ASSESSMENT OF PREVALENCE OF DEFICIENCY OF TRACE-ELEMENT AND MICRO-NUTRIENTS AMONG ADOLESCENCE ON CLINICAL BASIS ("10-14" YEARS)

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Abstract

The importance of coexisting micronutrient deficiencies in developing countries is gaining recognition, prompted by the disappointing responses often observed with single micronutrient supplements. Further, of concern is the feasibility and sustainability of supplementation as a mode of delivery in poor resource settings. A cross sectional study was carried out to assess the nutritional status of adolescent girls and boys of Kanpur district. This study was conducted among 4-schools using general information, anthropometric, clinical information, dietary intake information and food habits. The study comprised of 150 adolescence boys and girls between the age group of 10-14 years of age. Iron, zinc and dietary folate deficiency are the common health problems among adolescent girls. A well balanced nutritious food should be consumed to prevent micro-nutrient efficiencies and to attain a good physical and mental well-being. Interventions like public health measures, school health programs should be implemented to address these health problems. Supplementation and fortification of foods should be done to prevent the micro-nutrient and trace element deficiencies and to improve the nutritional status of the adolescence.

Key words : Micro-nutrients, adolescents boys and girls, deficiency diseases, trace elements.

Introduction

Trace elements are micronutrients required in the body for its normal function especially through various enzymes, hormones, vitamins etc. where they are the important components among them iron, zinc, copper and cobalt are prominent. Deficiency of each one gives rise to specific clinical feature. Besides iron deficiency causing anemia, zinc deficiency causes skin changes, copper deficiency hair changes, cobalt deficiency vitamin B_{12} deficiency and selenium deficiency may cause cardiomyopathy (Dutta *et al.*, 2012).

Micronutrients are nutrients that are only needed by the body in minute amounts, which play leading roles in the production of enzymes, hormones and other substances, helping to regulate growth activity, development and the functioning of the immune and reproductive system. Micronutrients of known public health importance include the following : zinc, iodine, iron, selenium, copper, vitamins A, E, C, D, B_2, B_6 and folate (UNICEF, 1998).

Carbohydrates, fats and proteins are macronutrients which act as metabolic fuel in our body. Vitamins and minerals are micronutrients essential for various biochemical reactions. Minerals can be further subdivided into two groups, macro (major) and trace minerals based on their body store and daily dietary requirement. The human body needs a number of minerals in trace (milligram) quantities. These include iron, copper and zinc. Other minerals are required in ultra trace (microgram) amounts. These are chromium, manganese, fluoride, iodide, cobalt, selenium, silicon, arsenic, boron and vanadium. In India, the micronutrient deficiencies of public health significance are vitamin 'A' deficiency (VAD), iron deficiency anaemia (IDA) and iodine deficiency disorders (IDD).

Therefore, the present survey was carried out to assess the prevalence of common micronutrient deficiencies among the vulnerable groups of urban population covering statistically adequate sample in each of the areas of Kanpur city, Uttar Pradesh, India.

Objective

To assess the trace elements & micro-nutrients deficiencies on clinical assessment basis.

Methodology

A cross sectional study was carried out to assess the nutritional status of young girls and boys of Kanpur district. A total of 150 adolescent girls and boys of 10 to 14 years of age, living in the kalyanpur area of Kanpur district of Uttar Pradesh state were selected at randomly as sample. Out of them, 75 were girls and 75 were boys. The socio-demographic data were elicited by administering the pretested questionnaire and anthropometric measurements such as height, weight, waist and hip circumference were recorded by following standard methods and clinical methods. The indirect method used was diet survey; the 24 hours recall method, food habits and dietary intake information.

Results

Table 1 reveals the distribution of the respondents according to the age group. The study comprised of 150 adolescence boys and girls between the age group of 10-14 years of age. 65.3% boys and 53.3% girls were belonged to 10-12 years age groups while 34.7% boys and 46.7% girls were belonged to 13-14 years age groups. Thus it is evident that majority of the respondents belonged to the age of 10-12 years.

