

**NUTRITIONAL STATUS OF SCHOOL GOING ADOLESCENT GIRLS RESIDING IN
SLUMS****Dr. Omesh Khurana^{1*}, Dr. Kavita Lal², Dr. D. Arora²**¹Assistant Professor, Dept. of Pediatrics CCM Medical College Durg.²Associate Professor Dept. Of Physiology CCM Medical College Kachandur Durg.***Corresponding Author: Dr. Omesh Khurana**

Assistant Professor, Dept. of Pediatrics CCM Medical College Durg.

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SUMMARY

The present study was undertaken with aim of assessment of nutritional status of school going adolescent girls of 11-18 year of age residing in slums of Durg district. Anthropometric evaluation was done by recording weight, height. BMI was calculated. The caloric intake of girls was by a 24hr. dietary recall. Physical examination was done to assess the common nutritional deficiencies prevalent among the study group like anaemia, angular Stomatitis, eye changes, dyspigmented hair and skin changes. Being a Govt. school located in urban slum, most of the girls studying in this school are from lower middle and lower socioeconomic status. The girls selected for the study belonged to families with:

- a) Less financial resources, poor socio economic status.
- b) Poor literacy rates of parents.
- c) Large families with averagely more 3 sometimes 4 children per family with grand parents, staying together & father being only earning member in most families.
- d) Lack of parental awareness about the nutritional values of food and importance of balanced diet & nutrition of adolescent girl.

400 adolescent girls (11-18 years) were undertaken for study. Total 8 group were taken with 50 girls in each age group. The girls were interviewed with respect to knowledge about food, nutritional values, calorie consumed in 24 hrs. Mean age of onset menarche was assessed through history and was also compared with other studies.

KEYWORDS: Wt, Ht, BMI, Hb, LBW.**INTRODUCTION**

The girl child, the second sex the weaker sex, the lesser sex. This is a reality with which women are unfortunately faced. A girl child is discriminated even before if sex is known. The consequences of this inferior status have found expression in several forms: female foeticide, malnourished mother giving birth to LBW babies & increased incidence of morbidity due to malnourishment.^[1]

When a son is born sweets are distributed to announce his birth. When a girl is born, the sound of tears vents the air. Sons are seen as an asset, essential to light funeral pyres, to ensure the continuation of the lineage and provide economic support to their parents in the latter old age. The girl is seen as a liability, a drain on the resources. Naturally, she herself grows up in this hostile environment, with poor self image.

A rejection of the girl begins before birth with prenatal sex determination tests, followed by abortion if the verdict is a girl. Those allowed to survive often meet death soon & undergo malnourishment.^[2]

GIRLHOOD – A PERILOUS PATH^[3-6]

1. THE PERIL OF PRE-BIRTH ELIMINATION: intra – uterine fetal sex determination and termination of ‘female pregnancies’. If the female foetus survives until birth,
2. THE PERIL OF ELIMINATION IN INFANCY: female infanticide by commission (deliberate killing) or omission (neglect during illness). If the girl baby survives until early childhood,
3. THE PERIL OF NEGLECT: less health care and less food resulting in high mortality and higher morbidity. If the girl child survives and before the teen age ,
4. THE PERIL OF EXPLOITATION: early assumption of domestic responsibilities and sibling care, discontinuation of education, hazardous work and high rates of morbidity and malnutrition. and, if the undernourished girl becomes an adolescent.
5. THE PERIL OF PHYSICAL STRESS AND DEPLETION early marriage, teenage pregnancy, maternal depletion, anaemia, stunted personal growth, perinatal complications, delivery of low birth weight babies, high infant morbidity/ mortality,

low/ no education, repeated pregnancies, maternal morbidity, decreased productivity.

HEALTH OF A GIRLCHILD: The life cycle approach^[4,5]

Once a girl child is born, the cycle of under nutrition beings. The female infant receives less breast milk & is fed at long interval than boys. As young children girl along with their mother, eat last & hence the least. Inadequate nutrients stunts adolescent growth in females resulting in poorly developing bones & muscles & low body weight, height & thus a low BMI. Thus under nutrition does not merely make a person tired & weak it predisposes one to innumerable infection, worsening an already fatigued state.

