

Nutritional status and lifestyle practices of adolescents girls (14-18 years)

SANJU DEVI AND MADHU GOYAL

A cross sectional study was carried out in two phases on randomly selected 300 school girls (14-18 years) studying in Government senior secondary schools of Bikaner district. An interview schedule was developed, pre tested and administered for data collection. During first phase, all subjects were assessed for their general information, anthropometric measurements and lifestyle practices. For second phase, fifty per cent (n=150) of the total subjects assessed during first phase, were identified using PPS technique, to study their TEI, TEE, energy balance and correlations between different parameters. The mean BMI (19.30 and 19.93 kg/m²), WHR (0.80±0.06 and 0.79±0.06) and MUAC (23.62±4.28 and 23.99±3.71cm) values respectively, of 14-15 and 16-18 years of the subjects were in accordance with reference values. The lifestyle practices indicated that most of the subjects spent their leisure time on mobile/internet and watching TV. They were fond of having fast foods frequently. During second phase, TEI and TEE of the subjects was determined and as per the mean values, they fell in negative energy balance status. A positive and significant correlation co-efficient was found between TEI as well as TEE of the subjects with their BMI, WC, HC, WHR, MUAC and TEE values.

Key Words : Adolescent girls, Anthropometry, Energy balance, Lifestyle practices

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INTRODUCTION

Adolescence is a journey from the world of the child to the world of the adult. It is an important stage of growth and development in the lifespan. Unique changes that occur in an individual during this period are accompanied by progressive achievement of biological maturity. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place (Patil *et al.*, 2009).

Growth and development depends on nutrition to support physiological and metabolic process of the body. During childhood and adolescence, intricate adjustments occurs involving changes in body size, shape and proportion. The nutritional needs of adolescence are unique and demand special attention. The growing of adolescence requires a high intake of energy because of their activities and an abundance of good quality protein and minerals because of their rapid growth. The need for vitamins is enhanced because of the characteristic high metabolic activity of this period in life cycle (Ghosh, 2004).

On the other hand over nutrition is mainly the problem of adults and adolescents especially in the urban dwellers. It is a rapidly escalating public nutrition problem. Principally reflecting shift in dietary patterns and more sedentary lifestyles. The rates of overweight and obesity among children worldwide have been increasing

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dramatically in the last few years (Sivakumar *et al.*, 2006).

Physical activity during adolescence takes a back seat as levels of physical activity decreases during this period (Shiely and Donncha, 2009). High use of T.V. and video among adolescents has resulted in technology based sedentary behaviour.

It must be acknowledged that adolescent is valuable human resource who will contribute substantially to the national economy, development and progress. Better the nutritional status of adolescents higher will be the nations rise because today's adolescents are tomorrow's adults. Therefore, their nutritional status and lifestyle habits are of great significance.

There is a relative scarcity of available literature on such information particularly from arid areas. Keeping this in view, present study has therefore been planned and designed to assess nutritional status and lifestyle practices of adolescent girls of Bikaner district (Rajasthan).

METHODOLOGY

The study was conducted on 14-18 years old adolescent girls studying in two randomly selected Government senior secondary schools of Bikaner district (Rajasthan).

After seeking permission and having discussion with the school authorities a list of students belonging to the age group of 14-18 years, was prepared. These students were studying in class 10th-12th standards. Out of the procured lists, 150 adolescent girls from each school, thereby making a total of 300 subjects were selected on the basis of probability proportionate to size sampling (PPS) technique. Willingness of the subjects to cooperate during the study as well as their regularity in attending the school was also taken care before selection of the subjects. The study was conducted during October, 2016 to February 2017 in two phases.

First phase of the study:

For obtaining the requisite information about all the subjects a well structured interview schedule was developed. It was pre-tested on non-sample adolescent population and required amendments were made for the actual data collection. The subjects (n=300) were categories in two age groups *i.e.* 14-15 and 16-18 years. All subjects in the both the age groups were assessed for their general information, BMI and lifestyle practices.

BMI was calculated and interpreted as per method given by WHO (2004). For lifestyle assessment activities like their total sleep duration, watching TV time, use of mobile and internet, fast food consumption and size of fast food preferred by the subjects was inquired.

