

A STUDY OF NUTRITIONAL AND HEALTH STATUS OF ADOLESCENT GIRLS (10-19 YEARS) IN JAIPUR CITY

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ABSTRACT: Adolescence is a time when the body prepares itself for the nutritional demands of pregnancy, lactation and heavy workloads that girls will soon experience. Good nutrition is essential for good health, physical growth and development, body composition and mental development. In recent years, the incidence of adolescent pregnancy and childbirth is increasing due to the early onset of puberty, the declining age of menarche and early sexual activity. They need to learn to cope with the future demands of life. Nutritional needs during adolescence are increased because of the increased growth rate and changes in the body composition associated with puberty. The dramatic increase in energy and nutrient requirements coincides with other factors that may affect adolescents' food choices and nutrient intake and thus nutritional status. National and population based surveys have found that adolescents often fail to meet dietary recommendations for overall nutritional status and for specific nutrient intakes. Nutritional requirements in relation to body size are more during adolescence. In a country like India with varying social customs and common beliefs against females there is a high prevalence of malnutrition amongst girls. Adolescents are tomorrow's adult population and their health and well-being are crucial. Yet, interest in adolescents' health is relatively recent and a focus on nutrition is even more recent. Nutrition influences growth and development throughout infancy, childhood and adolescence; it is, however, during the period of adolescence that nutrient needs are the greatest. A questionnaire-based study was undertaken in Jaipur city of Rajasthan with 500 respondents divided equally between government schools and private schools populations. Adolescent girl is subjected to more physical and mental challenges on a day-to-day basis due to ever increasing pressure of modernization. Hence they have to work hard physically as well as mentally. Thus we found it important to study the nutritional and health status of adolescent girls.

KEYWORDS: Adolescence, Nutrition, Health Status, Puberty, Teenage pregnancy, Eating habits.

INTRODUCTION: Adolescence, a period of transition between childhood and adulthood, occupies a crucial position in life of human beings.¹ Poor nutrition starts before birth and generally continues into adolescence and adult life and can span generations, chronically malnourished girls are more likely to remain undernourished during adolescence and adulthood and when pregnant are more likely to deliver low birth weight babies. Thus nutrition challenges continue throughout life cycle particularly for girls.² India has the largest population of adolescents in the world being home to 243 million individuals aged 10-19 years. The country's adolescents constituted 20 percent of the world's 1.2 billion adolescents.³ Fast food culture is an emerging trend among the younger generation. The ready availability, taste, low cost, marketing strategies and peer pressure make them popular with

ORIGINAL ARTICLE

children and adolescents.⁴ Adolescence is a fascinating period of life that marks the transition from being a dependent child to becoming an independently functioning adult. The changes that occur in adolescence are⁵

- Biological development (body size and shape)
- Cognitive development
- Self-concept and self esteem
- Sexuality and morality
- Relationship with family, peers and society.

Studies on diet surveys have shown that the diets of adolescent population are inadequate when compared to recommended standards.⁶ The common causes are less access to healthy food, easily available junk food and inadequate knowledge about dietary requirements.⁷ In our study the

Nutritional status include:

- UNDERNUTRITION, OVERWEIGHT AND OBESITY,
- EATING HABITS, CALORIES CONSUMPTION, BREAKFAST SKIPPING AND FAST FOOD CONSUMPTION,
- NUTRITIONAL DEFICIENCIES AND ANEMIA.

Health status includes:

- PHYSICAL ACTIVITY AND ENTERTAINMENT,
- TEENAGE PREGNANCY AND CONTRACEPTION,
- PUBERTAL CHANGES,
- BODY IMAGE,
- PERSONAL HYGIENE, SKIN AND HEALTH PROBLEMS: Menstrual, Skin disorder- Acne and other cosmetic problems.

The needs of adolescents have not been given due priority in policy and programs in our country. So we covered all these aspects about adolescents.

MATERIAL & METHODS: This study entitled “A study of Nutritional and Health status of adolescent girls (10-19 years) in Jaipur City” was undertaken in Jaipur city of Rajasthan. Jaipur is the capital city of Rajasthan with female population of 3, 157, 671 and Rajasthan make 21.8 percent of total female population.⁸ The sample size for this study was 500 respondents divided equally between government schools and private schools populations. This study was a questionnaire-based study.