Adolescent is a fascinating period of life. It makes the transition from being a dependent child to becoming an independently functioning adult. It extends from onset of puberty till the time when sex maturation is completed, and encompasses physical, emotional, cognitive social growth & development aspect bridging childhood & adulthood.

Today's adolescent female is a mother of tomorrow. So the relationship of woman, status with birth wt of the offspring & maternal mortality has been well established. This has resulted in a remarkable upsurge of interest in ensuring improved growth of women in the adolescent phase. A healthy well nourished tall mother is likely to give birth to healthy normal weight baby. The health & growth of the foetus is mostly dependent upon the health of the mother. Pre-pregnancy maternal weight of <38 kg & maternal height of <145 cm are associated with significant risk of LBW.

In India the, female child is mostly under nourished, deprived & grows up in neglect & discrimination during infancy & develops frequent infections, is fed poorly and is likely to have poor adolescent growth spurt. She will grow to become a small woman who will perpetuate the cycle of LBW in the next generation. It appears that adverse environmental factors may become genetic & constitutional when they operate over several generations & this trend cannot be, reversed by merely giving nutritional supplements during pregnancy alone. It is therefore important to improve the status of

women in our society, reduce neglect of girl & provide them adequate nutrition during infancy & most importantly in adolescent phase, as adolescence is crucial phase of growth; it offers second & last chance for the catch up growth in the life cycle of girls. Failure to achieve optimum nutrition intake at this time can potentially retard physical growth & intellectual capacity and sexual maturation.^[7]

But, over nutrition is also hazardous. Adolescent is a vulnerable period for obesity. Lack of physical activity & outdoor play along with consumption of fat rich foods is the major cause of adolescent obesity among affluent popular. In states like Delhi & Panjab, over nutrition is emerging as an important problem particularly among well to do urban. Obese adolescent female also prove to be high risk obstetric case as they are likely to from cardiovascular complications, sleep apnoea, obesity, systemic hypertension, endocrinal problems etc.

So adolescent nutrition is very important as eating & life style behavior, practiced in these years would go a long way in preventing or postponing the onset status of Indian females from birth to adolescence and till their conception is responsible for concomitant problem of poor body weight & height, poor weight gain during pregnancy, low BMI, low Hb levels, increased incidence of birth of LBW babies & increase maternal mortality.

AIMS AND OBJECTIVES

1. To evaluate the nutritional status of school going adolescent girls of 11 – 18 yrs. of age group belonging to poor socio-economic status.
2. To do anthropometric assessment of these girls by recording weight, height and BMI.
3. To calculate the mean age of attainment of menarche.
4. To study the prevalence of under nutrition by analyzing BMI.
5. To study the prevalence of signs of nutritional deficiency like pallor, angular stomatitis, pigmented hair, skin changes.
6. To conduct health education session in school to educate the adolescent girls about balanced nutritional diet and its effect on growth and development.

Tanner scale of sexual maturation^[7]

SMR Stage	Pubic Hair	Breast
1	Preadolescent	Pre adolescent
2	Sparse, lightly, pigmented, straight medial border of labia	Breast and papillae elevated as a small mound areolar diameter increased
3	Darker, beginning of curl, increase amount	Breast and areola enlarged no contour separation.
4	Coarse, curly, abundant net amount less than in adults.	Areola and papilla formed and secondary mounds.
5	Adult feminine triangle, spread to medial surface of thighs.	Mature, nipple projects, areola part of general breast contour.

1. MACRONUTRIENTS

The nutrients intake for adolescent should be sufficient and balanced one to meet the demands of physical growth and adequate store for pregnancy but

simultaneously avoiding over nutrition. Energy needs for adolescent vary according to body size and level of activity and sex. The recommended dietary allowances (RDA)(8) for adolescent are shown in table (1).

Table 1: Recommended Dietary Allowance Macronutrients and Minerals.

