



---

## A COMPARATIVE STUDY OF DAILY NUTRIENT INTAKE AND ITS RELATION TO HAEMOGLOBIN LEVEL OF SANGLI AND KOLHAPUR CITY ADOLESCENT GIRLS

---

**Dr. Susmita Durgule**

Assistant Professor in Home Economics, Smt. C. B. Shah Mahila Mahavidyalaya, Sangli, Maharashtra

**Corresponding Author- Dr. Susmita Durgule**

Email- [durgasmita@gmail.com](mailto:durgasmita@gmail.com)

DOI-

---

### **Abstract:-**

*Adolescent girls (age 10-19 years) are at high risk of iron deficiency and anemia due to accelerated increase in requirements for iron, poor dietary intake of iron, high rate of infection and worm infestation as well as the social norm of early marriage and adolescent pregnancy. If adolescent girls are well nourished, they can make optimal use of their skills, talents and energies today, and be healthy and responsible citizens and parents of healthy babies tomorrow. The findings of the present study reveal that the food and nutrient intake of adolescent girls from both cities are in general below the RDA prescribed intake for this group. Inadequate intake of iron, predominance of food of plant origin, low frequency consumption of foods of animal origin and of fruits and vegetables might have resulted in iron deficiency and it's observed in a high prevalence of anaemia among both cities adolescent girls.*

**Key Words:-** Anemia, Iron Deficiency, Adolescents

---

### **Introduction**

Adolescence offer the last opportunity to intervene and recover growth faltered in childhood and also support growth faltered in childhood, growth spur and skeletal development to break the vicious cycle of intergenerational under nutrition. An adequate and balanced food intake is important for the maintenance of health, especially in the period of growth. Until recently, very little attention has been given to adolescent nutrition and growth performance in developing countries even for the population that falls into the age group of 10 and 19 years as defined by the WHO.

### **Importance of Study**

Adolescent have additional requirements for nutrients due to the spurt in growth that occurs at puberty. An increase in appetite occurs at puberty. This normally ensures that

increased food intake is taken by them. This helps to meet the additional need for nutrients. This is more interesting and perhaps more important than the physiological change

### **Objective of the study**

The objectives of the present study are: -

1. To evaluate the nutrition status of selected adolescence girls.
2. To find out dietary consumption pattern of adolescent girls.
3. To evaluate the hemoglobin content in the blood samples of selected adolescent girls.
4. To study the relation between dietary intake and bio-chemical status.

### **Material and Methods**

The present study comprises of assessing the nutritional status of adolescence girls belonging to 10 to 19 years of age group, studying in high school from Sangli and Kolhapur region. The present study covers different

features influencing the nutritional status of adolescences girls. Different parameters used for the study were survey, assessment of anthropometry, determination of dietary consumption, biochemical assessment for hemoglobin content etc. A total sample of 600 adolescent's girls was selected randomly from secondary school of Sangli (300) and Kolhapur City (300). The questionnaire consists of questions regarding consumption pattern, preferences of food, age at menarche assessed, etc.

### Result

Comparison of Nutrient in the diet and its relation to Haemoglobin level of adolescent girls from both cites. After studying the three-day diet of girls in Sangli and Kolhapur, information about their diet was collected. Based on the information the diet of the adolescent girls was analyzed according to the classification of nutrients and Haemoglobin level of girls. Hemoglobin levels were not found to be normal in any of the girls in Sangli, whereas none of the adolescent girls in Kolhapur were found to have severe anemia. According to the anemia, classification of adolescent girls in both the cities, the correlation of nutrients in their diet and level of Haemoglobin was examined. The Haemoglobin level (anaemia) of girls in Sangli city is divided into three groups viz., Severe Level, Moderate Level and Mild Level, while the girls in Kolhapur City are categorized into Moderate Level, Mild and Normal Level according to their Haemoglobin level.

