An Epidemiological Study of Malnutrition and Its Associated Factors in School Going Adolescents of District Ghaziabad, Uttar Pradesh

Dr. Kumar Gunjan[1], Dr. Vimal Arya[*2], Dr. R K Arya[3]

[1]Assistant Professor, Venkateshwara institute of Medical Science, Hapur
[2]Assistant Professor, MLB Medical College, Jhansi
[3]Professor and Head, Santosh Medical College, Ghaziabad

Abstract

Introduction: *Today, the world faces double burden of malnutrition that includes both under nutrition and overweight, especially in developing countries. Malnutrition, especially in adolescent and young women, not only effects the growth and development in this generation but also in the next. This study has been designed with the objectives to assess the nutritional status and various socio-demographic variables in the adolescent population and their association with nutritional status of the adolescents in Ghaziabad, Uttar Pradesh.* **Material and Methods:** *The study was carried out during November 2013 to October 2014 in higher secondary schools in urban area of district Ghaziabad by Department of Community Medicine, Santosh Medical College, Ghaziabad. Multistage sampling technique was used. 50 subjects from each school were questioned with self-administered well-designed pre-tested and close-ended questionnaire. Data was coded and transferred to a master chart and simple and association tables were prepared and analysed with appropriate statistical tests like Chi-square test with Yates correction.* **Results:** *It was found that out of the total 550 adolescents, the majority of the adolescents (64%) were male while females added up to 36% of the total. The association between age and nutritional status of adolescents was statistically insignificant. The association between socio-economic status and nutritional status of adolescents was statistically insignificant.*

Keywords: *Malnutrition, Adolescents, Overweight,*

Introduction

The term adolescence is derived from the Latin word 'adolescere'; meaning "to grow, to mature". It has been defined by the World Health Organization (WHO) as the period of life from 10 to 19 years and is characterized by rapid physical growth, significant emotional, psychological and spiritual changes; and evolving personal relationships. One in every five people in the world is an adolescent and 85% of them live in developing countries.[1,2]

According to the WHO Health Report (2006) many low and middle income countries are now facing a "double burden" of disease. Malnutrition in India is not a child specific problem. It is prevalent in every age group and in every group it has an adverse effect through a greater susceptibility to infections, through increased morbidity and mortality, through decreased productivity and through a lesser quality of life. Malnutrition, especially in adolescent and young women, not only effects the growth and development in this generation but also in the next.

With the overall objective of creating awareness and increasing knowledge of the students on diet and nutritional habits, the present study will be conducted. This study on malnutrition and its associated factors in school going adolescents of District Ghaziabad, Uttar Pradesh has been designed with the following objectives:

I   To assess the nutritional status of school going adolescent age group in urban area of district Ghaziabad.
II   To study the various socio-demographic variables in the adolescent population and their association with nutritional status of the adolescents.

Material and Methods

Location: The district Ghaziabad is situated in the middle of the flat alluvial tract between the Ganges River and Yamuna River. The District statistical book informs that there are 676 basic senior high schools and 159 higher secondary schools. [3]

Organization of Study: Santosh Medical College, Ghaziabad

Place of Work: The study was carried out in higher secondary schools in urban area of district Ghaziabad.

International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 03 Issue 02 February 2018, ISSN No. - 2455-8737
Available online at - www.ijirms.in

Study Design: School based epidemiological study

Sample Size: According to NFHS-3 and several other studies conducted in India by World Health Organization and the World Bank[4,5], the prevalence of malnutrition is 42%.

The sample size was calculated by the formula (n = Z.Z.P.Q/L.L)

Sample Size (n)=4*42*58/4.2*4.2 =552.38

n is the desired sample size, p is prevalence of malnutrition among adolescents in India= 42, q = (100-p), l = 10%

Substituting all the values we get sample size (n) = 552

Methodology

Sampling Technique: Multistage sampling technique

Stage 1: A list of all the higher secondary schools located in urban area of District Ghaziabad was prepared. For convenient access to the schools in the course of the study, the schools located within 12 kilometres of Santosh Medical College and Hospital was shortlisted. Out of these schools, 11 schools were selected by Simple Random Sampling. Stage 2: One section was randomly selected from each of the classes (VIth to Xth). The first ten students who consented were then selected from each of these sections. In this manner, 50 students were selected from each of the 11 schools.

