RESEARCH ARTICLE

A CROSS SECTIONAL STUDY ON ANTHROPOMETRIC VARIABLES ON GROWTH & NUTRITIONAL STATUS OF ADOLESCENT GIRLS

[1,*]Dr. Zanvar Varsha and [2]Bhoyar Archana

[1]Assistant Prof. Shri Yoganand Swami Arts College, Basmat, Dist. Hingoli
[2]Assistant Prof. VNMM, Pusad, Dist. Yeotmal

ABSTRACT

Present cross sectional study was carried out to assess anthropometric variables on growth & nutritional status of adolescent girls among 600 adolescent girls of 16-18years from Parbhani district, Maharashtra. The anthropometric status of selected adolescent girls was determined by recording height (cm), weight (kg), mid upper arm circumference (cm), waist circumference (cm), hip circumference (cm) and hip: waist ratio. Body Mass Index was calculated using value of height and weight. On the basis of BMI, adolescent girls were categorized into different grades of under nutrition. Daily food intake of each selected adolescent girls was recorded with the help of three day recall method and weightment method. Nutrient intake was calculated by using Nutritive value of Indian food book. Percent adequacy of food intake was calculated using balance diet table for adolescent girls and percent adequacy of nutrient intake was done by using RDA table. The finding of study showed that Recorded values for anthropometric measurements revealed that urban girl's exhibits better values for height and weight while rural girls noted highest value for body mass index. Adolescent girls were categorized in to different grade of under nutrition on the basis of BMI. As per area, age, food habit and family income level showed that 5.00 to 71.62 per cent of girls were normal while remaining were suffering with one or other degree of under nutrition. Mean per cent adequacy for cereal ranged from 67.64 to 84.21 per cent. The per cent adequacy for pulses intake was ranged from 49.67 to 70.35 per cent. The range of per cent adequacy for green leafy vegetable, roots & tubers and other vegetables was 28.95 to 34.68, 16.13 to 20.01 and 18.14 to 33.1 per cent respectively. Per cent adequacy for fruit intake was ranged from 23.82 to 36.3. Per cent adequacy for Milk and milk products intake was ranged from 16.7 to 23.45. Per cent adequacy for fats and oil ranged from 42.86 to 80.12 per cent. Whereas per cent adequacy of calorie intake was ranged from 65.17 to 72.12 per cent. Per cent adequacy of protein and fat intake was ranged from 90.24 to 98.32 and 112.19 to 132.77 per cent. Per cent adequacy of iron, calcium and zinc intake ranged from 72.47 to 89.21, 40.4 to 62.77 and 53.76 to 73.81 per cent respectively. Per cent adequacy of -carotene intake ranged from 2.02 to 98.45 per cent. Per cent adequacy of thiamine, riboflavin and niacin were ranged from 50.55 to 90.18, 56.47 to 94.68 and 83.43 respectively. Per cent adequacy of folic acid intake ranged from 102.89 to 122.85 per cent whereas vitamin C consumption ranged from 73.31 to 153.82 per cent.

INTRODUCTION

Adolescence is a particularly unique period in life because it is a time of intense physical, psychosocial, and cognitive development. Increased nutritional needs at this juncture relate to the fact that adolescents gain up to 50% of their adult weight, more than 20% of their adult height, and 50% of their adult skeletal mass during this period. Caloric and protein requirements are maximal. Increased physical activity, combined with poor eating habits and other considerations, e.g.

menstruation and pregnancy, contribute to accentuating the potential risk for adolescents of poor nutrition. Anthropometrics can be sensitive indicators of health, growth and development in infants and children. In particular anthropometry has been used during adolescence in many contexts related to nutritional status. According to World Health Organization, the ultimate intention of nutritional assessment is to improve human health. Malnutrition which refers to an impairment of health from a deficiency or imbalance of nutrients is of public health significance among adolescents all over the world. It creates lasting effect on the growth, development and physical fitness of a person. It is well recognized worldwide that anthropometric measurements are indispensable in diagnosing under nutrition.

---

*Corresponding author: Dr. Zanvar Varsha,
Assistant Prof. Shri Yoganand Swami Arts College, Basmat, Dist. Hingoli.

