IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138
INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG
An International Open Access, Peer-reviewed, Refereed Journal

Assessment of Nutritional Status of Adolescent Girls From Nagpur City (16 to 18 years)

Sonal Chawla & Shubhada Jambhulkar

Department of Home Science, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra (INDIA)

ABSTRACT

Objective: The present study was a cross-sectional study designed to collect information on dietary intake and food patterns of adolescent girls from different junior colleges of Nagpur city. **Methods:** A sample of 100 adolescent girls belonging to 16-18 years of age group were selected from Dayanand Arya Kanya Junior College of North Nagpur. Their general information and 24 hour dietary recall was taken through an interview cum questionnaire method. Data of mean height(cm) and weight(kg) of the subjects were compared with the NCHS standards. Average daily nutrient intake of adolescent girls were calculated and compared with recommended dietary allowances (RDA) for Indians.

Results: The height and weight of the subjects were found to be lower than the NCHS standards. Average daily dietary intake of adolescent girls was found significantly lower when compared with RDA. **Conclusion:** Results indicated an overall poor nutritional status among surveyed adolescent girls. A very high incidence of under -nutrition was seen among these girls. Nutritional and health professionals are required to educate and encourage these adolescent girls to improve their dietary habits and nutrients intake.

This will help in preventing the disease associated with poor nutrition.

Keywords : Adolescent girl, meal pattern, dietary intake, recommended dietary allowances.

Introduction

Adolescence is the period of transition from childhood to adulthood (Srilakshmi, 2002). During this period, the final growth spurt occurs. There are many body changes that occur due to the influence of hormones and with profound growth there is increased demand for energy, proteins, minerals and vitamins. The process of maturation becomes rapid from the puberty stage, that is from 1 1 to13 years

(Easwaran and Poorani,1991). To strengthen any nation, there is need of healthy mothers as they only can produce healthy citizens (Elizabeth,2000).The term adolescence comes from the latin word 'adolescere', meaning 'to grow , to mature, to emerge or achieve identity.'According to WHO, adolescent girls are those aged between 10-19 years and their body needs extra nutritional demands for rapid increase in height and weight, psychological and sexual maturity (Prashant, 2009 ; NIN, 1998 ; Raghunatha,et al.,2007). About one-fifth of the world's population are adolescent girls and

84 % live in developing countries (Raghunatha, et al., 2007). According to National Youth Policy 2000, about 21.4 percent of the total population in India are adolescent girls, whereas, Kaur et al. (2007) proposed that these numbers account for 22.8 per cent. However, Pratibha Patanwar and Sharma showed that about 1.2 billion adolescent girls are present in the world and these numbers are increasing day by day (Pratibha Patanwar , 2013). Adolescent girls are more vulnerable to the effects of malnutrition, stunting, anaemia etc. because of their frequently erratic eating patterns, lack of nutritional knowledge and poor dietary habits (Prashant, 2009; Elizabeth, 2000; Gaikwad Surekha Ramrao, 2013). As a result, growth is impaired and this may be an important public health problem in the world (Kalhan et al., 2010 ; Pratibha Patanwar , 2013). By reviewing the studies conducted to assess the nutritional status of the adolescent girls from different parts of the country curiosity aroused to see the nutritional status of these future mothers who are around us and with this objective this study was conducted in the north side of Nagpur city .

Methodology

This study was a community based cross sectional study conducted in Dayanand Girls Junior College which is situated in the north side of Nagpur city , Maharashtra, India. The study was carried out on a sample of 100 adolescent girls belonging to 16-18 years of age group. Questionnaire cum interview method was adopted for collecting the data. Information regarding family background, dietary pattern, 3 days dietary recall, anthropometric measurements, biochemical and clinical parameters were collected. The assessment of nutritional status of subjects was done by calculating the nutrient intake for 3 consecutive days and comparing its adequacy with recommended dietary allowances. Height and weight was taken and Body Mass Index was computed. Height was measured using a stadiometer and recorded to the nearest zero.Weight was recorded using a weighing machine. W eight was recorded to the nearest zero.The body mass index (BMI) was computed with the standard formula given below:

BMI (kg/m^2) = Weight (kg) / Height (m^2).

Results & Discussion

In the present cross sectional study total 100 adolescent girls were studied to assess their nutritional status by taking their anthropometric measurements and dietary intake. The collected data was tabulated and discussed as below.

Table 1: Age wise Distribution of Adolescent Girls

Sr. No.	Age (years)	Number of girls	Percentage (%)
1.	16	40	40
2.	17	39	39
3.	18	21	21
	Total	100	100

Table 1 shows the age wise distribution of adolescent girls. Among all the adolescent girls 40 % girls were of 16 years age followed by 39 % and 21% of 17 years and 18 years respectively .

