
Research Papers



**A STUDY ON THE NUTRITIONAL STATUS AND PREVALENCE OF ANAEMIA
IN ADOLESCENT GIRLS IN WARDHA CITY**

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Abstract

Good health is an invaluable asset for better economic productivity, both at individual and national level, but above all, it is valued for those who own it as a prerequisite for a better quality of life and better standards of living.

INTRODUCTION :

Nutrition is significant determinant of good health & the incidence of mal & under nutrition in the community affects certain indicators such as IMR & MMR adversely. The status of nutrition depends on food consumption patterns, which in turn are shaped to a great degree by women's status relative to men. The greatest levels of poor nutrition occur among women and children. An insufficient food intake and ignorance about nutrition coupled with low immunity ensure that the most vulnerable experience of very fragile health.

Anaemia is the most common nutritional problem in the world & mainly affects women of child bearing age, teenagers & young children. It is a condition in which the haemoglobin concentration in the blood is below a defined level, resulting in a reduced oxygen carrying capacity of red blood cells. About half of all cases of anaemia can be attributed to iron deficiency; other common causes

include infections, such as malaria & genetic factors, which result in thalassaemia & sickle cell disease.

The need for iron increases with rapid growth and expansion of blood volume & muscle mass. The onset of menstruation imposes additional needs for girls. Adolescents should be encouraged to consume iron rich foods complemented with a vitamin C source like citrus fruit & Indian gooseberry. Adolescent girls need additional requirement of iron to compensate for menstrual blood loss.

Young girls who have inadequate nutrition do not grow well and become stunted women. Adolescent girls suffer from anaemia because of poor consumption of iron rich foods and also due to worm infestation & frequent infection; because of severe malnutrition and repeated illness, the growth spurt in early adolescence does not occur and a slower & prolonged pubertal growth period is seen in adolescents from lower economic status.

As a consequence of inadequate dietary intake of energy, protein, vitamin A, iron & riboflavin, nutritional deficiencies are widespread in India, particularly among the low income groups of the population both in urban & rural areas. Deficiency in iron & B-complex is common among adolescent girls.

Hence, in present investigation an attempt was made to assess the nutritional status as well as prevalence of anaemia in adolescent girls in Wardha city.

Methodology:

The study was carried out in 4 schools from Wardha city. The selection of school was based on purposive sampling. Adolescent girls of 13 – 18 years age group were included & 25 girls from each school were covered in the study. Data was collected by using interview & questionnaire method. General information, specific information regarding anthropometric measurements and dietary intake was collected. Haemoglobin was estimated by Sahli's method.

In anthropometric measurements weight, height & MUAC was recorded by using standardized equipment. Measurements of standing weight, height were taken without shoes and the body held straight standing against the improvised anthropometric rod & measured by a portable weighing balance with zero adjustment. The accuracy of the machine was checked at regular intervals. The girls were made to stand comfortably & steadily on the machine with minimum clothing & without shoes. Weight was recorded to the nearest 0.25kg (Gopaldas & Sheshadri 1987, Jelliffe 1966).

MUAC was measured using a narrow flexible non-stretch fiberglass tape placed at a slight midway between the tip of the shoulder and the elbow.

The information regarding diet was collected by interview & questionnaire technique. Data regarding food habits and intake of food was recorded. Daily intake of nutrients was calculated by using 24 hours recall method.

The results were analyzed using NCHS standard for anthropometric measurements & RDA for dietary intake.

Results & Discussion:

The human body and its growth is influenced by various biological determinants including sex, intra – uterine development, birth order, birth weight, parental size, genetic constitution, climate & socio – economic level etc. The physical dimensions of the body are influenced by nutrition, especially the rapid growth period of childhood.

In every nutritional survey age is very important factor. Age-wise distribution of girls under study is presented in Table – I

Table I : Age-wise distribution of Girls

Sr. No.	Age (Years)	No. of Students	Percentage
1	13	14	14%
2	14	31	31%
3	15	23	23%
4	16	04	4%
5	17	24	24%
6	18	04	4%

Highest numbers of girls were from 14 years group and lowest from 16 years & 18 years age category.

The mean height, weight and MUAC in each age group was recorded & is given in Table II, III & IV.

Table II : Mean Height (cm) of Girls

Sr. No.	Age Group	No. of Students	Mean \pm SD	Range	Std. Height	% of NCHS
1	13	14	140.9 (11.37)	129.5-160	155	90.90
2	14	31	148.6 (12.36)	127-165.1	159	93.46
3	15	23	146.4 (12.06)	132.1-165.1	161	90.93
4	16	04	144.8 (11.80)	129.5-157.5	162	89.38
5	17	24	151.3 (10.95)	127-162.6	163	92.82
6	18	04	149.1 (9.99)	132.1-157.5	164	90.91

The mean height of the 13 years old girls was found to be 140.9cm whereas it was 148.6cm in 14 years age group girls against 155cm and 159cm of NCHS standard respectively. The standard height of 15 years age category was 161cm while the observed height was found to be 146.4cm which was 90.93% against NCHS standard. The mean height of 16 years was found to be lowest of all age group which was just 89.38% of the standards prescribed by NCHS. Remaining 2 age groups i.e. 17 years and 18 years were just above 90% of the NCHS standard.