DATA COLLECTION: The girls were briefed about the study by researcher. Pre-formed questionnaire was given to each respondent which comprised of 4 sections, namely General information, family background, personal (physical activity, marriage and sex, puberty and personal hygiene, studies and entertainment and eating habits), and clinical Examination.

Sexual development mainly breast and pubic hair development and menarche was staged according to Tanner Staging for sexual development.⁹ Socioeconomic status was classified using modified Kuppaswamy's Socioeconomic Scale: upper (I), upper-middle (II), lower-middle (III), upper-lower (IV) and lower (V)¹⁰

ORIGINAL ARTICLE

Body Mass Index was calculated by standard calculation.³

$$\text{BMI} = \frac{\text{wt(kg)}}{\text{Ht (m}^2\text{)}} \times 100$$

BMI > 85th centile = overweight (BMI =25- 29.99)
 > 95th centile = obese (BMI>30)
 < 85th centile = normal (BMI= 18.5-24.99)

Adolescents with BMI values less than 18.5 were considered to be suffering from chronic energy deficiency (CED). The CED was further classified into various degrees: first (17-18.5), second (16-17) and third (below 16).¹¹ Dietary intake was assessed by 24-hr recall method using a questionnaire. The nutrient intake was calculated using tables of Nutritive Value of Indian foods.¹²

Statistical Analysis: Descriptive and inferential statistical analysis been carried out in the present study. Results on categorical measurements are presented in Number (%). Significance is assessed at 5% confidence limits into (No significance, significant and strongly significant) different levels of significance.¹³

Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS: The students were grouped under early (10-13), middle (14-16) and late (17-19) adolescence.

Table 1 shows the socioeconomic status of respondents' families as per modified Kuppuswamy Socioeconomic status (SES) classes. It shows that higher SES has frequently observed in private schools. All these observations were significant. There were no families in SES Class V.

Socioeconomic status	Government school (n=250)		Private School (n=250)		Total		P-Value
	No	%	No	%	No	%	
Upper I	0	0.0	104	41.6	104	20.8	-
Upper middle II	51	20.4	126	50.4	177	35.4	<0.001**
Lower middle III	45	18.0	20	8.0	65	13.0	<0.05*
Upper lower IV	154	61.6	0	0.0	154	30.8	-
Lower V	0	0.0	0	0.0	0	0.0	-
Total	250	100.0	250	100.0	500	100.0	-

Table 1: Distribution of Socio-Economic Status (Kuppuswamy) of families of respondent

(p value; *=significant, **= highly significant)

ORIGINAL ARTICLE

Time Spent in	Government School (n=250)		Private School (n=250)		Total (n=500)		P-Value
	No	%	No	%	No	%	
Hours spent in physical activity							
<2h	95	38.0	71	28.4	166	33.2	0.022*
2-4h	26	10.4	48	19.2	74	14.8	0.005**
>4h	2	0.8	4	1.6	6	1.2	0.411
<3d/w	75	30.0	75	30.0	150	30.0	1.000
>3d/w	52	20.8	52	20.8	104	20.8	1.000
Study time (hrs.)							
<2	125	50.0	125	50.0	250	50.0	1.000
>2	75	30.0	75	30.0	150	30.0	1.000
>4	50	20.0	50	20.0	100	20.0	1.000
Internet surfing/TV (hrs.)							
<2	185	74.0	150	60.0	335	67.0	0.001**
2-4	55	22.0	75	30.0	130	26.0	0.041*
>4	10	4.0	25	10.0	35	7.0	0.008**
House work							
No	50	20.0	200	80.0	250	50.0	<0.000**
Yes	200	80.0	50	20.0	250	50.0	

Table 2: Time spent on physical activities, studies, internet surfing and movies

Marriage & Sex	Government school (n=250)		Private school (n=250)		Total		P-Value
	No	%	No	%	No	%	
Marital Status							
Unmarried	250	100.0	250	100.0	500	100.0	1.000
Married	0	0.0	0	0.0	0	0.0	-
Sexual exp.							
No	194	77.6	188	75.2	382	76.4	0.5168
Yes	56	22.4	62	24.8	118	23.6	0.5274
Consent							
NR	190	77.0	185	75.0	375	76.8	-
Yes	60	23.0	65	25.0	125	23.2	0.5249
Contraceptive methods							
NR	195	78.0	188	75.2	383	76.6	-
Yes	55	22.0	62	24.8	117	23.4	0.5249
What contraceptives (Multiple answers)							
Pills	2	0.8	6	2.4	8	1.6	0.3311
Condoms	53	21.2	56	22.4	109	21.8	0.745
NR	195	78	188	75.2	383	76.6	-