Age Group	Sex	Weight (Kg)	Net Energy Kcal/day	Protein g/d	Fat g/d	Calcium mg/d	Iron mg/d
10-12 yrs	Boys	35.4	2190	54	22	600	34
	Girls	31.5	1970	57	22	600	19
13-15 yrs	Boys	47.8	2450	70	22	600	41
	Girls	16.7	2060	65	22	600	28
16-18 yrs	Boys	57.1	2640	78	22	500	50
	Girls	49.9	2060	63	22	500	30

The needs for calorie and protein intake increase during adolescence peaking at about 12 years in girls and 16 years in boys. It is recommended that diet of adolescents should provide 55-60% calories from complex carbohydrate. Fat should constitute less than 3.0 % of total calories with less than 10% saturated fat and 300 mg of cholesterol.

The micronutrient requirement increase substantially during adolescence because of the growth spurt. Imbalance between intake and requirement can cause biochemical or clinical difference of micronutrient. The recommended dietary allowance (RDA) of common adolescent population has shown that the diet are inadequate in micronutrients including iron and calcium.^[8,9]

2. MICRONUTRIENTS

Table 2: Recommended Dietary intake for Macronutrients.

Age Gr. & Sex	Vit. A IU/d	Thiamine mg/d	Riboflavin mg/d	Niacin mg/d	B6 mg/d	Vit. C mg/d	Folic acid meg/d	Vit. B ₁₂ meg/d
10-12 (B)	600	1.1	1.3	15	1.6	40	70	0.2-1.0
10-12(G)	600	1.0	1.2	13	1.6	40	70	0.2-1.0
13-15(B)	600	1.2	1.5	16	2.0	40	100	0.2-1.0
13-15(G)	600	1.0	1.2	14	2.0	40	100	0.2-1.0
16-18(B)	600	1.3	1.6	17	2.0	40	100	0.2-1.0
16-18(B)	600	1.0	1.2	14	2.0	40	100	0.2-1.0

MATERIALS AND METHODS

STUDY SETTING:-The study was conducted at Chandulal Chandrakar Memorial Medical College Kachandur, Durg.

STUDY PERIOD:-The study was carried out from July, 2017-Dec, 2017 over a period of six months.

ELIGIBILITY CRITERIA:-Age group 11-18 year's adolescent school going girl were enrolled for the study.

STUDY DESIGN:-The methodology of the study was of cross sectional research design. Study was conducted prospectively and in randomized control way.

SETTING: Total 400 girls were enrolled for the study in (11-18 years) age group.

- 8 groups were taken.
- N = 50 in each age group.

A carefully planned proforma was used for collection of data. Proforma was divided into three parts A, B, C with the aim of assessment of:

1. Age
2. Socioeconomic status.
3. Evaluation of calorie intake in 24 hrs. By 24hr. dietary recall.
4. Anthropometric assessment to calculate BMI.
5. Age of onset of menarche.

6. General physical examination for signs of nutritional deficiency.

SELECTION CRITERIA: The study conducted in cross – sectional, prospective, randomized controlled way. Study was conducted over a short period of six months. Being a Government school located in the urban slums most of the girls belonged to lower middle and lower socio-economic status.

THE INCLUSION CRITERIA USED FOUR SELECTION

1. **AGE GROUP:-**Girls falling in age group 11-18 years were selected for study. Girls were asked to write their date of birth in the proforma & date of birth was confirmed from their school records.
2. **ASSESSMENT OF SOCIOECONOMIC STATUS:-**For the sake of convenience the preset proforma was distributed to girls of each group in the school. They were told to fill only part A of proforma which had name, age, date of birth, family type, number of family member, parental literacy & occupation & monthly income. Socioeconomic status evaluated as modified Kuppu Swami's scale. Scholars were told to get the form duly filled in consultation with their parents and to return back the proforma. Most of the girls belonged to families

with less financial source, poor literacy rates. Parents lacked awareness about the nutritional values of food.

Exclusion criteria

- Girls less than 11 years and more than 18 years of age.
- Girls suffering from chronic illness and physical deformities.
- Girls belonging to upper middle class and upper class.

