International Journal of Research in Medical Sciences
Bhambhani GD et al. Int J Res Med Sci. 2015 Nov;3(11):3372-3376
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20151194

Research Article

Health profile of adolescents of Bhavnagar district, Gujarat, India: a cross sectional study

G. D. Bhambhani[1], Rutu G. Bhambhani[1], Nilesh Chandradityasinh Thakor[2]*

[1]Department of General Medicine, College of Dental science, K.J. Mehta Hospital, Amargadh-Bhavnagar, Gujarat, India
[2]Department of Community Medicine, GMERS Medical College, Dharpur-Patan-384265, Gujarat, India

Received: 25 September 2015
Accepted: 08 October 2015

***Correspondence:**
Dr. Nilesh Chandradityasinh Thakor,
E-mail: drnileshthakor@yahoo.co.in

ABSTRACT

Background: Adolescence and young adulthood are periods of critical development and transition. Adolescent constitutes over 23% of the population in India. Nutrition and health needs of the adolescent are more because of more requirements for growth spurt and increase in physical activity. Objective: To study health profile of adolescents of Bhavnagar district.
Methods: The study was carried by Medicine Department, K.J. Mehta Hospital, Amargadh, Bhavnagar during period from September 2014 to August 2015. After taking the permission of principals of 10 schools and consent of the parents of adolescents, 842 adolescents from 10 schools of Bhavnagar district were examined for nutritional deficiencies. The data was collected by predesign, pretested proforma and analyzed using SPSS 17.0 (Trial version).
Results: Mean age was 15.8 ± 1.96 years. Out of 867, 433 (51.4%) were boys and 409 (48.6%) were girls. Vitamin A deficiency was present in 53 (6.3%) adolescents. Vitamin B complex deficiency signs were seen in 139 (16.5%) adolescents. Vitamin C deficiency signs were seen in 84 (10.0%) adolescents. PEM was observed in 90 (10.7%) adolescents. The study revealed that 67.0% girls were suffering from anaemia compare to 58.7% of boys. 117 (13.9%) adolescents had visual impairment.
Conclusions: Poor personal hygiene and nutritional deficiency among these adolescents needs great attention and health education.

Keywords: School health, Adolescents health, Anaemia, Nutritional deficiency, Health profile

INTRODUCTION

Adolescence and young adulthood are periods of critical development and transition. In terms of age, It is period of life that is extended from 10-19 years which includes pubertal development also. These young people undergo major physical, cognitive, and psychosocial changes. These changes have important implications for health. As young people become increasingly independent, they face significant choices in areas such as diet, substance use, sexuality, physical activity and use of health care services. These choices are shaped by individual, family, social environments, and other contextual factors. A school is a key location for educating adolescents about health, hygiene and nutrition, and for putting in place interventions to promote the health of adolescents. At the same time, poor health, poor nutrition and disability can be barriers to attending school and to learning. Schools are sacred because they provide an environment, for learning skills, and for development of intelligence that can be utilized by students to achieve their goals in life. It is also observed that "to learn effectively, adolescents

need good health." Health is key factor in school entry, as well as continued participation and attainment in school.[1]

Many adult health problems e.g. obesity, hypertension have their early origins in childhood, because this is the time when lifestyles are formed. In primordial prevention, efforts are directed towards discouraging adolescents from adopting harmful lifestyles. The main intervention in primordial prevention is through individual and mass education.[2] Adolescent constitutes over 23% of the population in India. Nutrition and health needs of the adolescent are more because of more requirements for growth spurt and increase in physical activity. Adolescent need more of all nutrient.[3] This study is a humble effort to throw light on the health profile of adolescents.

METHODS

The study was carried by Medicine Department, K.J. Mehta hospital, Amargadh, Bhavnagar during period from September 2014 to August 2015. 10 schools were selected by purposive sampling. After taking the permission of principals of schools and informed written consent of the parents of adolescents, 842 adolescents from these schools of Bhavnagar district were examined using pre-designed, pre-tested, semi-structured WHO standard with ICMR modifications questionnaire for nutritional deficiencies. Performa contained general information, anthropometry and general health check-up of the adolescents. The modification included deletion of columns irrelevant to the present study and addition of some columns to record other health abnormalities specially which are common in adolescents. Data were analysed using SPSS version 17 (Trial version). Parameters such as rate, ratio and percentages were calculated. In order to have valid interpretation of rates, 95% Confidence Intervals (CI) were calculated. To test the significance of the difference among the statistical parameters in different subsets of population, suitable statistical tests were applied.