Nutritional needs during this period are increased because of the increased growth rate and changes in body composition associated with puberty. Adolescents tend to eat differently than they did as children. Factors like the quest for independence and acceptance by peers, increased mobility and greater time spent at school/college and/or work activities and preoccupation with self-image that may affect adolescent's food choices. All these factors contribute to the erratic and unhealthy eating behaviors that are common among adolescents. Busy schedules may lead to meal skipping, snacking throughout the day and more eating away from home. Peer pressure is very high during adolescence. The need to be in the step with trends and belong to the peer group leads to adolescent eating non-nutritious foods like pizzas, burgers coffees, soft drinks, chocolates and also other roadside junk foods. Awareness about one's body and its appearance becomes the top priority. Dietary nutrients are consumed by the body to provide energy and structural material needed for regulating growth, maintenance and repair of the tissue. The intake of all the essential nutrients in the form of a balanced diet brings health benefits for the present and also for the future. Energy is required for growth and activity. Insufficient food will not only result in under nutrition in terms of inadequate weight gain but will also hinder growth. The rate of growth fluctuates from one age to another. In view of this present cross sectional study was carried out on anthropometric variables on growth & nutritional status of adolescent girls

METHODOLOGY

Purposively 600 adolescent girls of 16-18 years were selected from urban and rural area of Parbhani District. Further the sample was categorized into 300 from urban and rural area of Parbhani district. Availability of adolescent girls was ascertained through visit to college, hostel and home. The anthropometric status of selected adolescent girls was determined by recording height (cm), weight (kg), mid upper arm circumference (cm), waist circumference (cm), hip circumference (cm) and hip: waist ratio. BMI was calculated using value of height and weight. On the basis of BMI, adolescent girls were categorized into different grades of under nutrition. Daily food intake of each selected adolescent girls was recorded with the help of three day recall method and weightment method. Nutrient intake was calculated by using Nutritive value of Indian food book. Percent adequacy of food intake was calculated using balance diet table for adolescent girls and percent adequacy of nutrient intake was done by using RDA table.

RESULTS

The anthropometric measurements of adolescent girls from different socio economic categories: The anthropometric measurements of adolescent girls from different socio economic categories are described in the Table1. The height of girls ranged from 152.08 ± 5.66 to 155.09 ± 5.78cm. Adolescent girls aged 18 years noted highest value for height (155.09 ± 5.78 cm) while the least value was noted 16 years (152.08 ± 5.66 cm).Area wise distribution showed that urban adolescent girls were having better height (154.96 ± 5.91 cm) than rural (152.34 ±5.02 cm). Similarly the adolescent girl belonging to non-vegetarian and high income group girls had better height than their counter parts. The weight of girls was ranged from 44.26 ± 5.784 to 46.10 ± 6.84 kg. However value

for weight was noted highest for high income group (46.10 ± 6.84 kg) and least values were noted for non vegetarian girls (44.26 ±5.84 kg). Similarly urban adolescent girls, 17 years age and vegetarian girls had better weight than their counter parts. The range of body mass index was 15. 23 ± 0.72 to 19.65± 2.74 kg/m^2.Middle income group showed highest value (19.65 ± 2.74 kg/m^2) whereas non vegetarian girls showed least values (15. 23 ± 0.72 kg/m^2) for body mass index. MUAC ranged from 22.35 ± 2.21 to 23.21 ± 2.71 cm. Urban girls noted highest value (23.21 ± 2.71 cm) while adolescent girls having age 16 years noted least values (22.35 ± 2.21 cm) for MUAC. Hip circumference ranged from 72.56 ± 15.85 to 79.76 ± 8.64 cm. It was noted that rural adolescent girls showed highest value (79.76 ± 8.64 cm) where as non-vegetarian showed least values (72.56 ± 15.85 cm) for Hip circumference. Waist circumference ranged from 62.96 ± 6.51 to 72.69 ± 12.94 cm. Urban adolescent noted highest value (72.69 ± 12.94cm)and rural adolescent noted least values (62.96 ± 6.51 cm) for Waist circumference. In case of Hip: Waist ratio it was noted that values ranged from 0.80 ± 0.80 to 0.92 ± 0.25cm and urban girls noted highest value (0.92 ± 0.25 cm) whereas rural adolescent noted least values (0.80 ± 0.80 cm) for Hip: Waist ratio respectively.