In the beginning of the study proforma were distributed to girls from class 6 to class 12. Each class had two sections. Then according to inclusion criteria girls were selected for the study and divided into 8 groups according to age group from 11 to 18 years. Those girls who were suffering from any chronic illness were not included. Then using simple random sampling from each group 50 girls were selected, then study further proceeded by doing.

- Anthropometric assessment
- Calculation of calories consumption
- Age of onset of menarche

Socio – economic status according to modified Kuppu Swami's Scale.

Sr. No.	Education	Score	Occupation	Score	Income	Score
1	Professional degree/ Hons, M.A. and above	7	Profession	10	Rs. 3000 and above	10
2	BA/ B.Sc. degree	6	Semi profession	6	Rs. 2001-3000	6
3	Intermediate/ high school certificate	5	Clerical, shop/ farm owner	5	Rs. 1500-200	5
4	Intermediate/ high school certificate	4	Skilled worker	4	Rs. 1000-1500	4
5	Middle school completion	3	Semi skilled worker	3	Rs. 500-999	3
6	Primary school completion	3	Unskilled worker	2	Rs. 200-499	2
7	Illiterate	1	Unemployed	1	Rs. < 200	1

Total Score

26-27
11-25
<5

Socio-economic status scale

Class I (upper), 16-25
Class III (lower middle), 05-10
Class V (lower)

Class II (upper middle)
Class IV (upper lower)

RESULTS AND DISCUSSION

The present study was conducted in a cross sectional design with the aim of assessment of nutritional status by anthropometry at CCM Medical College Kachandur, Durg in the Dept. of Pediatrics. In this study a general

physical examination was done to analyze the sign of nutritional deficiencies. The mean age of onset of menarche was calculated. Analysis of the dietary habits of the study group was also done.

Table 1: Sample size and groups.

Sr. No.	Name of School	Government Senior Secondary School, Maroda Tank, Bhilai
1	Total No. of cases enrolled.	400
2	Age group of girls enrolled	11-18 years (adolescent age group)
3	Number of cases in each age group	50
4	Total no. of groups	8
5	Study design	Cross sectional Prospective randomized.

Total 400 girls were enrolled for study. Total 8 groups were taken for the study, with n=50 in each group. Study was conducted in a cross sectional research, prospective and randomized control design.

Table 2: Family size distribution.

Sr. No.	No. of members in family	Nos.	percentage
1	5 membered	26	6.5%
2	6 membered	82	20.5%
3	>7 membered	292	73.0%

Majority of girls to big families with family number being more than 7 (292 girls) which further complicates the poor S.E.S. I 6 membered group 82 girls and in 5 members group 26 girls. In the study 78.75% girls were from joint family with father being only earning member in family and 21.25% of girls were from the nuclear family. In the terms of infrastructure of family about 73% girls were >7 membered families, 20.50% girls were from 6 membered family.

Table 3: Socioeconomic status Kuppu Swami Scale.

Sr. No.	No. of cases	class	Total Score	percentage
1	321	IV	6	80.25%
2	79	III	14	19.75%

A large majorities of girls belonged to lower S.E.S by Kuppuswamis scale with parents mostly being illiterate or primary school passes and father being only earning member.

Table 4: Weight, SEM and Confidence limits of all age group students.

Sr. No.	Age group	Mean± SD	Median	95% CI (±2SD)	SEM
1	11 ⁺	28.91±3.56	28.0	27.90 to 29.92	0.505
2	12 ⁺	31.65±3.47	31.0	30.67 to 32.64	0.491
3	13 ⁺	34.81±3.67	35.2	33.77 to 35.86	0.52
4	14 ⁺	38.57±4.15	39.2	37.39 to 39.75	0.588
5	15 ⁺	41.98±3.48	42.1	40.49 to 42.97	0.493
6	16 ⁺	42.56±3.73	42.2	41.50 to 43.62	0.528
7	17 ⁺	43.37±2.90	44.0	42.54 to 44.20	0.412
8	18 ⁺	44.27± 2.99	45.0	43.41 to 45.12	0.425