Table 2: Data on Socio Demographic Variables of Adolescent Girls

Sr. No.	Variables	Numbers (%)	
1.	**Type of Family**		
	Nuclear	83	
	Joint	17	
2.	**Educational Status**	**Father**	**Mother**
	illiterate	5	9
	Primary education	17	13
	Middle school	23	19
	High school	21	24
	SSC	15	21
	HSC	14	11
	Graduate	05	03
3.	**Occupation**		
	Business	19	3
	Government job	4	2
	Private job	36	16
	Labor	39	37
	Housewife	--	41
4.	**Total family income (Rupees)**		
	50001-100000	16	
	100000 -200000	74	
	200000 -500000	10	
5.	**Family Size**		
	1-5	79	
	6-10	21	

Table 2 focussed mainly on the demographic variables of the subjects. The result showed that 83 % of girls belonged to the nuclear family and 17 % belonged to the joint family. Educational status is an important indicator to judge the socio economic status as well as nutritional status of the community. The data of educational level of parents of adolescent girls showed that the majority of parents had

their education up to SSC & HSC.Only 5 % fathers and 3 % mothers completed their graduation and none of the parents were post graduates whereas 5 % of fathers and 9% mothers were illiterate. It is observed that maximum parents(39 % fathers and 37 % mothers) were laborers followed by private jobs (36 % fathers and 16 % mothers). Very few parents preferred doing business (19 % fathers and 3 % mothers) whereas parents engaged in government jobs was even lesser (4 % fathers and 2 % mothers). Maximum mothers were found to be housewives (41%). With respect to the family income, it is observed that 16 % adolescent girls belonged to the families earning Rs.50001-100000 and 74 % girls belonged to the families earning 100000 -200000 whereas 10 % girls belonged to the group of family income 200000-500000. Maximum girls (79 %) were from families which have 1-5 total family members.

Anthropometric Measurements

Table 3: Mean Height of Adolescent Girls

Sr. No.	Age (years)	Mean & S.D Height (cms)	Range	N.C.H.S standards	Student's 't' test	'z' test
1.	16 (N=40)	152.07 ± 5.91	141-169	162	-	10.67
2.	17 (N=39)	151.07 ± 4.74	140-164	163	-	15.69
3.	18 (N=21)	152.66 ± 4.41	146-161	164	11.763	-

Result of student 't' test : significant at both t he levels ($p<0.01$).

From the above table it is observed that the mean height of the girls is found to be less than the NCHS standards. The mean height of 16 year old adolescent girls was 152.07 ± 5.91 which is 6.17 % less than the NCHS. The mean height of 17 and 18 years old adolescent girls was 151.07 ± 4.74 and 152.66 ± 4.41which is 7.31 % and 6.91% less than the NCHS respectively . Though the range of height suggests that some of the subjects are taller than the standards but maximum are shorter as compared with the standards. The statistical interpretation for 18 year old adolescent girls also supports that there is a huge difference in the height of the girls ($p<0.01$) as compared with the standards.

Table 4: Mean Weight of Adolescent Girls

Sr. No.	Age (years)	Mean & S.D Weight (kgs)	Range	N.C.H.S standards	Student's 't' test	'z'test
1.	16 (N=40)	44.77±5.39	37-60	53	--	9.68
2.	17 (N=39)	44.07±4.80	35-55	54	--	12.91
3.	18 (N=21)	46.09±5.14	40-59	54.4	6.98	-

Result of student 't' test: significant at both the levels ($p<0.01$).

From the above table the observations clearly indicates that the mean weight (kg) of the girls is between 44 to 46 kgs and found to be less than NCHS standards(ICMR 2010).

The mean height of 16 , 17 and 18 year old adolescent girls was 44.77±5.39 , 44.07±4.80 and 46.09±5.14 which is 15.52 %, 18.38 % and 15.27 % less than the NCHS respectively . The range of weight indicates that some of the girls weighed more than the NCHS standards but the maximum of the girls fall in the category of underweight. The findings of Sujatha K. and Kowsalya S.(2017) revealed that the mean height and weight of the subjects were below the expected measures and standard reference value for their age group. The statistical interpretation of student 't' test % also supports ($p<0.01$) that there is a huge difference in the weight of the girls as compared with the standards.

