found undernutrition is highly prevalent among rural adolescents.<sup>[6-8]</sup> There have been many nutritional programs to address malnutrition among adolescents in India. However, service utilization by the adolescents is still limited and more research is needed on this aspect.

The present paper is a part of a larger study “improving health and nutritional status of vulnerable segment of population by

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implementing multi-component health and nutrition education intervention as sustainable model of intervention” in 41 districts of India which was initiated as per directives from Government of India. It describes the findings of the cross-sectional baseline survey among adolescent girls conducted under this study in two tribal blocks of Palghar district in Maharashtra. Palghar district was carved out from Thane district in August 2014. It has a total of eight talukas, 1008 villages, and the literacy rate is 66.65%. The major tribes in the study area are Warli, Thakar, Thakur, Dubala, Koli, and Macchi.

The objectives of the present study were to assess nutritional status of adolescent girls and to study their hygienic practices and awareness regarding government adolescent programs.

## SUBJECTS AND METHODS

The present study was a community-based cross-sectional study conducted in 10 villages of two tribal blocks, Palghar and Dahanu in Palghar district of Maharashtra. The data collection period for baseline survey was from July 2015 to August 2016. The study participants were adolescent girls in the age group of 12–18 years. Institutional ethical clearance was obtained before the initiation of the study. The sample size was calculated for the interventional study; however, in this paper, findings of the baseline survey are described. Assuming the prevalence of anemia among adolescent girls is ~60% and an anticipated reduction of anemia is 20%, with 95% confidence interval, 80% of power, a design effect of 2; the sample required in each district was 194. Assuming 20% loss to follow-up, a sample size of 240 per district was calculated. From each of the 10 villages, 24 adolescents were included in the study. A multistage sampling method was adopted; within the district, two blocks were selected randomly, and from each block, five villages were selected by probability proportion to size sampling method. Each village was divided into three to four zones, and households were selected serially until the required numbers of study participants were enrolled from each zone. From each household, one adolescent girl was selected until the desired sample size was met.

Written informed consent was taken from one of the parent, and written assent was also obtained from the adolescent girls. A pretested and validated questionnaire was administered to the study participants. Nutritional status was assessed using anthropometry, and hemoglobin was estimated by cyanmethemoglobin method.

Height was measured using stadiometer (nearest 0.1 cm), and weight (nearest 0.5 kg) was measured using a portable weighing machine. WHO classification was used for the assessment of malnutrition.<sup>[9]</sup>

The data were analyzed using SPSS software version 19 (SPSS South Asia Private Limited, Bangalore, Karnataka, India). Frequency and percentage were calculated for age, educational status, occupation, etc., Continuous variables were summarized as mean with standard deviation (SD).

## RESULTS

The mean age of adolescent girls was  $14.5 \pm 1.62$  years with the minimum age being 12 and maximum 18 years. Majority of the participants had attained menarche with mean age at menarche being  $12.96 \pm 1.7$  years. Majority (79.2%) belonged to scheduled tribes, and 92.5% were in lower socioeconomic class.<sup>[10]</sup> Almost half (45.8%) had semi-pucca houses, 31.3% had kutchha houses while 22.9% had pucca houses. Sixty-one percent had sanitary latrines in their houses while 36.3% reported open air defecation.

Majority of the study participants (76%) were schoolgoing, while 24% were nonschoolgoing. Among the school going participants, 56.5% were offered mid-day meals at school while among nonschool going adolescents, only 15.5% were offered food supplementation [Table 1].

Wasting and stunting were classified among adolescent girls as per WHO criteria. More than half of them were malnourished with 55% of them having wasting. Among them, 7.1% were having severe wasting having Z score of body mass index (BMI) for age  $< -3$  SD and 17.9% were having moderate wasting. Sixty-seven percent of the adolescent girls were stunted; only three participants were overweight and only one was obese. About 7.5% of the participants were having severe stunting and 22.9% were having moderate stunting with Z score of height for age between  $-2$ SD and  $-3$ SD. Mean Z score for BMI for age and height for age was  $-1.2 \pm 1.39$  and  $-1.43 \pm 1.67$ , respectively. Mean BMI and mean height of the study population was  $18.13 \pm 7.11$  kg/m<sup>2</sup> and  $148.75 \pm 9.6$  cm, respectively [Table 2].

Mean hemoglobin among adolescent girls was  $9.57 \pm 1.4$  g/dl. Only 7.3% of the adolescent girls had normal hemoglobin. Majority of the adolescent girls (81.6%) had moderate anemia [Figure 1].

Majority of the adolescent girls (92.1%) reported hand washing with soap, 7.5% with soil/ash, and 0.4% with only water after defecation. A large percentage (88.8%) reported washing their hands with water while 11.2% did not wash their hands before taking food.