Table 3: Showing marital status and involvement in the sexual activity

ORIGINAL ARTICLE

Breast development	Government school (n=250)		Private school (n=250)		Total		P value
	No.	%	No.	%	No.	%	
10.01-11.00	2	0.8	45	18	47	9.4	<0.001**
11.01-12.00	18	7.2	94	37.6	112	22.4	<0.001**
12.01-13.00	76	30.4	56	22.4	132	26.4	<0.05*
13.01-14.00	154	61.6	55	22	209	41.8	<0.001**
Total	250	100	250	100	500	100	

Table 4: Distribution of cases by age of attainment of tanner stage II breast development

Menarche (in years)	Government school (n=250)		Private school (n=250)		Total		P value
	No.	%	No.	%	No.	%	
10.01-11.00	66	26.4	60	24	126	25.2	0.014*
11.01-12.00	107	42.8	140	56	247	49.4	0.018*
12.01-13.00	21	8.4	15	6	36	7.2	0.311
13.01-14.00	56	22.4	35	14	91	18.2	0.078
Total	250	100	250	100	500	100	

Table 5: Distribution of age of onset of menarche

Personal Hygiene	Government school (n=250)		Private school (n=250)		Total		P-Value
Use in menses							
Cloth	16	6.4	0	0	16	3.2	0.0001**
Sanitary napkins	234	93.6	250	100.0	484	96.8	
How often Hand wash (multiple answers)							
After household work	27	10.8	60	24	87	17.4	0.0001**
Before meals	57	22.8	80	32	137	27.4	0.0211*
After toilet	250	100	250	100	500	100	1.0000
Clean and cut nails							
<1/Week	210	84.0	6	2.4	216	43.2	<0.000**
>1/Week	40	16.0	244	97.6	284	56.8	

Table No. 6 Shows various items of personal hygiene of respondents

ORIGINAL ARTICLE

Eating Habits & Body image	Government School (n=250)		Private School (n=250)		Total (n=500)		P-Value
	No	%	No	%	No	%	
Conscious of Looks							
No	100	40.0	56	22.4	156	31.2	0.7824
Yes	150	60.0	194	77.6	344	68.8	0.0002**
Eat outside							
No	12	4.8	12	4.8	24	4.8	0.9521
Yes	238	95.2	238	95.2	476	95.2	1.0000
What you eat more							
Fast food	128	51.2	172	68.8	300	60.0	0.0001**
Street food	119	47.6	72	28.8	191	38.2	0.0001**
NR	3	1.2	6	2.4	9	1.8	-
Dieting							
No	247	98.8	245	98.0	492	98.4	0.4760
Yes	3	1.2	5	2.0	8	1.6	

Table 7: Eating habits and body image of respondents

BMI	Government school (n=250)		Private school (n=250)		Total		P value
	No.	%	No.	%	No.	%	
Normal (BMI=18.5-24.99)	121	48.4	117	46.8	238	47.6	0.054
Under weight (BMI<18.5)	51	20.4	10	4	61	12.2	0.001**
Over weight (BMI=25-29.99)	78	31.2	112	44.8	190	38	<0.001**
Obese (BMI>30)	0	0	11	4.4	11	2.2	-
Total	250	100	250	100	500	100	

Table 8: Distribution of Body Mass Index of the respondents

	Government school (n=250)		Private school (n=250)		Total (500)		P-Value
	No	%	No	%	No	%	
Pallor	No	%	No	%	No	%	
Absent	100	40.0	170	68.0	270	54.0	0.4271
Present	150	60.0	80	32.0	230	46.0	<0.000**
Signs of Vit. A deficiency							
No	243	97.2	250	100.0	493	98.6	0.007*
Yes	7	2.8	-	-	7	1.4	