Above table shows the mean weight and SD of the present study in age group 11-18 yrs. Mean weight were 28.91±3.56, 31.65±3.47, 34.81±3.67, 38.57±4.15, 41.98±3.48, 42.56±3.73, 43.37±2.90 and 44.27± 2.99 respectively. The mean weight gain during adolescent growth period in present study was about 15.36 kg. Similar result reported by Gupta V. and Agrawal K.N.^[10,11]

In the present study the maximum gain in wt was seen after 13-14 years height. This is a period of catch up growth 14-18 yrs due to adolescent growth spurt. Thus, if we improve nutritional intake in this stage we are likely to succeed in attaining a good weight gain till 18 yrs of age.

Median weight and 95% confident limit i.e. ± 2SD for the present study group from 11-18 yrs. 28.0, 31.0, 35.2, 39.2, 42.1, 42.2, 44.0 and 45.0 respectively. The value of mean weight of adolescent girls of upper socio-economic status reported by NFI (12) 1989 and Agrawal et.al. are higher. The mean weight compare with the 50th percentile of Agrawal et.al. the value were found to be low for all age groups. A difference of 5-6 kg was seen finally at 18 years of age, when the weight of present study is compared with NFI and Agrawal et.al.^[11]

The present study was carried on girls of LES residing in CG state which is tribal belt. This shows the effect of socio economic status and regional differences on the nutritional status.

Table 5:-Height, SEM and Confidence limits of all age group.

Sr. No.	Age group	Mean ± SD	Median	95 % CL (+25SD)	SEM
1	11 ⁺	137.28±4.61	137.15	135.97-138.59	0.653
2	12 ⁺	140.77±4.97	141.05	139.36-142.19	0.704
3	13 ⁺	144.78±4.82	145.05	143.4-146.15	0.683
4	14 ⁺	149.82±3.26	150.00	148.89-150.75	0.461
5	15 ⁺	150.58±3.55	150.15	149.57-151.59	0.502
6	16 ⁺	151.37±3.49	151.85	150.38-152.36	0.494
7	17 ⁺	152.02±3.89	152.10	150.91-153.12	0.551
8	18 ⁺	152.93±4.76	154.20	151.58-154.28	0.673

Above table shows that the mean height and SD in all age groups 11, 12, 13, 14, 15, 16, 17 and 18 were 137.28±4.61, 140.77±4.97, 144.78±4.82, 149.82±3.26, 150.58±3.55, 151.37±3.49, 152.02±3.89 and 152.93±4.76 respectively. The peak gain in height in present study was seen between 13-14 years. After 14 years the gain in height is probably due to (delayed squet) adolescent growth squet. But if we provide these girls with better nutrition and education them about nutritional values we are likely to achieve a good height.

A height of 15.65 cm was seen from 11-18 years of age. Kaul et al^[13] reported a height gain of 18.6 cm in USES girls of Jabalpur, where as for (USES) Delhi girls^[14] the total gain was 17.3 cm, indicating the effect of S.E.S on

adolescent growth, Sathyavati et al^[15] reported a gain of 17.5 cm in urban and 15 cm for rural girls. In the study of rural girls of Varanasi by Gupta et al^[10] a height gain of 15.93 cm was seen, where as girls of USES of Varanasi showed a height gain of 16-17 cm. the gain in height in study of Chaturvedi et al^[9] (rural girls of Rajasthan) was significant, a gain 18.19 cm was seen from 11-18 years. Similarly the height difference of 13.2 cm between the affluent of NFI study and rural poor NNMB^[12] at the 9th year is reported to 7.8 cm by the 18th years. Similarly a difference of 15.65 cm of height is seen between 11-18 years in present study reduce to 2.35 cm after 15 years. This data proves that adolescent support provides "second opportunity" for achievement of full genetic potential for growth & development, an

opportunity to overcome the adverse effects if early childhood nutrition.