Second phase of the study:

Fifty per cent of the total subjects of first phase were identified using PPS technique for second phase of the study (n=150). Their availability and willingness to cooperate frequently was also ensured. During this phase, the subjects were studied in detail for their total energy intake (TEI), total energy expenditure (TEE), energy balance and correlations between different parameters. TEI of the subjects was derived by using food composition table (Gopalan *et al.*, 2004). To calculate TEE, factorial method was used and energy balance was determined by subtracting TEE from TEI (ICMR, 2010).

Statistical analysis of the data:

Statistical analysis was carried out using SPSS software to draw meaningful interoperations. Statistical parameters used were mean percentage, standard deviation and correlation co-efficient. Correlation co-efficient was calculated between energy intake as well as energy expenditure of the subjects with their BMI, WC, HC, WHR, MUAC and TEE values.

OBSERVATIONS AND ASSESSMENT

Majority of the subjects of 14-15 (20.4%) and 16-18 (79.6%) year age group, were vegetarian, belonged to general caste, nuclear families, MIG and had educated parents. Their families were involved in business as a source of income and mothers were noted to be as home makers in majority of the cases.

Anthropometric measurements:

BMI:

BMI of the respondents was calculated based on their height and weight measurements. It can be observed from the data displayed in Table 2 that the mean BMI of the subjects belonging to 14-15 and 16-18 years age group category was found to be 19.30 and 19.93 kg/m², respectively.

The overall mean BMI of all the subjects (14-18 years) was recorded as 19.80±4.43 kg/m², which is almost in conformity with the results reported by Kankana (2016),

Table 1: Distribution of the subjects according to their demographic profile (n=300)

Sr. No.	Parameters	Subjects		Percentage	
1.	Caste				
	General	145		48.3	
	Other backward class	99		33.0	
	Scheduled caste	50		16.7	
	Scheduled tribe	6		2.0	
2.	Food habits				
	Vegetarian	261		87.0	
	Non- vegetarian	6		2.0	
	Ova vegetarian	33		11.0	
3.	Types of family				
	Joint	62		20.7	
	Nuclear	238		79.3	
4.	Income group				
	Low income group	71		23.7	
	Middle income group	213		71.0	
	High income group	16		5.3	
5.	Educational level of parents	Father	Mother	Father	Mother
	Illiterate	-	7	-	2.3
	Primary	6	45	2.0	15.0
	Secondary	13	117	4.3	39.0
	Senior secondary	160	113	53.3	37.7
	Graduate	102	16	34.0	5.3
	Post graduate	16	2	5.3	0.7
	Doctorate	3	-	1.1	-
6.	Occupation of family				
	Agriculture	31		10.3	
	Animal husbandry	9		3.0	
	Business	226		75.3	
	Service	34		11.3	
7.	Mother's occupation				
	Employed	25		8.3	
	Home maker	275		91.7	

Table 2 : Distribution of the subjects according to their BMI (Kg/M²) (n=300)

BMI classification grades	Cut-off points (kg/m ²)*	14-15 year		16-18 year		Total (14-18 years)	
		BMI (mean±SD)	No. of Ss. (n=61)	BMI (mean±SD)	No. of Ss. (n=239)	BMI (mean±SD)	No. of Ss.
Severe thinness	<16.00	15.20±1.10	13(21.3)	15.15±0.64	32(13.4)	15.16±0.79	45 (15)
Moderate thinness	16.00-16.99	16.51±0.32	10(16.4)	16.55±0.28	26(10.9)	16.54±0.28	36(12.0)
Mild thinness	17.00-18.49	17.69±0.53	12(19.7)	17.59±0.43	56(23.4)	17.61±0.45	68(22.7)
Normal range	18.50-24.99	20.25±1.84	16(26.2)	20.45±1.56	85(35.6)	20.42±1.60	101(33.7)
Pre-obese	25.00-29.99	26.18±1.33	8(13.1)	26.93±1.49	31(13.0)	26.78±1.48	39(13.0)
Obese grade I	30.00-34.99	32.7	1(1.6)	31.60±1.62	8(3.3)	32.65±2.50	9(3.0)
Obese grade II	35.00-39.99	36.1	1(1.6)	37.5	1(0.4)	36.8±0.98	2(0.7)
Overall mean		19.30±5.14		19.93±4.39		19.80±4.43	

Note: values in parenthesis indicate percentage of the subjects. Ss=subjects

*Classification devised by WHO (2004)

who also found mean BMI values as 19.44 kg/m² for 10-19 years old adolescent girls studied by them at West Bengal.