Prevalence of under nutrition among selected adolescent girls: Prevalence of under nutrition among selected adolescent girls based upon body mass index is presented in Table 2. When compared area wise almost equal per cent of adolescent were suffering with mild and moderate grade of under nutrition which was comparatively more than rural girls. However 35.63 per cent adolescent from 18 years of age group reported mild grade of under nutrition followed by 16 years of girls (23.11 %) further it was also reported that non vegetarian girls were categorized as either mild, moderate or severe grade of under nutrition. In the same way it was also noted from the table that maximum girls from high income reported mild grade under nutrition.

Mean per cent adequacy of food intake of selected adolescent girls from different socio economic categories: Mean per cent adequacy of food intake of selected adolescent girls from different socio economic categories is presented in Table 3. Mean per cent adequacy of intake of cereal ranged from 67.64 to 84.21 per cent. However urban adolescent girls recorded highest per cent adequacy of intake of cereals (84.21%) while lowest per cent adequacy of intake was noted by rural adolescent girls (67.64 %). Similarly the adolescent girl belonging to 17 yrs of age group, non-vegetarian and middle income group girls recorded highest per cent adequacy of intake of cereals than their counter parts. The per cent adequacy of pulses intake was ranged from 49.67 to 70.35 per cent. However highest per cent adequacy for pulses intake was noted for non- vegetarian girls (70.35 %) and least per cent adequacy was equally contributed by girls belonging to urban and rural area (49.67 %). Similarly 17 years old adolescent girls and high income girls had better per cent adequacy for pulses than their counter parts. The range of per cent adequacy of consumption of green leafy vegetable was 28.95 to 34.68 per cent. Girls belonging to middle income group showed highest per cent adequacy for consumption of green leafy vegetable (34.68 %) whereas non vegetarian girls showed least per cent adequacy (28.95 %). Per cent adequacy of roots and tubers intake was ranged from 16.13 to 20.01 per cent. Adolescent girls of 18 years noted highest per cent adequacy (20.01 %) while adolescent girls of 17 years noted least per

Table 1. Anthropometric measurements of selected adolescent girls from different socio economic categories (n=600)

Particular	Height (cm)	Weight (Kg)	BMI (Kg/m^2)	MUAC (cm)	Hip circumference(cm)	Waist Circumference (cm)	Hip /waist ratio
Area							
Urban	154.96 ± 5.91	45.99 ± 7.23	19.16 ± 2.84	23.21 ± 2.71	78.39 ± 11.16	72.69 ± 12.94	0.92 ±0.22
Rural	152.34 ±5.02	44.97 ±5.06	19.39 ±2.06	22.43 ±1.79	79.12 ±7.15	62.96 ±6.51	0.80 ±0.12
Age							
16 yrs	152.08 ± 5.66	44.96 ± 5.99	19.31 ± 2.09	22.35 ± 2.21	78.73 ± 9.02	64.01 ± 9.46	0.82 ± 0.16
17 yrs	154.34 ± 5.33	45.79 ± 6.36	19.40 ± 2.74	23.02 ± 2.24	79.07 ± 9.63	68.78 ± 11.46	0.88 ± 0.20
18 yrs	155.09 ± 5.78	45.69 ± 6.53	18.75 ± 2.39	23.25 ± 2.72	77.74 ± 9.35	73.78 ± 11.90	0.88 ± 0.16
Food habits							
Vegetarian	153.55 ± 5.64	45.56 ± 6.28	19.55 ±2.31	22.79 ±2.35	79.17 ± 8.63	67.71 ± 11.16	0.84 ± 0.17
Non- vegetarian	155.13 ± 5.34	44.26 ± 5.84	15.23 ± 0.72	23.17 ± 1.97	72.56 ± 15.85	69.38 ±13.70	1.08 ± 0.30
Family income							
Rs.<10000	152.77 ± 5.51	44.80 ± 5.71	19.09 ± 2.43	22.60 ± 2.20	78.12 ± 9.57	65.94 ± 9.68	0.85 ± 0.18
Rs.10001-20000	154.43 ± 5.57	46.10 ± 6.84	19.65 ± 2.74	23.00 ± 2.25	79.76 ± 8.64	68.65 ± 12.08	0.88 ± 0.20
Rs.>20001	154.31 ± 5.75	45.97 ± 6.36	19.10 ± 2.13	23.01 ± 2.64	78.61 ± 9.92	70.46 ± 12.69	0.84 ± 0.18