**Table 1: Nutritional and health facilities availed by the adolescent girls**

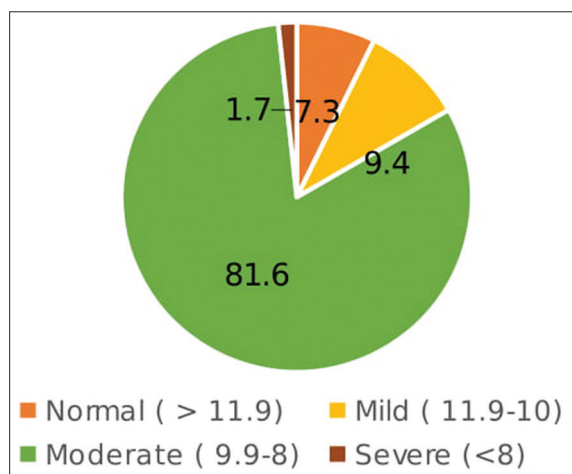
	Yes, n (%)	No, n (%)
Schoolgoing adolescents (n=182)		
Receiving mid-day meal in school	103 (56.5)	79 (43.5)
Receiving iron and FA tablets	103 (56.5)	79 (43.5)
Deworming	112 (62)	70 (38)
Nonschoolgoing adolescents (n=58)		
Availing the ICDS facilities (food supplementation and nutrition education)	9 (15.5)	49 (84.4)
Receiving iron and FA tablets	24 (41.3)	34 (58.7)
Deworming	38 (65.5)	20 (34.5)

ICDS: Integrated Child Development Service, FA: Folic Acid

**Table 2: Grades of malnutrition in the adolescent girls according to World Health Organization criteria (n=240)**

	n (%)
Z score for BMI for age (grading of wasting)	
-1-1 (normal BMI for age)	108 (45)
-1--2 (mild wasting)	68 (28.3)
-2--3 (moderate wasting)	43 (17.9)
<-3 (severe wasting)	17 (7.1)
1-2 (overweight)	3 (1.25)
>2 (obesity)	1 (0.49)
Z score for height for age (grading of stunting)	
>-1 (normal height for age)	79 (32.9)
-1--2 (mild stunting)	88 (36.7)
-2--3 (moderate stunting)	55 (22.9)
<-3 (severe stunting)	18 (7.5)

BMI: Body mass index

**Figure 1:** Hemoglobin percentage among the adolescent girls (n = 235)

Only 2.5% adolescent girls had awareness regarding the government programs for adolescents.

## DISCUSSION

The present study indicates that majority of the adolescent girls in selected tribal area were malnourished and anemic. Studies conducted in tribal and rural areas have always indicated a very high prevalence of malnutrition.<sup>[6-8]</sup> A study conducted by National Institute of Nutrition indicated that around 40% of adolescent girls were undernourished in rural areas of nine states of India.<sup>[7]</sup> The prevalence of wasting and stunting in the present study was 55% and 67%, respectively. This prevalence is comparable to other similar studies done in India.<sup>[11]</sup> However, it was higher as compared to the other studies. The higher prevalence of stunting points toward chronicity of malnutrition was faced by the adolescents in rural India. The prevalence of severe wasting was slightly higher as compared to other similar studies. However, like many other studies, majority were having mild wasting.<sup>[11,12]</sup>

Anemia has always been highly prevalent among Indian females, and this study showed a similar trend in Indian

adolescents in which >80% were anemic. This is similar to a study conducted among schoolgoing adolescents in South India which showed 78.7% prevalence.<sup>[13]</sup> The prevalence of anemia in Thane district of Maharashtra as per district level household survey (DLHS-4)<sup>[14]</sup> in rural adolescent females was 88.2% and severe anemia among them was 16.2%. In the present study, anemia among adolescents was slightly higher (92.7%) though severe anemia (1.7%) was quite less as compared to DLHS-4. However, the data for Palghar district as per DLHS-4 are not available as the district was separated from Thane district and newly formed in August 2014.

The poor functioning of Integrated Child Development Service (ICDS) scheme was quite evident through our study, and this is consistent to a study conducted on this issue.<sup>[15]</sup> Only about half of the schoolgoing participants (56.5%) were offered mid-day meals while only 15.5% received food supplementation at the anganwadis. This clearly indicates the need of improvement in the functioning of the ICDS scheme. The nonschoolgoing adolescents are rather more vulnerable group, and hence, more focus needs to be laid on this group in the ICDS program. Furthermore, the Weekly Iron and Folic Acid Supplementation scheme is also not being implemented properly in rural India as is evident from the large proportion of adolescents in our study being never offered the iron and folic acid tablets and deworming tablets by healthcare providers. Worm infestation could be also an important contributory factor for the high prevalence of anemia among them.

The hygienic practices among the adolescent girls were quite satisfactory as 92.1% reported hand washing with soap after defecation and 88.8% reported washing their hands with water before taking food. The awareness regarding the government programs for adolescents was very poor pointing toward the need for sensitizing them for the available services.

## CONCLUSION

The present study shows very poor nutritional status among tribal adolescent girls even though various nutritional programs are being implemented by Government of India. Interventions to reduce the prevalence of malnutrition and anemia in this age group is the need of the hour.

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## Conflicts of interest

There are no conflicts of interest.

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