The mean weights of girls are presented in Table III.

Table III: Mean Weight (kg) of Girls

Sr. No.	Age Group	No. of Students	Mean \pm SD	Range	Std. Weight	% of NCHS
1	13	14	38.4 (6.81)	25-55	44	87.27
2	14	31	40.4 (8.35)	31-71	48	84.17
3	15	23	39.6 (5.25)	30-52	51.4	77.04
4	16	04	38.5 (4.39)	34-45	53	72.64
5	17	24	43.5 (7.15)	35-66	54	80.56
6	18	04	41 (5)	35-49	54.4	75.37

As compared to height measurements, the weight measurements were lesser. The lowest mean weight was observed in 16 years age group, which was just 72.64% of NCHS standard. The highest mean weight was observed in 13 years age group was 87.27% of NCHS standard. The mean weight of 14 years age group was found to be 84.17% of NCHS standards. The average weight of 18 years

age group was just 75.37% of NCHS standard. Except 16 years age group all other age groups fall in the category of Grade I malnutrition (Gomez classification).

Only 16 years age group was in the category of Grade II malnutrition, as it was just 72% of NCHS standard.

Mean of MUAC is presented in Table IV.

Table IV: Average Middle Upper Arm Circumference (cm) of Girls

Sr.No.	Age Group	No. of Students	Mean±SD	Range	Std arm circumference(cm)	% of STD.
1	13	14	24.7(1.98)	22-30	22.4	110.27
2	14	31	24.8(2.52)	22-32	23.2	106.90
3	15	23	24.5(1.86)	21-28	24.4	100.41
4	16	04	23.8(1.48)	22-26	24.7	96.15
5	17	24	25.6(1.84)	23-32	24.9	102.81
6	18	04	26.3(1.26)	25-28	-	-

The table shows that the standard values & observed values of MUAC were similar in 15 years age category. Almost in every age group the observed values of MUAC were above the NCHS standard, exception to this was observed in 16 years age category.

Dietary intake of girls was studied. Information regarding food habits of girls is presented in Table V.

Table V: Distribution of students based on food habits

Sr. No.	Age group (years)	No. of students	Food habits	
			Vegetarian	Non-vegetarian
1	13	14	10 (71.43%)	4 (28.58%)
2	14	31	30 (96.77%)	1 (3.23%)
3	15	23	19 (82.61%)	4 (17.40%)
4	16	04	2 (50%)	2 (50%)
5	17	24	16 (66.67%)	8 (33.34%)
6	18	04	2 (50%)	2 (50%)

From the table it is revealed that majority of the adolescent girls in all age group were vegetarian. (79%) only 21% families were non-vegetarian.

The mean intake of nutrients of adolescent girls was calculated. The data regarding mean energy intake is presented in Table VI.

Table VI: Distribution of students based on mean energy intake.

Sr. No.	Age Group (years)	Mean energy (kcal) ±SD	RDA (Kcal)	% adequacy
1	13	1776.96 (4.76)	2060	82.26%
2	14	1827.88 (4.90)	2060	88.73%
3	15	1788.13 (4.86)	2060	86.83%
4	16	1685.08 (4.15)	2060	81.80%
5	17	1683.02 (4.19)	2060	81.70%
6	18	1680.96 (4.22)	2060	81.60%

Figures in parentheses indicate standard deviation.

From the table it is observed that percentage adequacy of energy was lesser in 18 years age group as compared to other groups. Highest percentage adequacy was observed in 14 years age group (88.73%).

Mean protein intake of students is presented in Table VII.

Table VII: Mean Protein Intake of Girls.

Sr. No.	Age Group (years)	Mean Protein (gm) ±SD	RDA	% adequacy
1	13	50.03 (4.25)	65	76.97%
2	14	51.34 (4.31)	65	78.98%
3	15	57.22 (5.03)	65	88.03%
4	16	60.24 (7.64)	63	95.68%
5	17	52.63 (4.50)	63	83.54%
6	18	51.44 (4.33)	63	81.65%

From the table it is found that mean protein intake was found highest in 16 years age group (95.68%) while it was lowest in 13 years age group (76.97%)

Mean Calcium Intake of Students is presented in Table VIII

Table VIII: Distribution of students based on Mean Calcium Intake (mg).