RESULTS

Out of total 842 adolescents 409 (48.6%) were female. Mean age of the study adolescents was 15.8 ± 1.96 years. Maximum numbers of the adolescents were in the age group of 10-14 years (60.5%). Mean age of female and male adolescents was 15.3 ± 1.89 years and 15.9 ± 2.02 years respectively.

Table 1: Gender wise distribution of adolescents according age groups.

Age groups	Female	Male	Total
10-14	261 (31.0)	248 (29.5)	509(60.5)
15-19	148 (17.6)	185 (22.0)	333 (39.5)
Total	409 (48.6)	433 (51.4)	842 (100)

Figures given in parentheses are percentages

The malnutrition status was assessed on the basis of classification laid down by Indian Academy of Paediatrics. 3.7% of the females and 2.5% of the males had grade-III malnutrition. The overall prevalence of malnutrition in this study was 11% separately being high (11.7%) in the male adolescents than the female adolescents (10.3%) and this difference was not found statistically significant. Though this classification is based on single reading and regular monitoring of growth (weight and height) would be a better indicator (Table 2 and 3).

Table 2: Nutritional status of 409 girls according to their age groups.

Age groups (years)	Normal	Grade-I	Grade-II	Grade-III	Total
10-14	241	9	3	8	261
15-19	126	11	4	7	148
Total	367 (89.7)	20 (4.9)	7 (1.7)	15 (3.7)	409 (100)

Figures given in parentheses are percentages

Table 3: Nutritional status of 433 boys according to their age groups.

Age groups (years)	Normal	Grade-I	Grade-II	Grade-III	Total
10-14	227	11	6	4	248
15-19	155	15	8	7	185
Total	382 (88.2)	26 (6.0)	14 (3.2)	11 (2.5)	433 (100)

Figures given in parentheses are percentages

Physical examination of the adolescents was conducted to identify various nutritional disorders. Identification of nutritional disorders of school going adolescents is helpful in constructing the nutritional deficiencies pattern, to work out the priority areas and in organising the health care services.

Table 4: Distribution of adolescents according to signs of vitamin A deficiency.

Signs	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Conjuctival xerosis	26 (6.4)	22 (5.1)	48 (5.7)
Night blindness	3 (0.7)	2 (0.5)	5 (0.6)
Total conditions	29 (7.1)	24 (5.5)	53 (6.3)

Females: 7.1%; Males: 5.5% p>0.05
Figures given in parentheses are percentages

Vitamin A deficiency was present in total 53 (6.2%) adolescents. 29 (7.1%) were females and 24 (5.5%) were males. The signs of vitamin A deficiency and gender was

not significantly associated (p>0.05). Other signs of vitamin A deficiency such as Bitot's spot, corneal xerosis and corneal opacities were not observed in any adolescents (Table 4).

Table 5 shows signs of vitamin B complex deficiency. Signs were seen in total 139 (16.5%) adolescents. 73 (17.8%) were females and 66 (15.2%) were males. Many adolescents have multiple signs of vitamin B complex deficiency. Signs such as angular stomatitis (Female: 3.7% Male: 5.1% p<0.05) and geographic tongue (Female: 0.7% Male: 2.5% p<0.05) were significantly more observed in males than in females.

Table 5: Distribution of adolescents according to signs of vitamin B complex deficiency.

Signs	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Nasolabial dyssebacea	5 (1.2)	3 (0.7)	8 (1.0)
Angular stomatitis	15 (3.7)	22 (5.1)	37 (4.4)
Cheilosis	33 (8.1)	13 (3.0)	46 (5.5)
Red and raw tongue	6 (1.5)	5(1.2)	11 (1.3)
Geographic tongue	3 (0.7)	11 (2.5)	14 (1.7)
Pellagrous dermatosis	11 (2.7)	12 (2.8)	23 (2.7)
Total conditions	73 (17.8)	66 (15.2)	139 (16.5)

Vitamin C deficiency signs were seen in total 84 (10.0%) adolescents. The prevalence rates in males and the females were 10.2% and 9.8% respectively. The signs of vitamin C deficiency and gender was significantly associated (p<0.05) (Table 6).

Table 6: Distribution of adolescents according to signs of vitamin C deficiency.