Study Population: All the school going adolescents in Ghaziabad district

Study Unit: All adolescents in age group of 11-15 years in higher secondary schools in urban areas of Ghaziabad district. A set of schedule was used for the study.

Study Period: November 2013 to October 2014

Data Collection and Analysis: A pilot study was carried out to test the study schedule and necessary changes were made before starting the actual study. The selected schools were visited and the respondents were carefully briefed about the purpose of the study with a written consent so as to get full co-operation in conducting the study. These 50 subjects from each school were questioned with self-administered well-designed pre-tested and close-ended questionnaire with prior permission from the Head of the school. Data was coded and transferred to a master chart and simple and association tables were prepared and analysed with appropriate statistical tests like Chi-square test with Yates correction wherever necessary.

Result:

Table 1: Age and gender wise distribution of study subjects.

Age	Male (N=352)	Female (N=198)	Total (N=550)
	N (%)	N (%)	N (%)
11 yrs. (n=78)	62(79.49)	16(20.51)	78(100)
12 yrs. (n=116)	73(62.93)	43(37.07)	116(100)
13 yrs. (n=133)	81(60.91)	52(39.09)	133(100)
14 yrs. (n=121)	69(57.02)	52(42.97)	121(100)
15 yrs. (n=102)	67(65.68)	35(34.31)	102(100)
Total	352(64)	198(36)	550(100)

N.B.: Numbers in parenthesis indicate row wise percentage

It was found that out of the total 550 adolescents, the majority of the adolescents (64%) were male while females added up to 36% of the total. According to the table, majority of the adolescents were 13 years old. Among the 11 year olds, 79.49% were males and 20.51% were females. Among the 12 year olds, 62.93% were males while 37.07% were females. Out of the 13 year olds, 60.91% were males and 39.09% were females. Among the 14 year olds, 57.02% were males and 42.97% were females. Among the 15 year olds, 65.68% were males while 34.31% were females.

Table 2: Distribution of study subjects according to their religion, caste and socio-economic status

	Total (N=550)	
	N	(%)
Religion		
Hindu	389	70.72
Muslim	98	17.81
Sikh	46	8.36
Christian	17	3.09
Caste		
General	272	49.45

International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 03 Issue 02 February 2018, ISSN No. - 2455-8737
Available online at - www.ijirms.in

SC	25	4.54
ST	13	2.36
OBC	240	43.63
Socio-economic status*		
I	99	18
II	185	33.63
III	195	35.45
IV	71	12.9

(According to Kuppuswamy's socioeconomic status scoring)

As per table 2 above, the majority of adolescents (70.72%) were Hindus, followed by Muslims (17.81%), Sikh (8.36%) and Christians (3.09%). The second table shows that the majority of adolescents belonged to general category (49.45%) followed by other backward classes (43.63%). 4.54% adolescents belonged to the scheduled caste category and 2.36% belonged to scheduled tribe category. Majority of the adolescents (35.45%) belonged to SES III, followed by SES II (33.63%) and SES I (18%). 12.9% adolescents belonged to SES IV.