Table 1 : Distribution of respondents according to age.

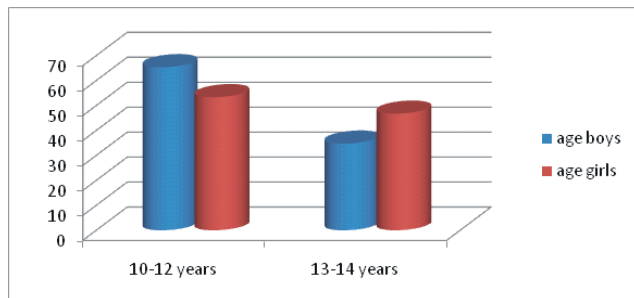| Age	Boys		Girls	
	N	%	N	%
10-12	49	65.3	40	53.3
13-14	26	34.7	35	46.7
Total	75	100	75	100
χ^2	0.0372			

Table 2 reveals the distribution of respondents according to general appearance. Among boys, 88 % were recorded as healthy. 6.7% were recorded as unwell and 5.3% were recorded as ill. Similarly, among girls, the healthy, unwell and ill signs were recorded as 77.3%,

Table 2 : Distribution of respondents according to general appearance.

Clinical signs	Boys		Girls	
	N	%	N	%
Healthy	66	88	58	77.3
Unwell	5	6.7	10	13.3
Ill	4	5.3	7	9.4
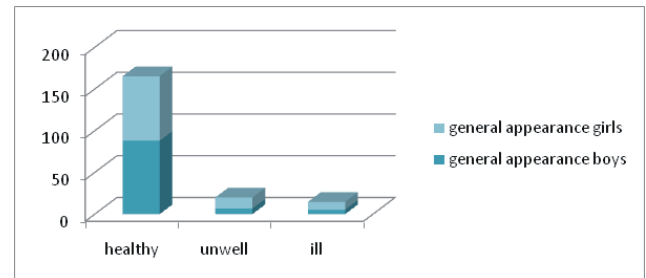
13.3% and 9.4%, respectively.

Table 3 reveals the distribution of respondents according to lips. Among boys, 94.8% were recorded as normal, 2.6% were recorded as swollen and 2.6% were recorded as any other signs of lips. Similarly, among girls, the normal, swollen and any other signs of lips were recorded as 96%, 1.4% and 2.6%, respectively.

Table 3 : Distribution of respondents according to lips.

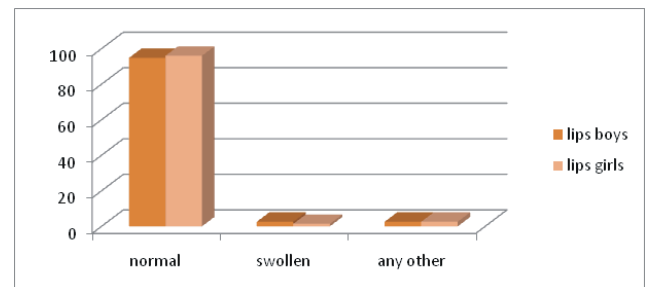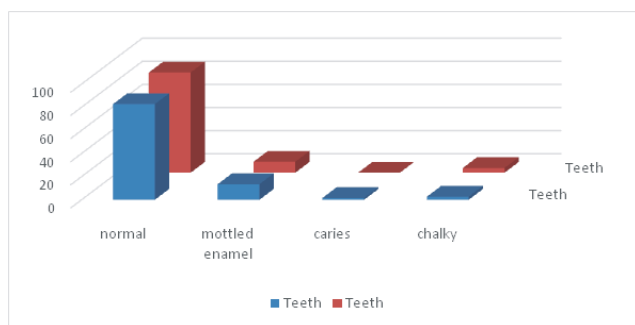| Clinical signs	Boys		Girls	
	N	%	N	%
Normal	71	94.8	72	96
Swollen	2	2.6	1	1.4
Any other	2	2.6	2	2.6

Table 4 reveals the distribution of respondents according to teeth. Among boys, 82.6% were recorded as normal, 13.4% were recorded as mottled enamel, 1.4% was recorded as caries and 2.6% were recorded as chalky. Similarly, among girls, the normal, mottled enamel, caries and chalky signs of teeth was recorded as 86.6%, 9.4%, 0% and 4%, respectively.