Table 2. Prevalence of under nutrition among selected adolescent girls (n=600)

Particular	Grade of under nutrition					
	Severe	Moderate	Mild	Normal	Over weight	Total
Area						
Urban	30 (5.00)	43 (7.17)	43 (7.17)	174 (29.00)	10 (1.67)	300
Rural	11 (1.83)	24 (4.00)	26 (4.33)	234 (39.00)	5 (0.83)	300
Age						
16 years	8 (3.77)	20 (9.43)	49 (23.11)	130 (61.32)	5 (2.36)	212
17 years	32 (10.63)	32 (10.63)	49 (16.28)	181 (60.13)	7 (2.33)	301
18 years	2 (0.66)	14 (16.09)	31 (35.63)	37 (45.23)	3 (3.45)	87
Food habits						
Vegetarian	36 (6.41)	59 (9.83)	63 (11.21)	389 (69.22)	15 (2.67)	562
Non- vegetarian	6 (15.79)	7 (18.42)	7 (18.42)	18 (47.37)	0 (0.00)	38
Family income						
Rs.<10000	24 (8.79)	32 (11.72)	30 (10.99)	181 (66.30)	6 (3.11)	273
Rs.10001-20000	12 (6.22)	21 (10.88)	20 (10.36)	133 (68.91)	7 (3.63)	193
Rs.>20001	6 (4.48)	13 (9.70)	20 (14.93)	93 (69.40)	2 (1.49)	134

Figures in parenthesis indicate percentage.

Table 3. Mean per cent adequacy of food intake of selected adolescent girls from different socio economic categories (n=600)

Particular	Cereals (g)	Pulses (g)	Green leafy Vegetable (g)	Roots & Tubers (g)	Other veg. (g)	Fruits (g)	Milk and milk products (ml)	Fats & oil (g)	Sugar & jaggery (g)
Area									
Urban	84.21	49.67	32.7	18.5	33.1	32.5	16.7	70	93.5
Rural	67.64	49.67	31.87	16.35	18.14	31.44	21.31	78.43	95.47
Age									
16 years	72.41	57.92	30.45	17.94	21.29	27.12	16.9	65.5	89.25
17 years	78.9	64.9	32.25	16.13	28.99	36.3	19.23	78.86	99.26
18 years	78.66	58.55	33.53	20.01	27.39	33.04	23.45	80.12	92.39
Food habits									
Vegetarian	75.62	60.29	32.52	17.35	25.44	32.52	19.3	76.32	94.3
Non- vegetarian	80.06	70.35	28.95	18.78	27.63	23.82	14.74	42.86	97.9
Family income									
Rs.<10000	74.92	59.05	31.96	16.29	23.19	31.08	16.82	68.45	91.72
Rs.10001-20000	77.47	59.63	34.68	18.77	26.9	27.9	19.79	79.71	102.54
Rs.>20001	76.32	64.31	31.22	18.19	28.06	28.33	21.49	78.61	93.13

cent adequacy (16.13 %) for intake of roots and tubers. Per cent adequacy of consumption of other vegetables ranged from 18.14 to 33.1 per cent. It was noted that urban adolescent girls showed highest value (33.1%) whereas rural adolescent girls showed least values (18.14%). Per cent adequacy of fruit intake was ranged from 23.82 to 36.3 per cent. Further 17 years old girls recorded highest value (36.3%) whereas non vegetarian girls recorded lowest value (23.82%).