Looking at the carbohydrate content in the diet of girls in Sangli city, it was found that the carbohydrate content was much less than the required amount suggested by RDA. Those with a blood clotting level of less than seven, which is at the severe stage, were found to have a very low carbohydrate intake. Most of the girls with moderate level of anemia with Hemoglobin 7 to 9.9 had higher levels of carbohydrates than the

girls of the remaining two groups. The blood and dietary protein content of the girls in Sangli city was found to be less than half of the required protein content of RDA recommended by the three levels of girls. Girls with severe and moderate anemia had lower protein intake, while girls with mild anemia had higher protein intake than the other two. However, this proportion is also very low. Fat consumption of girls with all levels of anemia was found to be higher than the RDA recommended levels of fat. The caloric content of the diet of girls in Sangli city is similar to that of girls with severe and moderate anemia, but the amount of caloric content is slightly higher in girls with a mild anemia. However, in girls of all the three levels, the level of iron is less than the rate suggested by the RDA. Looking at the amount of iron in the diet of these girls, it appears that the amount is much less than the required amount recommended by the RDA. The diet of girls with moderate anemia is found to be very low in iron while the diet of girls with mild anemia is found to be slightly higher. Calcium levels were found to be 40% lower than the recommended level of RDA in the diet of girls with severe and moderate anemia and 63% in mild anemia. Vitamin A (beta carotene) levels were found to be lower than the required RDA recommended levels in girls with all three types of anemia. Vitamin B1 levels were found to be higher than the RDA recommended levels of girls within all three groups. The incidence was 50% in girls with severe anemia, 65% in girls with moderate anemia and 70% in girls with a mild anemia. Vitamin C levels in girls with all three types of anemia were found to be much lower than the levels recommended by the RDA. The incidence was 25% in girls with severe and moderate anemia and 33% in girls with mild anaemia.

Thus, all of the nutrients were found to be lower than the required

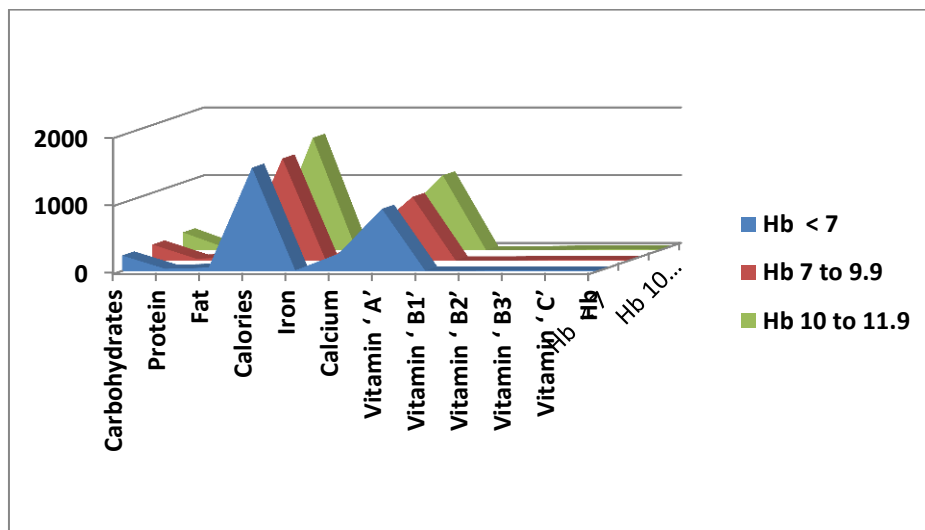
RDA recommended levels in girls with all three levels of anemia. The only exceptions are fats. After investigating the correlation between dietary intake and anemia of adolescent girls in Kolhapur city, the amount of carbohydrates in the diet of these girls was found to be less than the amount suggested by RDA. Moderate or mild anemia has a protein content of less than 47%, while normal girls have a protein content of 50%. Lipids were found to be higher than the recommended RDA levels in girls of all levels. The caloric intake of these girls was found to be lower than the RDA recommended levels. Girls with moderate anemia showed a caloric intake of 75%, while those with moderate anemia and normal level (non anemic) girls had a caloric intake by 80%. Iron levels were found to be 28%

of the diet of girls with moderate and mild level anemic, and 30% in girls with normal level (non anemic). Calcium intake was found to be 65% in girls with moderate and mild anemia and 65% in girls with normal level anemia. Vitamin or beta carotene intakes were found to be 35% of moderate anemia girls and 40% in mild anemia girls and 41% in normal girls. The levels of vitamin B<sub>1</sub> and B<sub>2</sub> were found to be higher in the diet than the RDA suggests all types of anemic girls from both cities. Vitamin B<sub>3</sub> intake was found low in adolescent girl's diet. Those had moderate anemia, only had 50% intake of vitamin B<sub>3</sub> than the RDA recommendations and 55% of moderate anemia girls and 62% of normal girls diet. Vitamin C intakes were found to be 18% in moderate anemic girls, 22% of mild anemic girls and 23% in normal girls.