It was seen that among the 11 year olds, 60.25% adolescents had normal BMI and 28.2% were overweight or obese. Among the 12 year olds, 60.34% adolescents had normal BMI and 28.44% were overweight and obese. Similarly, the above table shows that majority of the adolescents in every age group had normal BMI for age, followed by those who were overweight or obese. The association between age and nutritional status of adolescents was statistically insignificant **[0.763, 8, p>0.05]**.
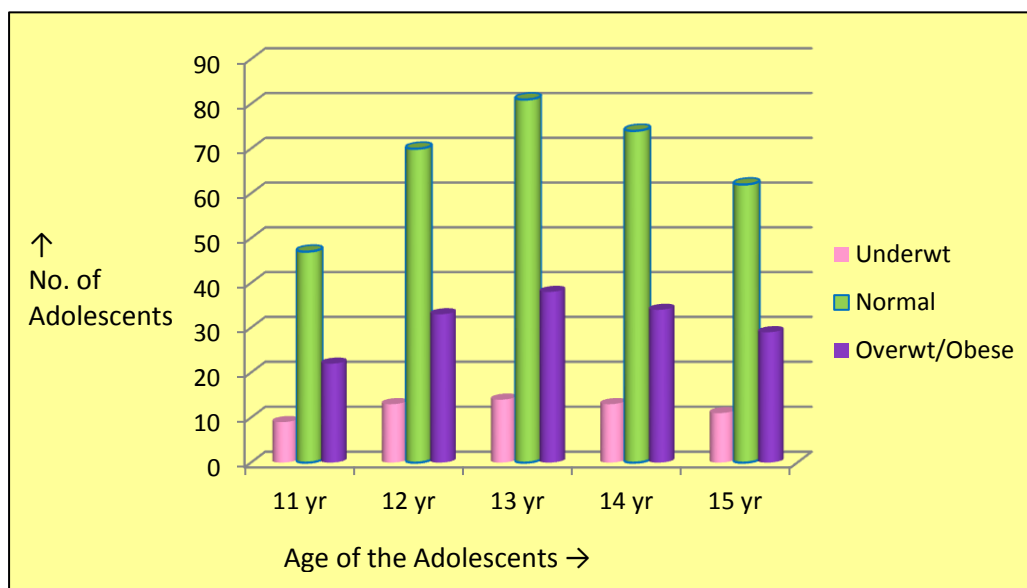

Figure1: Bar Diagram showing Distribution of Adolescents According to Age and Nutritional Status

It was seen that among the Hindu adolescents, 60.66% adolescents had normal BMI and 28.27% were overweight or obese. Among the Muslim adolescents, 60.2% adolescents had normal BMI and 28.57% were overweight and obese. Similarly, the above table shows that majority of the adolescents, whether Sikh or Christian, had normal BMI for age, followed by those who were overweight or obese. The association between religion and nutritional status of adolescents was statistically insignificant **[0.323, 6, p>0.05]**.

It was seen that among the adolescents who belonged to general category, 60.66% adolescents had normal BMI and 28.3% were overweight or obese. Among the adolescents who belonged to other backward classes, 60.83% adolescents had normal BMI and 28.33% were overweight

and obese. Similarly, the above table shows that majority of the adolescents, whether SC or ST, had normal BMI for age. The association between caste and nutritional status of adolescents was statistically insignificant **[0.188, 6, p> 0.05]**.

It was seen that among the adolescents who belonged to SES I, 60.6% adolescents had normal BMI and 28.28% were overweight or obese. Among the adolescents who belonged to SES II, 60.54% adolescents had normal BMI and 28.64% were overweight and obese. Similarly, the above table shows that majority of the adolescents, whether SES III or IV, had normal BMI for age. The association between socio-economic status and nutritional status of adolescents was statistically insignificant**[0.299, 6, p>0.05]**.

International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 03 Issue 02 February 2018, ISSN No. - 2455-8737
*Available online at - www.ijirms.in*

Table 3: Distribution of study subjects according to physical activity level and nutritional status

	Total (N-550)	Nutritional status of the study subjects			χ^2, df, p-value
		Underweight	**Normal**	**Overweight/ Obese**	
Physical Activity level	Low (n=144)	9(6.25)	23(15.97)	112(77.77)	**237, 4, < 0.05**
	Moderate (n=254)	29(11.41)	198(77.95)	27(10.62)	
	High (n=152)	22(14.47)	113(74.34)	17(11.18)	
	Total	60(10.92)	334(60.72)	156(28.36)	