Table 4. Mean per cent adequacy of nutrient intake of selected adolescent girls from different socio economic categories (n=600)

Paricular	Energy (Kcal)	Protein (g)	Fat (g)	Iron (mg)	Calcium (mg)	-carotene (µg)	Thiamine (mg)	Riboflavin (mg)	Folic acid (mg)	Niacin (mg)	Vitamin C (mg)	Zinc (mg)
Area												
Urban	69.71	98.32	112.19	77.64	44.04	21.35	89.52	59.97	116.8	92.34	97.78	61.22
Rural	66.4	90.24	137.29	75.29	54.36	52.24	64.45	72.18	117.41	92.89	91.3	53.76
Age												
16 years	67.32	94.14	128.87	75.22	46.79	18.33	79.45	56.47	102.89	95.35	109.21	61.48
17 years	69.49	94.73	119.29	73.39	46.7	30.85	83.23	64.07	121.15	87.89	76.41	55.24
18 years	65.17	93.16	132.77	89.21	62.77	98.45	51.21	94.68	122.85	101.5	119.04	55.54
Food habits												
Vegetarian	67.78	94.54	125.31	76.59	49.79	39.14	76.09	66.59	114.71	93.23	90.53	56.39
Non- vegetarian	72.12	90.39	116.34	74.54	40.4	2.02	90.18	58.56	118.69	83.43	153.82	73.81
Family income												
Rs.<10000	68.88	94.3	128.38	76.14	44.8	20.8	86.57	59.01	112.52	93.27	101.83	60.88
Rs.10001-20000	68.31	93.88	120.56	72.47	46.77	34.6	81.78	66.64	121.87	89.37	73.31	54.76
Rs.>20001	66.02	94.81	123.34	82.88	61.66	72.51	50.55	79.65	109.98	95.94	110.27	54.51

Per cent adequacy of Milk and milk products intake was ranged from 16.7 to 23.45 per cent. Highest per cent adequacy for milk and milk products was noted among adolescent girl of 18 year (23.45 %) and lowest per cent adequacy was noted by urban girls (16.7 %). Per cent adequacy of intake of fats and oil ranged from 42.86 to 80.12 per cent. However adolescent girls of 17 years recorded highest per cent adequacy (80.12 %) and 16 years adolescent recorded lowest per cent adequacy (42.86 %). In case of per cent adequacy of sugar & jaggery intake values were ranged from 89.25 to 102.54 per cent and girls belonging middle income group noted highest per cent adequacy (102.54 %) whereas adolescent of 16 years noted least per cent adequacy (89.25 %). In the nut shell it can be concluded from the table that highest per cent adequacy for roots & tubers, milk & milk products and fats & oil were recorded by 18 years adolescent girls, however per cent adequacy mentioned by 17 years adolescents girl for pulses and fruits, whereas per cent adequacy for cereals and other vegetables were recorded by urban girls, further per cent adequacy for sugar & jaggery and green leafy vegetable by girls belonging to middle income group.

Mean per cent adequacy of nutrient intake of selected adolescent girls from different socio economic categories

Per cent adequacy of nutrient intake among selected adolescent girls from different socio economic categories is presented in Table 31 and Fig.6a, 6b. Mean per cent adequacy of calorie intake was ranged from 65.17 to 72.12 per cent. Non vegetarian girls recorded highest per cent adequacy for calorie (72.12 %) while lowest per cent adequacy was noted by adolescent girls of 18 years (65.17 %). Per cent adequacy of protein intake was ranged from 90.24 to 98.32 per cent. Highest per cent adequacy was noted for girls belonging to urban (98.32 %) and least per cent adequacy was noted by rural girls (90.24 %). Similarly 17 years old adolescent girls and high income girls had better per cent adequacy for protein than their counter parts. The range of per cent adequacy of fat intake was 112.19 to 132.77 per cent. The highest per cent adequacy was recorded by adolescent girls of 18 year (132.77 %) whereas urban girls showed least per cent adequacy (112.19 %) for fat. Per cent adequacy of Iron intake ranged from 72.47 to 89.21 per cent. Adolescent girls of 18 years noted highest per cent adequacy (89.21%) while middle income group noted least per cent adequacy (72.47%) for intake of iron. Per cent adequacy of Calcium consumption ranged from 40.4 to 62.77 per cent. It was noted that adolescent girls belonging to 18 years showed highest per cent adequacy (62.77 %) whereas non vegetarian showed least per