Table 9: Shows Results of Clinical Examination

ORIGINAL ARTICLE

DISCUSSION: The average age of the respondents was 15.20±2.60 years in government School and 15.28±2.53 years in private school. A study by Chaturvedi et al¹⁴ showed mean age of adolescent girls of rural Rajasthan was 12.9±3.0 years. The difference in mean age in various studies may vary because of social and cultural practice of putting girls into schools as prevalent in that area and the nature of study conducted. In our study we selected schools from Jaipur city which is mainly urban in nature and girls are put to school at the early age. The socioeconomic divide was defined by the parents' occupation, Education, ownership of house and monthly income all combined and categorised according to modified Kuppaswamy classification. In the present study, 230 were from upper and upper middle (class I and class II SES) from private school in contrast to all cases from government school from class II, III and IV. In a study by Prashant et al², of 223 adolescents subjects were in the age group of 12-14 years, maximum girls belonged to social class III (30.5%) and class IV (32.7%) and 67.7% belonged to large family size with more than 5 members. In a study by Shahabuddin et al¹⁶ the mean size of each household was 6.7 persons. In our study we found that 62.8% of both the groups belonged to joint family. In the study by Chaturvedi et al¹⁴ showed majority of girls (60.3%) belonged to the joint family system.

The incidence of obesity and hypertension in our study is higher and similar findings in study by Shahabuddin et al¹⁶ perhaps reflect inclusion of girls from higher socioeconomic status particularly of private schools. Our study found 2.4% had history of any other chronic illness in them. In a study by Chaturvedi et al¹⁴ there was history 6.59 % of chronic illness in the girls.

We found physical activity was not a popular pastime in both the groups as majority spent less than 2 hours in physical activity. The study highlights the fact that physical activity is reduced among adolescents. A study conducted in Hyderabad¹⁷ in 2003 also analysed the role of physical activity amongst adolescents that the prevalence of overweight and obesity among students who participated in physical activity was 3.1% while among non-participants the prevalence of obesity and overweight was 9.7%. As much as 50% girls were contributing to household work. As far as studies are concerned 50% respondents from both spent less than 2 hours in studying and only 20% spent from both spent >4 hours in studying. We found that in a study relationship between TV viewing time, playing with peers and studying reported TV viewing leads to less time spent with peers and family.¹⁸ Time of going to bed and getting up in morning also had association with TV viewing and content, ultimately leading to poor school performance, adverse health outcome and sexual promiscuity.¹⁹ Further, daytime sleeping also had adverse effect on emergence of overweight and obesity as it leads to less physical activity.

MARITAL STATUS, INVOLVEMENT IN THE SEXUAL ACTIVITY AND CONTRACEPTION:

In our study all respondents were school going and were below 19 years and found none of them married but 24.6% were in relationship with boys and 23.6% had a sexual experience. In a study in USA 84% respondents had friends in relationship with boys.²⁰ In the United States of America, approximately 47% of the adolescent school going girls have admittedly had sexual relationship.²⁰ We found that 23.4% had indulged in sexual intercourse used contraceptive. As to the type of contraception use, 21.8% used condom as compared 1.6% used pills as contraceptive. A study in Kashmir, showed that 46% of the respondents had knowledge of condoms as a contraceptive measure and it appeared to be their most favoured contraceptive.²¹ Patel et al,²² in her study conducted in the slums of Ahmedabad on adolescent population, found in their study, 68% of

ORIGINAL ARTICLE

adolescents knew about contraceptive methods for family planning. According to NFHS-II, use of contraception among adolescents in India is very low; only 13.4% use any method including traditional methods of contraception. In our study however the use of contraception was 100% indicating that the information about these products, print and audio visual media is overwhelming and is available to everyone. Thus today's girls are informed and ready to accept contraception.

PUBERTY: Breast development in the respondents was 13.21 ± 0.58 years and 11.97 ± 0.72 years and pubic hair development was 13.17 ± 0.76 years and 13.12 ± 0.76 years respectively, both of these observations were significant. This data highlights the role of socioeconomic conditions and nutritional conditions on the time of puberty. With urbanization there is a sharp rise in the sedentary lifestyle and obesity, leading to increased energy availability and body size which are found to be important contributors to early sexual maturity. In the average girl, the growth spurt peak at 11.5 yr. at a top velocity of 8.3 cm per year and then slows to a stop at 16 year.⁹ However from studies in America it is clear that the mean age of pubic hair tanner stage II was 11.0 ± 1.1 years in year 1948 has now been advanced to 10.6 in whites and 9.5 in African-Americans in year 2002.⁹

