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Prevalence of trace element and micro-nutrients deficiency of adolescence (10-14 years) by nutritional awareness and dietary assessment

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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.

Keywords: micro-nutrients, adolescents boys and girls, deficiency diseases, trace elements

Introduction
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).

Classic nutritional deficiency usually results in a complex syndrome of typical signs and symptoms, and these have now been fully characterized for each of the vitamins and trace elements. It is however now clear that the full blown clinical deficiency syndrome is the endpoint of a prolonged pathway. With the exception of certain single nutrient deficiencies, most clinical deficiency states are comparatively uncommon in clinical practice. It would be entirely appropriate for groups of this sort to take supplements to ensure their total intake, including their diet, was adequate. 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.

Objective
To assess the trace element and micro-nutrients deficiencies by nutritional awareness and dietary assessment method.

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.

Result

Table 1: Distribution of respondents according to knowledge about CHO

Know about CHO	Boys		Girls	
	N	%	N	%
Yes	15	20	25	33.3
No	60	80	50	66.7
Total	75	100	75	100

Table 1 reveals that only 20 % boys and 33.3 % girls had knowledge about CHO while the rest 80 % boys and 66.7 % girls had no knowledge about CHO.

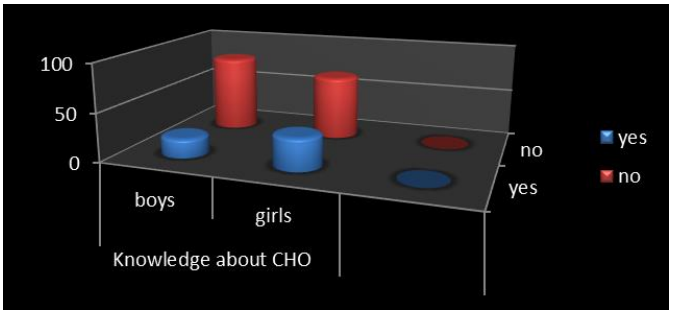

Fig 1

Table 2: Distribution of respondents according to knowledge about protein

Know about Protein	Boys		Girls	
	N	%	N	%
Yes	19	25.3	30	40
No	56	74.7	45	60
Total	75	100	75	100

Table 2 reveals that only 25.3 % boys and 40 % girls had knowledge about protein while the rest 74.7 % boys and 60 % girls had no knowledge about protein.

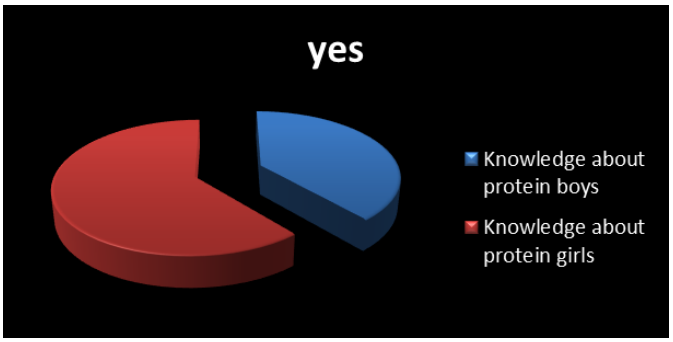

Fig 2

Table 3: Distribution of respondents according to knowledge about fat

Know about Fat	Boys		Girls	
	N	%	N	%
Yes	12	16	20	26.6
No	63	84	55	73.4
Total	75	100	75	100

Table 3 reveals that only 16 % boys and 26.6 % girls were conscious about fatty food while the rest 84 % boys and 73.4 % girls had no knowledge about fat and they had taken more fatty foods than RDA value.

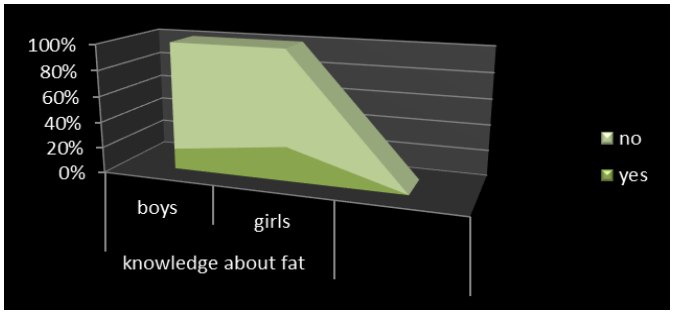

Fig 3

Table 4: Distribution of respondents according to knowledge about Vitamin- C

Know about Vitamin-C	Boys		Girls	
	N	%	N	%
Yes	40	53.4	55	73.4
No	35	46.6	20	26.6
Total	75	100	75	100

Table 4 reveals that maximum 53.4 % boys and 73.4 % girls had knowledge about vitamin-C while the rest 46.6 % boys and 26.6 % girls had no knowledge about vitamin-C.

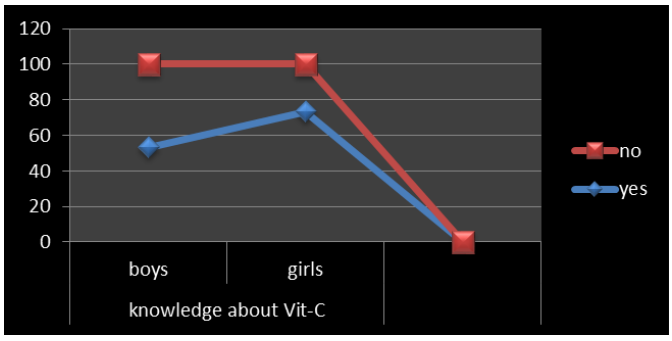

Fig 4

Table 5: Distribution of respondents according to knowledge about Folic acid

Know about Folic acid	Boys		Girls	
	N	%	N	%
Yes	3	4	5	6.6
No	72	96	70	93.4
Total	75	100	75	100

Table 5 reveals that only 4% boys and 6.6 % girls had

knowledge folic acid while the rest 96 % boys and 93.4 % girls had no knowledge about folic acid.