Singh and Devi (2013) and Joshi *et al.* (2014) also have studied on similar lines about nutritional status of adolescent girls and found varying data on the prevalence of under nutrition, overweight and obesity.

However, present findings regarding prevalence of under nutrition (49.7%) are close to the results reported by Hossien *et al.* (2016), who also found prevalence of under-nutrition as 51.3 per cent among literate adolescent girls of Bangladesh.

Waist and hip circumference:

The mean value for waist circumference (70.84±11.05 cm) and hip circumference (87.82± 9.05 cm) of all the subjects was noted to be as per the normal values given by WHO (2004) and Hertzerg *et al.* (1963), respectively.

Waist-hip-ratio (WHR):

The mean values of WHR (0.79±.06-0.8±.06) for the subjects belonging to 14-15 and 16-18 years age group fell in normal category (<0.80) suggested by WHO (2004). Kowsayla and Parimalavalli (2014) also

Table 3 : Distribution of the subjects according to their anthropometric indices

(n=300)

Anthropometric indices	Reference values	n=61 (14-15 years)			n=239 (16-18 years)			Overall		
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
*Waist circumference (cm)	Normal	<80	69.40±11.99	71.03±11.38	70.84 ±11.05					
**Hip circumference (cm)	Narrow hips	≤93.0	86.43±9.90	88.18±9.03	87.82± 9.05					
*Waist hip-ratio	Normal	<0.8	0.79±.06	0.8±.06	0.80±0.06					
**MUAC (cm)	High	≥23.2	23.62±4.28	23.99±3.71	23.92±3.79					

*Classification devised by WHO (2004)

**Classification devised by Hertzerg *et al.* (1963)

Table 4 : Distribution of the subjects according to their daily leisure time activities

(n= 300)

Sr. No.	Leisure activities	Number of subjects		
		14-15 year (n=61)	16-18 years (n=239)	Total
1.	Sleep duration			
	7-8 hours	28(45.9)	71(29.7)	99(33.0)
	9-10 hours	33(54.1)	168(70.3)	201(67.0)
2.	Watching TV time			
	1-2 hours	31 (50.8)	143 (59.8)	174(58.0)
	3-4 hours	14 (23.0)	27 (11.3)	41(13.7)
	4-5 hours	Nil	3 (1.3)	(1.0)
	Not fixed	7 (11.5)	49 (20.5)	56(18.7)
	Rarely	9 (14.8)	17 (7.1)	26(8.7)
3.	Use of mobile and internet			
	1-2 hours	41 (67.21)	170 (71.12)	211 (70.33)
	3-4 hours	7 (11.47)	21 (8.78)	28(9.33)
	Not fixed	8 (13.11)	39 (16.31)	47 (15.66)
	Rarely	5 (8.19)	9 (3.76)	14 (4.66)
4.	Fast food consumption			
	Rarely	6(9.83)	12(5.02)	18(6.0)
	Once	14(22.95)	30(12.55)	44(14.7)
	Twice	16 (26.22)	55(23.01)	71 (23.7)
	Thrice	20 (32.78)	114 (47.69)	134 (44.66)
	>Four times	5(8.19)	28(11.71))	33(11.0)
5.	Size of fast food preferred			
	Large	11(18.0)	43(18.0)	54(18.0)
	Regular	37(60.7)	158(66.1)	195(65.0)
	Small	13(21.3)	38(15.9)	51(17.0)

Note: Values in parenthesis indicate percentage of the subjects

conducted a study on similar lines at Tamil Nadu but found little higher values (0.88-0.97) of WHR, may be due to variations in dietary habits.

Mid upper arm circumference (MUAC):

During present study, the mean value of MUAC (23.92±3.79cm) of all the subjects was also found to be falling in normal category as suggested by Hertzberg *et al.* (1963).