N.B.: Numbers in parenthesis indicate row wise percentage

It was seen that among the adolescents who had a low level physical activity, 15.97% had normal BMI while 77.77% were overweight or obese. Among the adolescents who had moderate level physical activity, 77.95% adolescents had normal BMI and 10.62% were overweight and obese. The association between physical activity and nutritional status of adolescents was found to be statistically significant (p<0.05).
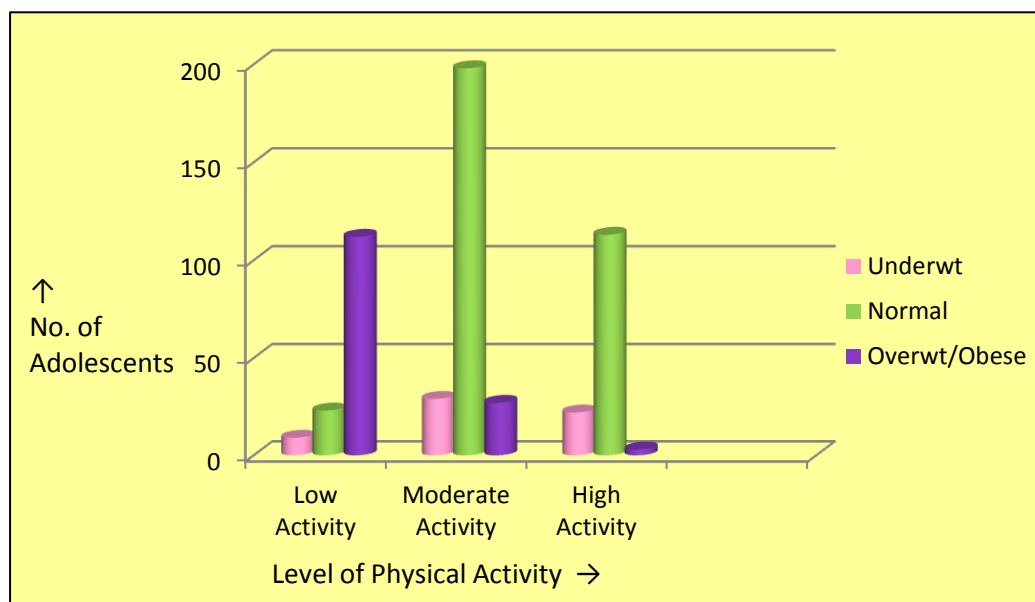
Figure 2: Bar Diagram Showing Distribution according to Physical Activity and Nutritional Status

Discussion

In the present study, it was found that out of the total 550 adolescents, the majority of the adolescents (64%) were male while females added up to 36% of the total [Table 1]. Rawat R. et al (2012)[6], in their study, found that 13.5% children were overweight or obese while Bharti et al (2008)[7] found that 4.3% school going children were overweight or obese. Overall prevalence of underweight was 17% and overweight and obesity was found to be 5.4% in adolescent girls of Lucknow district, in a study done by Sachan B et al (2013)[8]. The high prevalence of overweight and obesity seen in the present study may be attributed to the lack of physical activity among adolescents.

The difference in the gender could be due to the fact that on reaching adolescence, girls are not as encouraged to play sports or outside games as the boys. In addition, most schools provide a limited number of hours for physical education per week which is not sufficient and even at home adolescents belonging to affluent classes have access to indoor activities like watching TV or playing games on the computer which discourages them from going out to play. In this study, the majority of adolescents (70.72%) were Hindus, followed by Muslims (17.81%) [Table 2]. The association between religion and nutritional status of adolescents was statistically insignificant (p>0.05). The majority of adolescents belonged to general category (49.45%) followed by other backward classes (43.63%). It was seen that among the adolescents who belonged to general category, 60.66% adolescents had normal BMI and 28.3% were overweight or obese. The association between caste and nutritional status of adolescents was statistically insignificant (p>0.05).