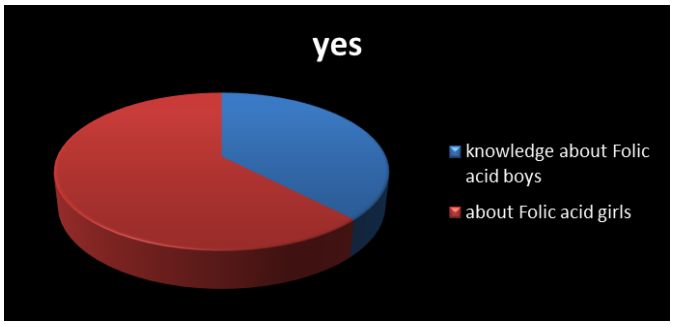

Fig 5

Table 6: Distribution of adolescence (13-14 yrs.) according to per day mean nutrient intake

Age	Nutrients	RDA	Boys		RDA	Girls	
			Mean	% deficit		Mean	% deficit
13-14 years	Energy (kcal)	2750	2872.0	-4.43	2330	2634.3	-13.06
	Protein (gm)	54.3	64.91	-19.53	51.9	63.01	-21.40
	Fat (gm)	45	70.32	-56.26	40	69.61	-74.02
	Iron (mg)	32	34.35	-7.34	27	24.62	8.81
	Zinc(mg)	11	10.87	1.18	11	10.39	5.54
	Vitamin-C (mg)	40	55.24	-38.1	40	53.82	-34.55
	Dietary folate (µg)	150	150.48	-0.32	150	143.85	4.1

The 24 hour dietary recall was used to find out the amount of essential nutrients intake by the respondents. The average intake of nutrients with the RDA and percentage deficit or increase is given here.

Table 6 shows that in adolescent boys of 13-14 years, the highest average energy intake was 2872.0 kcal/day and that of girls of same age group was 2634.30 kcal/day, the highest average protein intake was 64.91 gm/day and that of girls of same age group was 63.01 gm/day, the highest average fat intake was 70.32 gm/day and that of girls of same age group was 69.61 gm/day, the highest average iron intake was 34.35 mg/day and that of girls of same age group was 24.62 mg/day which was least than RDA value, the highest average zinc intake was10.87 mg/day and that of girls of same age group was 10.39 mg/day. In this, both boys and girls have low zinc intake than RDA value, the highest average Vitamin-C intake was 55.24 mg/day and that of girls of same age group was 53.82 mg/day, the highest average folic acid intake was 150.48 µg/day and that of girls of same age group was 143.85 µg/day which was least than RDA value.

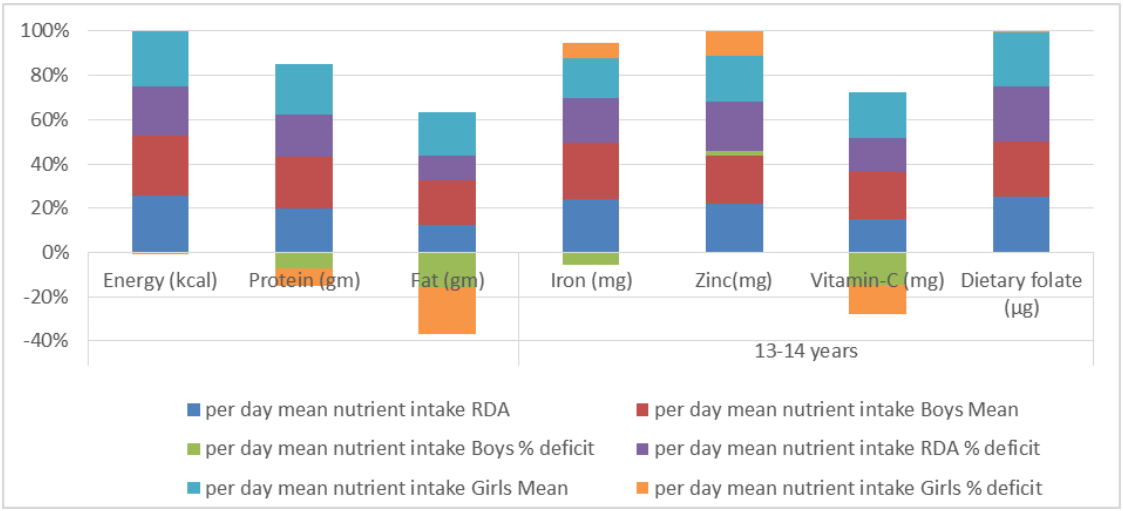

Fig 6

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.

For people who are taking oral diets, whether in the general population or in hospital, ideally an adequate intake of micronutrients should be obtained from a well balanced diet. If such a well balanced diet cannot be consumed and there is evidence of inadequate micronutrient intake, a well balanced supplement of all trace elements and vitamins designed to deliver at most the RNI should be given.

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