cent adequacy (40.4%) for calcium. Further per cent adequacy of -carotene intake ranged from 2.02 to 98.45 per cent. Highest per cent adequacy was recorded by 18 yrs of girls (98.45%) and low income group noted least values (2.02 %). Per cent adequacy of Thiamine intake was ranged from 50.55 to 90.18 per cent and non vegetarian recorded highest per cent adequacy (90.18%) and adolescent girls of 18 yrs and high income group recorded lowest per cent adequacy (50.55%). Per cent adequacy of Riboflavin intake was ranged from 56.47 to 94.68 per cent. Highest per cent adequacy recorded by girls of 18 yrs (94.68 %) whereas lowest per cent adequacy was recorded by 16 yrs old girls (56.47%). Per cent adequacy of Folic acid intake ranged from102.89 to 122.85 per cent. Highest per cent adequacy for folic acid was noted among adolescent girl of 18 year (122.85 %) and lowest was noted by adolescent girl of 16 year (102.89 %). Per cent adequacy of Niacin was ranged from 83.43 ± 101.5 per cent. Adolescent girls of 18 years recorded highest per cent adequacy (101.5%) and non vegetarian girls recorded lowest value (83.43 %). Per cent adequacy of vitamin C consumption ranged from 73.31 to 153.82 per cent. Non vegetarian girls recorded highest per cent adequacy for vitamin C consumption (153.82 %) and least per cent adequacy was recorded by girls belonging to middle income group (73.31%). In case of per cent adequacy of zinc intake non vegetarian girls noted highest per cent adequacy (73.81%) whereas rural girls noted least per cent adequacy (53.76%) and intake of zinc ranged from 53.76 to 73.81 per cent. In the nutshell it can be concluded from the above table that 18 yrs girls recorded highest value for intake of fat, iron, calcium, -carotene, riboflavin, folic acid, niacin and non vegetarian girls also recorded highest value for thiamine, vitamin C and zinc contrary lowest per cent adequacy for energy by 18 yrs, protein and zinc by rural girls, riboflavin and folic acid by 16 yrs, calcium, -carotene and niacin by non vegetarian girls and iron by girls belonging to middle income group.

DISCUSSION

The present data on anthropometric measurements of adolescent girls (Table.3) revealed that the girls from urban area were better off in their height, weight, mid upper arm circumference and waist circumference as compared to the rural adolescent girls. It also revealed from the table that as age increase height, weight, mid upper arm circumference and waist circumference increases. The result reported by Zanver *et al.* (2007) were also in line with the present results they reported that urban adolescent girls were having better height,

weight and body mass index than rural and tribal adolescent girls. Lata *et al* (2012) who conducted studies in Karad, Satara district of Maharashtra were also reported the same result. The impact of food habit showed that vegetarian girls recorded good height, mid upper arm circumference and waist circumference. Majority of studied adolescent girls belong to income group Rs.10, 001 – 20,000 shows better value for all anthropometric measurements. Borkar and Khan (2017) undertaken the study in Parbhani, Maharashtra also reported the same result which are going in hand in hand with present finding. An increase in income status always enhance purchasing power of family resulting in better food consumption which directly affect on the growth of children specially adolescent girls. Therefore it is assumed that socio economic environment of the family also influence on the growth and development of adolescent girls. Influence of socio economic factors on prevalence of under nutrition revealed in Table (2). Persual of tables revealed that maximum percent of normal girls were present in rural area while high percent of urban girls were suffered with one or more grade of under nutrition and over nutrition. When observed age wise high percent of normal girls from 16 years on the contrary majority of 18 years adolescent girls categorized under the grade of mild, moderate and overweight, while 17 years girls were suffering with severe under nutrition. More percentage of vegetarian girls was normal and overweight also while non vegetarian girls were suffered from one or more degree of under nutrition. Further it was noted that irrespective of family income, almost 66.3 to 69.4 percent girls were normal. The studies conducted in Maharashtra state by Mane *et al.* (2012), Jawarkar *et al.* (2015) also reported that majority of participant were belonging to normal category. The more percentage of girls were normal this may be due to less physical activity. Selected participants were studied in 11th and 12th standard which was crucial period for study. As majority participant spent more time on study and less physical activity and limited outdoor playing and allied activities. Majority were from middle income group and staying in hostel which required less physical stress and consumption pattern was found to almost same. Majority were found to be normal body mass index.