Signs	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Spongy bleeding gums	35 (8.6)	41 (9.5)	76 (9.0)
Petechiae	5 (1.2)	3 (0.7)	8 (1.0)
Total conditions	40 (9.8)	44 (10.2)	84 (10.0)

Chi- square: 4.32; Degrees of freedom: 1; p=0.031

Protein energy malnutrition was observed in total 90 (10.7%) adolescents. 47 (11.5%) were females and 43 (9.9%) were males. Many adolescents have multiple signs of protein energy malnutrition. The signs of protein energy malnutrition and gender was significantly associated (p<0.001). Thin and sparse hair was more common in girls and lack of lustre of hair was more common in boys (Table 7).

Essential fatty acid deficiency in the form of phrynoderma was observed in total 138 (16.4%) adolescents. Prevalence of essential fatty acid deficiency and gender was not significantly associated (p>0.05) (Table 8).

The prevalence of anaemia in adolescents in present study was 62.7% (528 adolescents). The prevalence of anaemia in female (274, 67.0%) was significantly higher than males (254, 58.7%). Possible reasons for IDA include poor consumption of DGLV, increased demand during adolescence and menstrual loss (Table 9).

Table 7: Distribution of adolescents according to signs of Protein energy malnutrition.

Signs	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Flag sign on hair	3 (0.7)	6 (1.4)	9 (1.1)
Lack of lustre of hair	12 (2.9)	23 (5.3)	35 (4.2)
Thin and sparse hair	32 (7.8)	14 (3.2)	46 (5.5)
Total conditions	47 (11.5)	43 (9.9)	90 (10.7)

Chi-square: 23.52; Degrees of freedom: 2; p<0.001

Table 8: Distribution of adolescents according to signs of essential fatty acid deficiency.

Signs	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Phrynoderma	73	65	138
Total conditions	73 (17.8)	65 (15.0)	138 (16.4)

Table 9: Distribution of adolescents according to signs of Iron deficiency.

Signs	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Pallor of tongue	274 (67.0)	253 (33.2)	527 (62.6)
Pallor of conjunctiva	249 (60.9)	233 (30.6)	482 (57.2)
Pallor of nail	274 (67.0)	254 (35.5)	528 (62.7)

Moderate to severe visual impairment and blindness was 13.9% in girls and 13.8% in boys respectively and the gender difference was not statistically significant. Though 117 (13.9%) adolescents had moderate visual impairment to blindness only 56 (6.6%) adolescents were wearing spectacles (Table 10).

Table 10: Gender wise distribution of adolescents according to their vision.

Visual impairment and category	Gender		Total 842 (100)
	Female 409 (100)	Male 433 (100)	
Mild or no visual impairment Category 0	352 (86.1)	373 (86.1)	725 (86.1)
Moderate visual impairment Category 1	51 (12.5)	53 (12.2)	104 (12.4)
Severe visual impairment Category 2	5 (1.2)	6 (1.4)	11 (1.3)
Blindness Category 3	1 (0.2)	1 (0.2)	2 (0.2)

Chi-square: 5.45; Degrees of freedom: 1; p=0.014

DISCUSSION

In Thakor N et al. age of the study children (total 867) ranged from 5-19 years. Mean age was 13.80 ± 1.96 years. Out of 867, 434 (49.9%) were boys and 433 (50.1%) were girls. Vitamin A deficiency was present in 54 (6.2%) adolescents. Vitamin B complex deficiency signs were seen in 179 (20.6%) adolescents. Vitamin C deficiency signs were seen in 86 (9.9%) adolescents. PEM was observed in 77 (8.9%) adolescents. The study revealed that 46.7% girls were suffering from anaemia compare to 37.3% of boys. 122 (12.9%) adolescents had visual impairment.[1]

In Srinivasan K et al. 61.4% adolescents were in the age group of 10-14 years, 84.3% adolescents had one or more morbid conditions, 29.9% adolescents had skin disorders, prevalence of anaemia in adolescents was 79.6, dental caries was present in 23.5% adolescents, 4.4% adolescents had defective vision.[4]

In Panda P et al 59.5% are boys and 40.5% are girls, prevalence of anaemia in boys was 22.9% and in girls was 30.5%, 47.8% of adolescents were found to be normal as per their weight for age, 52.2% were malnourished. 28.4% adolescents had mild, 17.0% had moderate and 6.8% adolescents had severe degree of malnourishment, 5.6% adolescents had refractive errors, dental caries was detected in 23.1% of adolescents.[5]

In Soumya Deb et al. 40.8 % boys and 25.93% girls were underweight, 76% of boys and 74% of girls were suffering from one or more morbidities, prevalence of anaemia in boys was 55.34% and in girls was 51.85%.[6]