The 50th percentiles for height of the present study are 137.2, 141.1, 145.1, 150.0, 152.0, 152.1, 154.2.

The value for mean heights of adolescents girls of upper socio-economic status reported by Agrawaletal^[11] and NFI^[16] were higher. NCHS study shows an marked in higher beyond 14 years. In the current study this increased in height is not seen and there is a “plateau effect”. Groups are suffering from chronic under

nutrition. Those girls who are having height below 5th percentile according to WHO are suffering from chronic under nutrition (Low height for age). If this prevailing under nutrition continuous or increased the girls are likely to become stunted in near future.

The mean values for height (cms) were found to be higher in study of Chaturvedi et al,^[9] girls in this study were taller than the present study group. But the final higher attained by girls in both study by the 18 years of age were almost same being 152.93 cm in present study group & 153.43 in study of Chaturvedi et.al.

Table 6:- BMI, SEM and Confidence limits of all age groups.

Sr. No.	Age group	Mean \pm SD	Median	95% CI (\pm 2SD)	SEM
1	11 ⁺	15.28 \pm 1.21	15.45	15.01 to 15.74	0.182
2	12 ⁺	15.98 \pm 1.17	15.80	15.65 to 16.31	0.165
3	13 ⁺	16.60 \pm 1.36	16.75	16.21 to 16.99	0.193
4	14 ⁺	17.16 \pm 1.52	17.20	16.73 to 16.59	0.215
5	15 ⁺	18.44 \pm 1.20	18.50	18.10 to 18.79	0.171
6	16 ⁺	18.54 \pm 1.27	18.70	18.18 to 18.90	0.18
7	17 ⁺	18.76 \pm 0.81	18.70	18.53 to 18.99	0.115
8	18	18.90 \pm 0.84	18.90	18.66 to 19.14	0.124

Above table shows the mean BMI, SEC and CL in age groups. The mean and SD of BMI of the present study for 11-18 years of age group are – 15.28 \pm 1.20, 15.98 \pm 1.17, 16.60 \pm 1.36, 17.16 \pm 1.52, 18.44 \pm 1.20, 18.54 \pm 1.27, 18.76 \pm 0.813, 18.90 \pm 0.845. The median values for BMI of each group and \pm 2SD (95% CL) for 11-18 years of age group are- 15.45 (15.01-15.75), 15.8(15.65-16.31), 16.75(16.21-16.99), 17.2(16.73-17.59), 18.5(18.10-18.90), 18.7(18.8-18.90), 18.7(18.53-18.99), 18.9(18.66-19.14). The values of 50th centile for 11-18 years of age are 15.4, 15.8, 16.8, 17.3, 18.5, 18.9, 18.7, 18.9.

Total no7: Shows cases with BMI <18.5.

Age Group	No. of cases BMI <18.5	Percentage
< 14 Yrs	186	93
> 14 Yrs	76	38

Girls with BMI less than 18.5 according WHO are under high risk group and are suffering from chronic energy deficiency. The values for BMI reported by Agrawal et.al in a study done on girls of USES were higher. This

shows the effect of socio-economic status on the nutritional status of girls.

The values for BMI reported by Chaturvedi et.al^[9] (done on rural girls of Rajasthan) were found to low in all age groups in comparison to present study group. Similarly the BMI values obtained from data of NNMB (12) 1996-97 are lower than the values of present study, which suggests that BMI of adolescent is increasing gradually.

The girls in present study those who are weight < 38 kg, height < 145 cm and BMI < 18.5 constituted a high risk group. In the present study girls below 14 years were found to be more undernourished then the girls beyond 14 years of age group. About 77% girls in age group < 14 years had weight below 38 kg and in contrast only 5% girls were below 38kg after 14 years of age group. About 55% girls in age were below 14 years had height < 145cm but after 14 years the % of girls having height <145cm was found to be only 5%. Similarly 93% girls had BMI <18.5 in age group <14 years and after 14 years this % reduce to only 38%.

Table no 8: Shows the caloric intake of each age group and deficit in each group.