Sr. No.	Age Group (years)	Mean calcium (mg) ± SD	RDA (mg)	% adequacy
1	13	518.8 (14.73)	600	86.47%
2	14	436.82 (12.22)	600	72.80%
3	15	504.76 (13.47)	600	84.13%
4	16	330 (10.00)	500	66%
5	17	401.25 (13.25)	500	80.25%
6	18	406.9 (13.83)	500	81.38%

Table shows that lowest calcium intake (66%) was observed in 16 years age group, while it was highest (86.47%) in 13 years age group. It is obvious from the table that the girls were not getting calcium through their diets in proper amount.

Mean Iron Intake (mg) of students is presented in Table IX.

Table IX: Distribution of students based on mean Iron (mg) Intake.

Sr. No.	Age Group (years)	Mean Iron (mg) ± SD	RDA (mg)	% adequacy
1	13	18.10 (11.46)	28	64.64%
2	14	20.59 (12.97)	28	73.54%
3	15	19.90 (13.04)	28	71.07%
4	16	20.69 (11.10)	30	68.97%
5	17	20.34 (10.59)	30	67.8%
6	18	23.04 (12.64)	30	76.8%

It is observed from the table that in all age groups, iron intake was much less than the requirement. The consumption of iron in age group 13 years, 14 years & 15 years was 18.10mg, 20.59mg & 19.90mg respectively, while their requirement is 28 mg. Deficiency of iron was seen in each & every group.

Mean folic acid was also calculated and is presented in Table X.

Table X: Distribution of students based on Mean folic acid.

Sr. No.	Age Group (years)	Mean folic acid (mg) ± SD	RDA (mg)	% adequacy
1	13	78.36 (10.92)	100	78.36%
2	14	88.63 (12.92)	100	88.63%
3	15	89.92 (12.99)	100	89.92%
4	16	80.01 (11.36)	100	80.01%
5	17	89.99 (13.01)	100	89.99%
6	18	80.11 (11.63)	100	80.11%

Figures in parentheses indicate standard deviation.

It is obvious from the table that lowest folic acid

intake was observed in 13 years age group while highest was observed in 15 years age group. Although 15 years age group had highest folic acid intake, then also it was not meeting the standard requirements of folic acid. It was found deficient by 10.09%.

VITAMIN - C

Mean intake of Vitamin C was calculated & is presented in Table XI.

Table XI : Distribution of students based on Mean

Vitamin C

Sr. No.	Age Group (years)	Mean Vitamin C (mg) ± SD	RDA (mg)	% adequacy
1	13	30.60 (6.1)	40	76.5%
2	14	32.80 (7.8)	40	82%
3	15	34.60 (10.23)	40	85.5%
4	16	35.30 (11.6)	40	88.25%
5	17	33.99 (13.54)	40	84.98%
6	18	38.73 (8.9)	40	96.83%

Figures in parentheses indicate standard deviation. From the table it is clear that 18 years age group had a highest Vitamin C intake while lowest was observed in 13 years age group (76.5%). Remaining groups were ranging from 82 to 88.25%.

Blood is the fairly easily available body fluid, which is used in biochemical assessment of the nutritional status. To estimate haemoglobin percentage of girls in the present investigation Sahlis' method was used. Haemoglobin percentage of the girls is presented in Table XII.

Table XII : Haemoglobin percentage in Girls

Sr. No.	Age Group (years)	No. of Students	Mean Hb% (gm/dl)	Range (%) gm/dl
1	13	14	9.74%	9.60-13.80
2	14	31	10.57%	8.60-13.80
3	15	23	10.42%	8.40-14.20
4	16	4	10.68%	9.00-14.80
5	17	24	10.34%	9.10-14.00
6	18	4	11.28%	11.20-13.80

From the table it is observed that lowest mean haemoglobin percentage was observed in 13 years age group; while highest haemoglobin percentage i.e. 11.28 which was normal was observed in 18 years age group. Remaining all the age groups were in the range of 8.40 to 14.80.

Conclusion : In the present investigation adolescent girls were in 13 years to 18years age group.

Mean height was found to be less than the standard height prescribed by NCHS.

Mean weight of girls was found to be less than the standard weight prescribed by NCHS. Except in 18years age group mid upper arm circumference was more than standard stated by NCHS.

29% girls were under weight, 17% girls suffer from Grad II, 15% girls suffer from Grade I

malnutrition, while 15% girls were suffering from severe malnutrition 21% girls were having normal BMI & only 3% girls were in obese I category.

All girls except age group 18years were found anemic. 18years age group girls were on the boundary of normal haemoglobin 79% of adolescent girls were vegetarian, 21% of girls were non-vegetarian.

Calorie intake was observed less than RDA, same trend was observed for protein. Only girls in 16years age group were meeting the requirement of proteins as per RDA.

Calcium intake was also found to be less than the requirement.

In all age groups mean intake of iron, folic acid & vitamin C was much less than the requirements.

References :

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