Lifestyle practices:

Leisure time activities:

Table 4 demonstrates the time spent every day by the subjects on various leisure time activities. Majority (67.0 %) of the subjects in both the age groups had a habit of sleeping for mean 9-10 hours.

The table clearly reveals that all the subjects of the study were viewing TV for varying time period. Majority of them viewed it for 1-2 hours. Akin to present finding, Musaiger *et al.* (2011) and Chauhan *et al.* (2014) have also reported that watching TV is almost common leisure time activity for the adolescents. It is clearly evident that all the subjects were using mobile with internet although with varying time durations *i.e.* 1-2 hours (70.33%).

Majority of the subjects (44.66 %) were eating the fast foods thrice followed by twice (23.4 %), once (14.7 %) or more than four times (11.0 %) a week. The portion

size of the fast food preferred by the subjects has also been indicated in the table. Majority of them (65.0 %) had a preference for regular sized fast foods as compared to small or large sized portions. Fast food consumption pattern of adolescents was also studied by Musaiger *et al.* (2011) and they had also reported that most of the subjects under their study preferred to have regular sized fast food.

When energy intake is equal to its expenditure, the body is said to be in energy balance. When intake is more than its expenditure the person may suffer from overweight or obesity. Similarly, if energy expenditure exceeds its intake the result is underweight. Therefore, during present study energy balance status of the subjects (n=150) was assessed.

The TEI of the subjects was found to be 22.4-22.76 per cent lower than the RDA (2330-2440 kcal) given by ICMR (2010) for 14-18 years age group. It could be due to relative low intake of energy providing foods in their diets.

During present study, TEE of the subjects exceeded their TEI, their by they fell in negative energy balance. Data in Table 2 also reveals that majority of the subjects (49.7%) were underweight may be due to their negative energy balance status.

Alike present findings Monika *et al.* (2017) also had observed negative energy balance although for adult PG

Table 5 : Energy balance of the subjects

Age groups	TEI (Mean± SD kcal)	TEE (Mean ± SD kcal)	Energy balance (kcal)
14-15 years (n=33)	1828.98 ± 386.12	2027.34±267.89	-198.36
16-18 years (n=117)	1884.75 ± 414.77	2098.91±257.98	-214.16

TEI-Total energy intake, TEE-Total energy expenditure

Table 6 : Correlation of the anthropometric measurements with energy intake and expenditure of the subjects (n=150)

Age groups	Parameters for correlation	Energy intake of the subjects	Energy expenditure of the subjects
14-15 years (n=33)	BMI	0.810**	0.901**
	WC	0.756**	0.845**
	HC	0.774**	0.891**
	WHR	0.494**	0.502**
	MUCA	0.740**	0.820**
	TEE	0.739**	-
16-18 years (n=117)	BMI	0.867**	0.932**
	WC	0.802**	0.866**
	HC	0.796**	0.903**
	WHR	0.538**	0.512**
	MUCA	0.759**	0.804**
	TEE	0.804**	-

Note: **indicates significance of value at P=0.01

BMI-Body mass index, WC-Waist circumference, HC- Hip circumference, WHR-Waist-Hip-Ratio, MUCA- Mid upper arm circumference
TEE- Total energy expenditure

hostel girls of Jaipur (Rajasthan).

Correlation co-efficient between anthropometric measurements with energy intake and expenditure:

Table 6 reveals correlation of energy intake as well as energy expenditure of the subjects with their BMI, WC, HC, WHR, MUCA and TEE values. The correlation was found to be positive and significant for both the age groups of the subjects. Similarly, Bandini *et al.* (2004) observed a positive relation between BMI and TEE ($p < 0.05$) while conducting a baseline study on girls (8-12 years) of England.

The relation between daily total energy intake and BMI of girls (12-15 years) was also found to be significant ($p < 0.01$) by Kucukkomurler and Istik (2016), while studying energy intake, energy dispersion and body mass index interaction in adolescents of Istanbul, Turkey.

Conclusion :

It can be concluded that although the mean BMI, WHR and MUAC of the subjects was as per reference values but perceivable number of them were either under weight or overweight/obese. At the same time their life style practices showed a scope for promotion of healthy nutrition habits and physically active life style.

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