**Table No:1:- Hb level in relation to Nutrient Intake of Sample Adolescent Girls in Sangli.**

Sangli	RDA	Hb < 7		Hb 7 to 9.9		Hb 10 to 11.9	
		Mean	SD	Mean	SD	Mean	SD
Carbohydrates	360.50g m	227.68	13.1276 8	237.88	91.96	264.55	73.1271 2
Protein	65gm	30.82	1.84308	30.22	9.3256	34.36	6.56910 5
Fat	22gm	49.58	1.68843	46.05	15.111	52.69	9.17674 4
Calories	2060Kcal	1523.4 3	81.1316 2	1506.7 2	371.15	1659.1 7	243.087 6
Iron	28mg	8.4	0.62936 5	8.36	3.146	9.65	2.22642 2
Calcium	600mg	255.41	39.7189 2	382.47	377.99	464.9	346.982 4
Vitamin 'A'	2400mcg	916.8	140.444 2	940.28	480.33	1105.5	344.655 7
Vitamin 'B1'	1.0mg	1.69	0.16483 2	1.58	0.605	1.91	0.41175 4
Vitamin 'B2'	1.2mg	1.67	0.11680 9	1.71	0.807	2.02	0.59047 8
Vitamin 'B3'	14.0mg	8.09	1.37867 5	7.23	3.20	9.06	2.17472 1
Vitamin 'C'	40.0mg	9.43	1.11243	11.24	9.065	13.16	7.99196 1
Hb		6.47	0.33082 4	8.64	0.98369 2	10.95	0.480

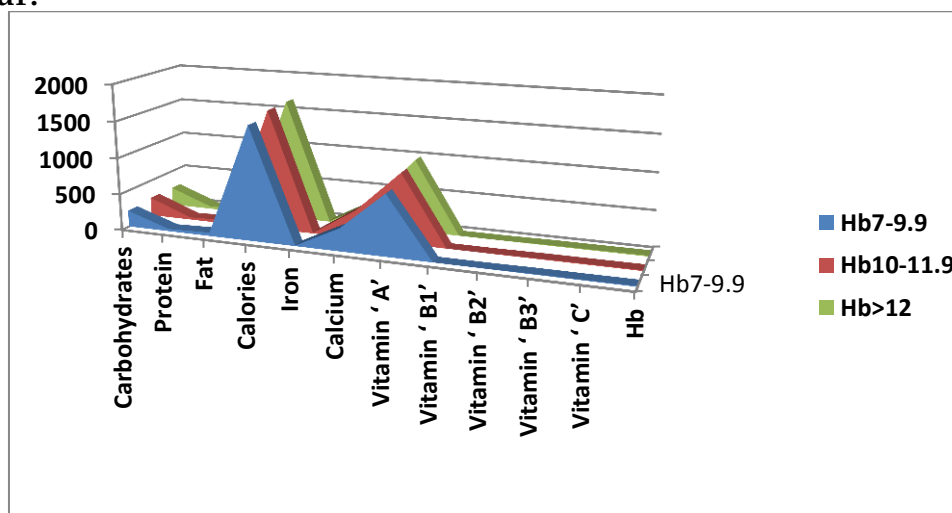
Graph No. 1:- Nutrient Intake and its relation to Hb level of Adolescent Girls in Sangli.



TableNo:2:-Hb level in relation to Nutrient Intake of Sample Adolescent Girls in Kolhapur.