Table 5 indicates the prevalence of micro nutrient deficiency on the basis of clinical signs and symptoms.

The prevalence of vitamin-A deficiency in boys was

**Table 4** : Distribution of respondents according to teeth.

Clinical signs	Boys		Girls	
	N	%	N	%
Normal	62	82.6	65	86.6
Mottled enamel	10	13.4	7	9.4
Caries	1	1.4	0	0
Chalky	2	2.6	3	4

Table 5 : Distribution of respondents according to clinical symptoms.

Clinical symptoms	Boys		Girls		Total	
	N	%	N	%	N	%
Vitamin-A	4	5.3	2	2.6	6	8
Vitamin-C	8	10.6	4	5.3	12	16
Vitamin-B	8	10.6	6	8	14	18.6
Iron	10	13.3	12	16	22	29.3
Calcium	13	17.7	10	13.3	13	17.3
Iodine	-	-	-	-	-	-

5.3% and that of girls was 2.6%. Vitamin-A deficiency was known on the basis of symptoms present in eyes like itching, slightly dry and any other (bitot spot, moderate brown patches and flakiness). Signs and symptoms of vitamin-C include swollen, spongy red and bleeding gums. It was found that 10.6% of boys and 5.3% of girls respondents were suffering from vitamin-C. Assessment of iron deficiency was done on the basis of pale skin, pail nails and dull hairs. It was found in 13.3% of boys and 16% of girls. Calcium deficiency was seen as per the symptoms shown in the teeth such as caries, chalky and mottled enamel. It was seen in 17.7% boys and 13.3%
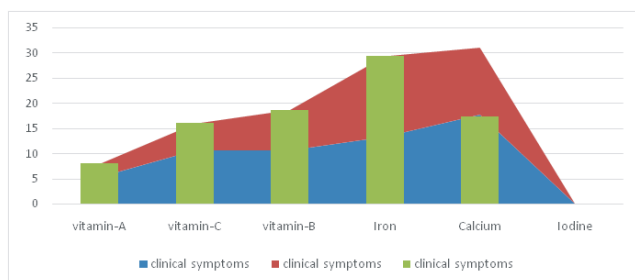
girls. Enlargement of thyroid gland is the only symptom for assessing the iodine deficiency. There was no case of thyroid enlargement among any adolescence in either of the category.

Discussion

Micronutrients such as iron, vitamin A, iodine and folate enhance the nutritional value of food and play a crucial role in the mother's survival in pregnancy and childbirth, and a child's ability to develop to their potential. Rates of regular consumption of foods rich in iron and vitamin A are low in India, particularly among infants and young children. The proportion of children aged six to 24 months who regularly consume vitamin A-rich foods is 39 per cent, while the proportion of those who regularly consume iron-rich food is only 11 per cent. The number of children who regularly consume vitamin A and iron-rich foods is particularly low in poorer communities. UNICEF partners governments and organizations to address micronutrient deficiencies by seeing that supplements are delivered to specific vulnerable groups around India, and that home fortification of complementary foods (foods given in addition to breast milk) takes place for children aged six to 24 months, along with fortification of staple foods and condiments in the family home.

Conclusion

The present study showed that the average nutrients consumption were more than RDA recommendation at urban area. The intake of some nutrients by the adolescence were lower than the prescribed recommended dietary allowances. Iron, zinc and dietary folate deficiency are the common health problems among adolescent girls. A well balanced nutritious food should be consumed to prevent micro-nutrient efficiencies and to attain a good physical and mental well being.

Interventions like public health measures, school health programs should be implemented to address these health problems. Supplementation and fortification of foods should be done to prevent the micro-nutrient deficiencies and to improve the nutritional status of the adolescence.

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