Table 5: Body Mass Index of Adolescent Girls

Sr. No.	BMI Range	Category	Number of girls	Percentage
1.	>17.50	Underweight	10	10
2.	17.50-22.99	Normal weight	85	85
3.	23.00-27.99	Overweight	05	05

The above table indicates that maximum girls (85%) fall in the category of normal Body Mass Index that is 17.50 – 22.99 whereas some of them are found to be in the category of underweight (10%) . On the contrary , a few adolescent girls (5 %) were found in the third category 23.0 – 27.99 and slightly overweight. The findings of BMI of present study were in accordance with the study conducted by Pratibha Patanwar and KKN Sharma(2013) .

Table 6: Haemoglobin levels of adolescent girls

Sr. No.	Age (years)	Haemoglobin (gm/dl) Mean & S.D	Range
1.	16 (N=40)	10.27±1.19	7.8-12.3
2.	17 (N=39)	10.55±0.90	8.6-12.3
3.	18 (N=21)	10.28±1.04	7.9-12.1

The above table shows the mean haemoglobin level of girls belonging to 16 ,17 & 18 years.Observations regarding mean haemoglobin levels of adolescent girls revealed presence of mild anaemia(10-12 gm/dl) whereas some girls whose haemoglobin was between 7-10 gms indicate the presence of moderate anaemia. It is evident that these levels fall under the deficiency category. A similar status of mean haemoglobin levels between 9.1 to 9.14 g/dl have been reported by Sujatha K. and Kowsalya S.(2017).

Table 7: Observations of Vital Signs among Adolescent Girls

Sr. No.	Vital signs	Blood Pressure Systolic Mean & S.D	Range	Blood Pressure Diastolic Mean & S.D	Range	Pulse Rate (per minute) Mean & S.D	Range
1.	16 (N=40)	115.8 ±5.23	105-127	75.32 ±3.94	68-82	73.67 ±3.27	65-81
2.	17 (N=39)	115.33 ±4.57	108-128	74.84 ±3.11	68-82	74.66 ±2.92	69-80
3.	18 (N=21)	116.23 ±4.70	108-123	75.38 ±4.11	68-82	74.57 ±3.17	69-81

Systolic and diastolic blood pressure along with pulse rate of the girls was recorded and was found within normal limits.

Dietary Habit and Nutrient Intake

Collected data of food habits and 24 hour dietary recall presented below in a tabular form.

Table 8: Dietary Habits of Adolescent Girls

Sr. No.	Dietary Habits	Number of girls	Percentage (%)
1.	Vegetarian	31	31
2.	Non Vegetarian	62	62
3.	Eggitarian	7	7
Total		N=100	100

From table 8, it is observed that a maximum of girls are non vegetarian (62%) followed by vegetarians (31%) and the rest were eggitarians.

Table 9:Mean Nutrient Intake of Adolescent Girls

Sr. No.	Nutrients	Mean & S.D	Range	R.D.A	% Deficit / Excess	'z' test
1.	Energy (Kcal)	1504.17±144.98	1180.2-2013.5	2500	-39.83	68.68
2.	Protein(g)	35.92±4.59	25.6-46.8	46.2	-22.25	22.39
3.	Fat(g)	36.18±4.38	26.5-48.6	35	+3.37	2.69
4.	Carbohydrates(g)	258.26±29.85	201.6-352.6	--	--	--
5.	Iron(mg)	25.11±3.57	18.6-36.4	32	-21.53	19.29
6.	Calcium(mg)	644.33±103.34	412.6-891.6	1050	-38.63	39.25
7.	Phosphorus(mg)	613.37±93.71	347.6-827.6	1050	-41.58	46.59
8.	Sodium(mg)	1361.74±99.11	1123.6-1654.2	1600	-14.89	24.04
9.	Potassium(mg)	1529.45±170.76	1226.5-1905.2	2825	-45.86	75.86
10.	Vitamin A (mg)	540.83±67.51	345.3-712.6	860	-37.11	47.28
11.	Vitamin C (µg)	40.16±4.04	32.6-48.1	68	-40.94	69.59
12.	Folic acid(mg)	168.68±19.95	132.4-231.2	270	-37.52	50.78

RDA: Recommended Dietary Allowances

An average daily nutrient intake of girls was found to be very low as compared to the RDA.These findings are endorsed by the findings of Parimalavalli and Sangeetha (2011) who revealed that the mean nutrient intake of the selected adolescent girls was less when compared with RDA.Majority of girls had calorie consumption near about 40% less than the

RDA.The mean protein intake was also found to be less (35.92 ± 4.59). Among macronutrients only mean fat intake was found to be slightly higher than the RDA (36.18 ± 4.38). Rest all the micronutrients including minerals like iron (25.11 ± 3.57) , calcium (644.33 ± 103.34), phosphorus (613.37 ± 93.71),

sodium 1361.74 ± 99.11) and potassium (1529.45±170.76) as well as vitamins namely vitamin A (540.83 ± 67.51) ,vitamin C (40.16 ± 4.04) and folic acid (168.68 ± 19.95) were found less . The results were similar to the findings of Seema Chaudhary et.al.(2010), who reported inadequate nutrient intake.