Kolhapur	RDA	Hb 7 to 9.9		Hb 10 to 11.9		Hb >12	
		Mean	SD	Mean	SD	Mean	SD
Carbohydrates	360.50gm	225.96	62.8093	255.32	98.650	253.68	85.140
Protein	65gm	31.31	10.66576	30.9	11.999	33.78	10.131
Fat	22gm	47.78	13.39457	52.22	11.634	52.57	8.769
Calories	2060Kcal	1556.37	320.53	1641.31	348.83	1653.45	269.534
Iron	28mg	8.42	3.00335	9.33	4.40	9.307	3.958
Calcium	600mg	309.73	227.8828	391.05	304.81	336.257	249.315
Vitamin 'A'	2400mcg	826.16	374.3833	954.63	362.48	988.65	271.655
Vitamin 'B1'	1.0mg	1.63	0.608887	2.22	2.030	2.51	2.696
Vitamin 'B2'	1.2mg	1.62	0.829057	1.79	0.88	1.71	0.740
Vitamin 'B3'	14.0mg	7.21	3.094659	8.2	3.00	8.79	2.175
Vitamin 'C'	40.0mg	7.47	3.501326	8.9	5.44	9.49	6.355
Hb		9.86	0.051755	11.27	0.45	12.23	0.198

Graph No. 2:- Nutrient Intake and its relation to Hb level of Adolescent Girls in Kolhapur.



### Discussion

The findings of the present study reveal that the food and nutrient intake of adolescent girls from both cities are in general below the RDA prescribed intake for this group. Depending on the local availability of food and intake of nutrient compared with RDA and the result reported that low intake of food main cause of malnutrition in these girls. It is observed from the data mean intake of carbohydrates and protein is lower than RDA for early adolescent girls from both cities. It means both cities adolescent girls couldn't fulfill their daily energy requirement and it is seen that their diet was severely deficient in protein rich food, nearly half of the requirement they fulfill from their diet. Reflection of deficiency saw in adolescent as stunted growth. The mean intake of other micronutrient also less than RDA in their daily diet, which dose curses impact on their growth and development. It is observed that fat and vitamin B2 was in sufficient amount in daily diet of both cities adolescent girls. Fruit and vegetables are mostly absent from both cities adolescents' diet. A major basic nutrient which is helpful in making hemoglobin were protein, iron and vitamin C are found absent in the daily diet of these adolescent girls.

The findings of the present study reveal that the food and nutrient intake of adolescent girls from both cities are in general below the RDA prescribed intake for this group. Depending on the local availability of food and intake of nutrient compared with RDA and the result reported that low intake of food main cause of malnutrition in these girls.

It is also observed that the consumption of fruits and fresh vegetables is low, thus limiting the dietary intakes of vitamin 'C'. Inadequate intake of iron, predominance of food of plant origin, low frequency consumption of foods of animal origin and of fruits and vegetables might have

resulted in iron deficiency and it's observed in a high prevalence of anaemia among both cities adolescent girls. The iron deficiency anaemia is high in Sangli city adolescent girls than Kolhapur adolescent girls. Poor iron intake and anemia is associated with growth failure and weight reduction in girls.

### References :-

1. Ahmed Faruk, Zareen Momtaz, Khan M. R., Banu C. P., HaQ M. N. and Jackson Alan A.(1998) "Dietary Pattern, Nutrient Intake and Growth of Adolescent School Girls in Urban Bangladesh." *Public Health Nutrition* 1(2), pp 83–92.
2. Akman Mehmet, Akan Hulya, Izbirak Guldal, Tannover Ozlem, Tilev Sirma M., Yildiz Anil, Tektas Simge, Vitrinel Ayca and Hayran Osman. (2010) "Eating Patterns of Turkish Adolescents a Cross Sectional Survey." *Nutrition Journal*, 9(67), pp 1-5. doi: 10.1186/1475-2891-9-67.
3. Robinson Sian, Skelton Ria, Barker Mary and Wilman Clare (1999) "Assessing the Diet of Adolescent Girls in the UK." *Public Health Nutrition*. 2(4), pp 571–577.
4. Shukla P. K. (1982). *Nutritional Problems of India*. Prentice Hall of India Private Limited, New Delhi.
5. Sjoberg, A., and L. Hulthen (2004) "Assessment of Habitual Meal Pattern and Intake of Food, Energy and Nutrients in Swedish Adolescent Girls: Comparison of Diet History with 7 Day Record." *European Journal of Clinical Nutrition*. 58, pp1181–1189. doi: 10.1038/sj.ejcn.1601947.
6. Yearul K. et. al., (2010) "Dietary Pattern, Nutritional Status, Anemia and Anemia-related Knowledge in Urban Adolescent College. - Girls of Bangladesh". *Pub-Med. Gov. Vol. 60*, No. 8, pp 633 – 638.