In Osei A et al. 60.9% adolescents were underweight in primary school age group, 36.7% adolescents were found anaemic in primary school age group.[7] In Dongre AR et al. wax in ears was present in 10.3% of adolescents, dental caries was detected in 8.3% of adolescents.[8]

In Chandna S. et al. adolescents had night blindness in 35.9%, xerosis conjunctiva in 9.2%, Bitot's spots in 14.2%, nasolabial dyssebacea in 6.8%, angular stomatitis in 6.8%, cheilosis in 8.7% red and raw tongue in 1.6%, pellagrous dermatosis in 13.3%, bleeding gums in 15.2%, ecchymoses in 6.1%, lack of lustre of hair in 26.5%, thinness and sparseness of hair in 24.3%, prevalence of anaemia in adolescents was 34%, 15.9% adolescents had phrynoderma.[9] In Rema N et al. prevalence of anaemia in boys was 44.08% and in girls was 52.21%, prevalence of vitamin A deficiency in boys was 5.65% and in girls was 8.64%.[10] As per DLHS (2002-2004), prevalence of anaemia in adolescent girls is 72.6%.[11] In India 6-7% adolescents aged 10-14 years have problem with their eye sight.[11]

In our study Mean age was 15.8 ± 1.96 years. Out of 867, 433 (51.4%) were boys and 409 (48.6%) were girls. Vitamin A deficiency was present in 53 (6.3%) adolescents. Vitamin B complex deficiency signs were seen in 139 (16.5%) adolescents. Vitamin C deficiency signs were seen in 84 (10.0 %) adolescents. PEM was observed in 90 (10.7%) adolescents. The study revealed that 67.0% girls were suffering from anaemia compare to 58.7% of boys. 117 (13.9%) adolescents had visual impairment.

CONCLUSION

The available data show a high prevalence of anemia among adolescents. Micronutrient deficiencies are also present among these adolescents. There is definitely a need for well-planned, large-scale studies using standardized methodologies to estimate the prevalence of iron deficiency, anemia and other micronutrient deficiencies. When planning these studies it is necessary to ensure that importance is given to accurate evaluation of socio economic status and representation of the different regions of India. A comprehensive study including anthropometric data, biochemical data, clinical signs and dietary intake data among the same group of adolescents will give a better insight into the situation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Thakor N, Shukla A, Bala DV, Vala M, Ninama R. Health status of children of primary and secondary boarding schools of Gandhinagar district. Int J Med Sci Public Health. 2014;3:866-9.
2. Chaudhari AI, Rami K, Thakor N. Assessment of knowledge regarding noncommunicable diseases and their risk factors among students of higher secondary school: an interventional study. Int J Med Sci Public Health. 2016;5:1-4.

3. Kishore J. Adolescent health. In: Kishore J, eds. National Health Programme of India. 8th ed. New Delhi: Century Publications; 2009: 176-179.
4. Srinivasan K, Prabhu GR. A Study of the morbidity status of children in social welfare hostels in Tirupati town. Indian J Community Med. 2006-2007;31(3):51-6.
5. Panda P, Benjamin AI, Shavinder Singh, Zacharia P. Health status of school children in Ludhiana city. Indian J Community Med. 2000 Oct-Dec;4:150-5.
6. Soumya Deb, Sinjita Dutta. Relationship of personal hygiene with nutrition and morbidity profile: a study among primary school children in South Kolkata. Indian J Community Med. 2010 Apr;35(2):282-4.
7. Osei A, Houser R, Bulusu S, Joshi T, Hamer D. Nutritional status of primary school children in Garhwali Himalayan villages of India. Food Nutr Bull. 2010 Jun;31(2):221-33.
8. Dongre AR, Deshmukh PR, Garg BS. The impact of school health education programme on personal hygiene and related morbidities in tribal school children on Wardha district. Indian J Community Med. 2006 Apr-Jun;31(2):81-2.
9. Chandna S, Sehgal S. Prevalence of deficiency diseases among school children. Health Arid Popul-Persp Issues 1994;17(1&2):108-13.
10. Rema N, Vasanthamani G. Prevalence of nutrition and lifestyle disorders among school going children in urban and rural areas of Coimbatore in Tamil Nadu. Indian J Sci Technol. 2011 Feb;4(2):131-40.
11. Park K. Park's textbook of preventive and social medicine. In: Park K, eds. A Book. 21st ed. Jabalpur: Banarasidas Bhanot; 2010.

Cite this article as: Bhambhani GD, Bhambhani RG, Thakor NC. Health profile of adolescents of Bhavnagar district, Gujarat, India: a cross sectional study. Int J Res Med Sci 2015;3:3372-6.