Discussion

Period of adolescence is a period of greater energy and nutrients requirements. This period is marked by rapid and continuous physical and mental changes that transform a small child into a young girl. During this period consumption of an insufficient diet can lead to slow growth. Improper diet and unsuitable food patterns can also result in diet-related chronic disease in adulthood. In our study we can see that the average daily nutrient intake of adolescent girls is very low in comparison to RDA.Very low intake of energy might be the reason for the high prevalence of underweight among these adolescent girls . Adolescent girls often lack basic health information or they have poor or less nutritional knowledge and health awareness or some taboos. As a result, their eating patterns are quite erratic and they are more vulnerable to the effects of malnutrition. But they have a positive tendency to learn more about nutrition education. Thus, an effective communication and nutrition education can play a significant role to enhance their nutritional awareness and good health.

Conclusion

The overall nutritional status of surveyed adolescent girls from Nagpur is not satisfactory. Average daily nutrient intake of adolescent girls was very less in comparison to RDA. Hence the present study reveals a high incidence of under -nutrition and dietary inadequacy in regards to energy, protein , iron and micronutrients. Result clearly shows a need for a nutrition education program for female adolescents. Target of education should be on encouraging daily breakfast consumption and pulses. Education should be provided about nutritive values of various foods and making healthy food choices. Encouragement should be given to increase their fruits and vegetable consumption.The low values for anthropometry and nutritional intake suggest that there is need for improvement in the nutritional status of these adolescents. More attention needs to be put to find a solution to adolescent girls malnutrition Various micro and macro nutrients deficiency are common nutritional problems in this age. This may give rise to different types of complications. It may be concluded that these adolescents are cognizant about nutritional awareness. If given proper knowledge to develop attitudes and practice regarding nutritional intake and dietary practices, they can easily beat these problems.

Bibliography

[1] Easwaran P.P. and Poorani R. The Indian Journal of Nutrition and Dietetics, 1991,28 , p.p 207-213.

[2] Elizabeth B. M., Developmental Psychology: A lifespan approach,5th ed.,Tata McGraw Hill 2000

[3] Sri Lakshmi B., Dietetics New Age International (P) Limited, 5th Edition, 2006.

[4] Prashant K.. & Chandan Shaw. Nutritional Status of Adolescent Girls from an Urban Slum Area in South India. Indian Journal of Pediatrics, 2009, Volume 76. DOI–10.1007/s12098–009–0077–2

[5] Kaur, J. T., Kochar, G. K., & Agarwal, T. Impact of Nutrition Education on Nutrient Adequacy of Adolescent Girls. Stud. Home Community Science, 2007, 1(1), 51-55

[6] Gaikwad Surekha Ramrao (2013). Impact of nutrition education on adolescent girls of Purna Maharashtra. Advanced Applied. Sci. Res., 4(1), 386-391

[7] Pratibha Patanwar, & K. K. N. Sharma (2013). "Nutritional status of Kurmi adolescent girls of Raipur city Chhattisgarh, India." International Journal of Scientific and Research Publications, Volume 3, Issue 11, November .

[8] Kalhan, M., Vashisht, B.M., Kumar, V, & Sharma, S., "Nutritional status of adolescent girls of rural Haryana", The Internet Journal of Epidemiology, 2010, Vol 8 (1).

[9] Sujatha K. and Kowsalya S. "Prevalence of anaemia and nutrition intervention on nutritional status of adolescent girls in rural Coimbatore."A Journal of Science & Technology, 2017, Volume 4, No.1,ISSN:2349-5456.

[10]Parimalavalli R. and Sangeetha M. "Anthropometric measurements and nutrient intake of adolescent girls." The Anthropologist,201 1;13:111-115

[11] Seema Chaudhary, C. P. Mishra and K. P. Shukla. " Dietary pattern and nutrition related knowledge of rural adolescent girls." Indian Journal of Preventive Social Medicine, 2010,Vol 41 , pp 207-215.

[12] Indian Council of Medical Research. "Reference body weight and height of children and adolescents. Nutrient requirement and recommended dietary allowances for indians",2010