Menarche: In the current study, the mean age for menarche in both the groups was 11.27 ± 0.72 years in girls from government school and 11.75 ± 0.57 years in girls from private schools. A study by Chaturvedi et al¹⁴ in Rajasthan showed mean age of adolescent girls of rural Rajasthan was 13.7 ± 3.6 years. In another study on adolescent Nutrition in Bangladesh reported the mean age of menarche was 13 years.¹⁶ In USA the age of menarche was 13.47 ± 1.02 years in year 1969 which has been advanced to in whites 12.82 years, African-Americans 12.48 years in the year 2003.⁹ It may be pointed out that nutritional status has role on menarche. Delayed menarche may be a sign of malnutrition; as nutritional status improves, the age at menarche is lowered.^{23,9}

EATING HABITS AND BODY IMAGE: For adolescents skipping breakfast at home, fast food comes handy in school. Junk foods are widely available in schools through variety of outlets. In our study we found 68.8% girls were conscious of their looks. Field, et al²⁴ observed that the majority of the preadolescents and adolescents girls in their school based study were unhappy with their body weight and shape. It seems that the present generation of adolescents are exposed to print and audio – visual media, movies, peers in their schools have significant effects on their thought process. Eating out is very common now-a-days as 95.2% girls eat outside in both the groups. A positive correlation of increased fast food consumption, skipped breakfast and increased body mass index was found among adolescents in other studies.²⁵ Children from high socio-economic status preferred fast foods to traditional foods despite their better nutritional knowledge.²⁶ Junk food famous in adolescents as 60% eat fast food and 38.2% eat street food. Consumption of fast food among children and adolescents seems to have an adverse effect on dietary quality in ways that possibly could increase the risk for obesity⁴. Fast food has high level of fat and sugars that are not only unhealthy but addictive and that creates a vicious cycle making it hard for children to choose healthy food. The micronutrient content (carotene, vitamin A, vitamin C) of the fast food is also low. Low level of calcium and magnesium in the diet can contribute to osteoporosis. Diets rich in free sugars can lead to increased risk of dental caries.²⁷ We also found 30% skip their breakfast; 1.6% diet to remain fit. Eating breakfast provides energy for the brain and improves learning. Regular breakfast eating habit

and weight for age percent were significantly associated with immediate memory recall. NS Gajre et al²⁸ conducted a study on the relationship of breakfast to the attention-concentration, immediate recall memory, nutritional status and academic achievement of school children and found regular breakfast group achieving the highest mean scores compared to the no breakfast group and it is significantly associated with nutrition.

CALORIES CONSUMPTION AND BMI: When the nutrient intake of the subjects was compared with ICMR's Recommended Dietary Allowance. It was found that the calorie intake was deficient by 61.4%; this could be due to inadequate intake of food. We also found 9.2% girls were consuming excess calories than required for their age. In the present study 20.4% from government school and 4% from private school suffered from first degree of CED. In a study by Chaturvedi et al¹⁴ from Rajasthan 8.07% of adolescents suffered from first degree of CED and the diet of adolescent girls was deficient in calories. We found 12.2% girls were underweight (BMI<18.5), 38% were overweight (BMI =23-29.99) and 2.2% girls were obese (BMI >30).

Obesity is problematic among adolescents in large cities of India, like Delhi. About 1 in every 4 (>25%) students enrolled are overweight or obese. BMI is an age independent anthropometric criteria. In an another study prevalence of underweight was found to be 42.6% and 22.9% as per NCHS and Indian standards respectively.²

PERSONAL HYGIENE, CLINICAL PROBLEMS AND NUTRITIONAL DEFICIENCIES: In this study we found 3.2% girls use cloth as menstrual absorbent and 96.8% used sanitary napkin as menstrual absorbent. But in an another study by Dasgupta et al shows that majority of the girls preferred cloth pieces rather than sanitary pads as menstrual absorbent, Only 11.25% girls used sanitary pads during menstruation.²⁹ Apparently, poverty, high cost of disposable sanitary pads and to some extent ignorance dissuaded the study population from using the menstrual absorbents available in the market. Hand washing, cleaning and cutting of the nails is considered an important factor in maintaining personal hygiene. We examined the girls and found clinically pallor was present in 46% girls. This shows how common anaemia is present in adolescent girls. Similarly, In a study from North India it was reported that the overall prevalence of anemia in girls of this age group was 48%.¹In an another study by Shahabuddin et al 95% of girls were anemic in Bangladesh.¹⁶ We also found signs of vitamin A deficiency in 1.4% girls. Educational television programmes, trained school nurses /health personnel, motivated school teachers and knowledgeable parents can play a very important role in transmitting the vital message of correct menstrual hygiene and nutritional importance to the adolescent girls of today.

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