Our findings were comparable to another study by Choudhary S et al (2008)[81] in which, they found that chronic energy deficiency grade III (BMI < 16 kg/m2) was

International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 03 Issue 02 February 2018, ISSN No. - 2455-8737
Available online at - www.ijirms.in

more in Hindu (31.54%) and SC (48.72%) adolescents. However, religion and caste of the family was not significantly (p>0.05) associated with the nutritional status of adolescent girls. In another study, Singh S. et al (2012)[82] found that majority (91.7%) of the adolescent girls were Hindu by religion. Religion was found to have a significant influence (p<0.05) on nutritional status of adolescent girls. In the present study, it was seen that 35.45% of the adolescents belonged to SES III, followed by SES II (33.63%) and SES I (18%). Among the adolescents who belonged to SES I, 60.6% adolescents had normal BMI and 28.28% were overweight or obese. The association between socio-economic status and nutritional status of adolescents was found statistically insignificant (p>0.05). Choudhary S et al (2008)[9], in their study, found that maximum (82.54%) under nutrition was observed in subjects belonging to lower SES, followed by those in middle (69.92%) and then in higher (54.05%) SES categories. There was a significant (P<0.05) association between SES and nutritional status of study subjects. In a study done by Goyal RK et al (2010) [10], the prevalence of overweight among children was higher in middle SES as compared to higher SES, whereas the prevalence of obesity was higher in high SES as compared to middle SES.

Conclusion

In the present study, out of the 550 adolescents surveyed, the nutritional status of 334 (60.72%) was in the normal range (BMI for age between 5th to 85th percentile), 60 (10.9%) were underweight (BMI for age< 5th percentile) and 156 (28.36%) were overweight or obese (BMI for age>85th percentile). It was seen that there was a significant association between the gender of the adolescents and their nutritional status. It was seen that the majority of the males (75.28%) had normal BMI for age while majority of the females (50.5%) were overweight or obese. The association between caste and nutritional status of adolescents was statistically insignificant (p>0.05). The association between socio-economic status and nutritional status of adolescents was statistically insignificant (p>0.05) while with physical activity, nutritional status of adolescents was found to be statistically significant (p<0.05).

Recommendation

There is an increased prevalence of overweight and obesity in female adolescents. Therefore, school teachers should encourage them to participate in games and sports in school. The school authorities should increase the number of hours devoted to physical exercises and sports per week. There are many ways to be physically active for example activities like yoga, aerobics, dance, running, skipping etc. All students should be continuously encouraged to pick at least one such activity and be more active.

References

[1] WHO. Programming for adolescent health and development. Report of a WHO/UNFPA/UNICEF study group on programming for adolescent health. WHO Tech Rep Ser. Geneva,1996;886:2

[2] WHO, facts on Adolescence. Fact file, World health organization. September 2008. Available from http://www.who.int/features/factfiles/adolescent_health/facts/en/index.html

[3] Census2011.co.in, Population Census 2011 from http://www.census2011.co.in (last assessed 23 Nov 2017)

[4] South Asia- India: Malnutrition Report- World Bank. Available from http://go.worldbank.org/TUTLNHSPH0 (last assessed 20 Nov 2017)

[5] National Family Health Survey, India- 3 Publications/Reports. Available from www.rchiips.org/nfhs/report/shtml (last assessed 23Nov 2017)

[6] Rawat R, Garg SK, Chopra H, Bajpai SK, Bano T, Jain S et al. Prevalence of malnutrition among school children with reference to overweight and obesity and its associated factors. Ind J of Comm Health, 2012; 24(2): 97-101

[7] Bharti DR, Deshmukh PR, Garg BS. Correlates of overweight and obesity among school going children of Wardha city, Central India. Indian J Med Res, June 2008; 127: 539-43

[8] Sachan B, Idris MZ, Jain S, Kumari R, Singh A. Nutritional status of school going adolescent girls in Lucknow district. J of Med Nutr and Nutraceuticals, 2012; 1(2):101-5

[9] Choudhary S, Mishra C, Shukla K. *Correlates of nutritional status of adolescent girls in the rural area of Varanasi.* The Internet J of Nutr and Wellness. 2008; 7(2):4339

[10] Goyal RK, Shah VN, Saboo BD, Phatak S, Shah N, Gohel M et al. Prevalence of overweight and obesity in Indian adolescent school going children: Its relationship with socio-economic status and associated lifestyle factors. JAPI, 2010; 58: 151-8

Corresponding Author -

Dr. Vimal Arya
H. No. 315, C.P. Mission Compound, Civil Lines, Jhansi (Uttar Pradesh)-284003,
Email id - drvimalarya@gmail.com