Age Group	Caloric intake \pm SD (Kcal)	Min intake	Max intake	Deficit \pm SD
11	1333.62 \pm 81.76	1200	1486	636.46 \pm 81.68
12	1439.2 \pm 59.24	1300	1560	531.04 \pm 59.4
13	1460.6 \pm 72.66	1346	1660	599.0 \pm 72.71
14	1494.4 \pm 100.39	1330	1720	568.76 \pm 98.6
15	1527.1 \pm 97.14	1376	1780	538.88 \pm 96.39
16	1585.4 \pm 96.28	1430	1820	476.26 \pm 13.77
17	1615.68 \pm 55.5	1500	1780	439.72 \pm 65.16
18	1622.3 \pm 76.2	1520	1820	439.46 \pm 77.12

Above table shows the caloric intake of each age group and deficit in each group. Age group 11 and 13 were

highly calorie deficit. The mean calorie intake of the girls in all groups from 11-18 years of age found to low.

The values of mean calorie intake and SD of each group from 11-18 years are 1333.62±81.76, 1439.2±59.24, 1460.6±72.66, 1494.4±100.39, 1527.1±97.14, 1585.4±96.28, 1615.68±55.5, 1622.34±76.2 K cal. The calorie deficit and SD seen in each group from 11-18 years 636.46±81.68, 531.04±59.4, 599.0±72.71, 868.76±98.6, 538.88±96.39, 476.26±13.77, 439.72±65.16, 439.46±77.12. The mean calorie deficit in present study for all age groups is about 500 k/cal.

On comparing the consumed by the girls in 24 hrs, with that of RDA of ICMR, it was observed most of the girls in the study had inadequate calories intakes. P value when calculated from t test was found to be statistically significant for all age group p value being <0.0001 in all age group. Similar resulting of inadequate calorie consumption was seen in studies of Chaturvedi^[9] & Qamra^[17] done on rural & LES girls.

Table No 9: Shows Sign of Nutritional Deficiencies.

Age Group	Pallor in %	Angular stomatitis %	Eye changes in %	Dyspigmented Hairs in %	Skin Changes in %
11	46	26	26	30	32
12	42	18	28	36	30
13	46	20	20	36	30
14	42	14	26	28	32
15	42	12	10	36	32
16	44	10	4	30	28
17	40	12	6	36	38
18	46	6	4	42	34

In the present study signs of nutritional deficiency like pallor, angular stomatitis, eye changes, dyspigmented hairs, skin changes were detected. The prevalence of pallor s/o anaemia was highest among all study group about 40-46% i.e. about half of the girls in each group had pallor, signs of Vit. B complex deficiency was evidenced by angular stomatitis, glossitis and c/o hair fall seen and given by girls. H/o repeated URI/ ARI was given by girls which was s/o lowered levels of immunity due to qualitative deficiency of proteins and vitamins in diet. In dietary analysis s gross deficiency of intake of protein & minerals was studies in which support we found that about 30% girls in almost all age group that skin changes dry rough, scaly skin in favour of (vitA deficiency) and coarse hair textures and colour changes suggestive of protein deficiency.^[18]

CONCLUSION

On the basis of our study we concluded that the main cause of low BMI and poor nutritional status were financial constraints, ignorance, lack of awareness and poor parental literacy indicating that socioeconomic status bears a close and linear relationship with the nutritional status. Education is most important tool to bring over all socioeconomic development. In this study we observed that period 14-18 is active growth period. In this stage motivation, education and prevention of child marriage is like to improve the gain in weight, height and BMI. Due to poor diet intake or protein, minerals, vitamins sign of nutritional deficiency was seen in present study like pallor, angular Stomatitis, Dispigmented hair, skin changes and eye changes. This study establishes that SEC and dietary inadequacy had significant bearing on the physical growth of adolescent girls.

As a part of Betibachao: Betipadaoprogramme, nutritional assessment of all school going adolescent

girls should be done. Micronutrients like iron folic acid, calcium supplementation alongwith nutrition education, deworming will ensure optimal health of adolescent girls – the mothers of tomorrow.

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