When seen critically it was crystal clear from the result that the per cent adequacy of cereal, pulses, sugar and jaggery was found to be maximum followed by fats and oil seeds. Daily diet in Maharashtra included Jowar, Wheat, Rice, Poha or Rawa. To prepare Bhakri, Chapati, Rice, Khichadi, Poha and Upma. Consumption of these products was found to be frequent and almost daily in one or other meal. Along with this pulses were used in the form of varan, amati, kadhi and different leafy vegetable curry. Oil was used very common for seasoning of vegetables, Dals and applying on chapaties. However adequacy of sugar was found tobe high as tea, milk and coffee intake was very frequent i.e. twice and thrice a day. Per cent adequacy of nutrient intake of selected adolescent girls is reported in Table (4). It is revealed from the table that irrespective all socio economic parameters per cent adequacy was found to be more than 100 per cent for fat (112.19- 137.29 %), vitamin C (153.82 %) folic acid (102.89- 122.85 %) and niacin (101.50 %). However 90-100 per cent adequacy was recorded for protein (90.24-98.32 %), - carotene (98.45 %), riboflavin (94.68 %), thiamin (90.18 %), and iron (89.21 %).

Further it is reported that 60 to 70 per cent adequacy was recorded for energy (66.02- 72.12 %), calcium (62.77 %) and zinc (61.22 %). As the present study was conducted in Marathwada zone. In almost all families groundnut powder is the main ingredients for preparation of all types of gravies prepared for curries. Apart from this chutnies of groundnut, seasamum, niger seed coconut and linseed were commonly prefer in any meal along with curries and koshimbir. Practice of applying oil at the time of roasting chapatti and use of extra oil for spicy curries and dal. These might be reason for highest per cent adequacy of fat. Also the per cent adequacy was noted maximum for folic acid and vitamin C. This may be due to regular consumption of green leafy vegetables like palak, methi , red gram dal. The habit of consume lime on poha, dal, curries was also found to be common among studied area. Lemon juice with sugar and lime in black tea was also very common pattern forms very good per cent adequacy for vitamin C. Consumption of leafy vegetable also enhances the vitamin C intake.

Conclusion

Nutritional status is a reflection of adequate intake of food and nutrition hence it is recommended for create awareness about importance of balance diet among adolescent girls and their mother.

REFERENCES

Borkar Dipali and Khan T.N. 2017. Evaluation of nutritional status of rural adolescent girls (16-18 years),Thesis (M.Sc.) VNMKV, Parbhani.

Jawarkar Ajay Keshavrao, Lokare Pushpa O, Kizhatil Anuradha and Jawarkar Jyoti A. 2015. Prevalence of anemia and effectiveness of iron supplementation in anemic adolescent school girls at Amravati City, Maharashtra. *Journal of Health Research and Reviews*, January - April 2015, Volume 2, Issue 1.

Jellif D.B. 1996. The assessment of nutritional status of the community, WHO monograph
series, No. 53: Geneva

Lata R Kollur, A K Pratinidhi and SV Kakade 2014. Nutritional status of adolescent girls, *International Journal of Medical Science and Public Health* ,Vol 3, Issue 8 pp.951-954.

Mane S.V., S.R. Agar, khedkar D.S., KarwaV., Pande S.S., Singhania and G.R.Karambelkar 2012. Study of risk factors for lifestyle diseases among adolescents in Western India, *Int J Pharm Biomed Sci* 2012, 3(4), 224-228, www.pharmainterscience.com

Zanvar, V., Rohini Devi, Arya, A. And Nerlekar, J.P. 2007, Prevalence of anaemia among selected adolescent girls of Marathwada region. *The Ind. J. Nutr. Dietetics*, 44: 559-571.

****