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Iodine Deficiency in School Children in Aligarh District, India

We carried out this study to assess iodine deficiency disorders among school children of 6-12 years age group in Aligarh district of India. The prevalence of goiter was 5.2%. Median Urinary Iodine Excretion level was 150 µg/L; 22.5% of students had biochemical iodine deficiency. 50.4% households were consuming adequately iodized salt.

Keywords: *Goiter, Iodine deficiency disorders (IDD), Median Urinary Iodine Excretion, Prevalence.*

Iodine deficiency disorders (IDD) affect all age groups [1]. In India, 263 districts are endemic for IDD [2]. Apart from goiter, WHO has also recommended the Median Urinary Iodine Excretion (MUIE) in school children as the main indicator for assessing IDD [3]. Very few studies have been carried out in the Aligarh for assessment of IDD. In view of this, a study was planned to find out the Goiter prevalence in school children aged 6–12 years in Aligarh, to determine MUIE in children, and to assess the level of iodine in salt samples at household levels.

The EPI-30 cluster sampling method as recommended by WHO/UNICEF/ICCIDD was followed [3]. The study was done in field practice areas of Department of Community Medicine, JNMC, AMU, Aligarh. The study spanned over a period of one year in 2012. A sample size of 790 was selected assuming goiter prevalence of 30.2% (as seen previously in Aligarh) at confidence level of 95%, margin of error at 15%, and design effect of 2 [4]. Twenty seven students of each school were studied using random sampling. On-spot urine samples were collected from 132 children using systematic random sampling. Samples were tested in Department of Gastroenterology and Human Nutrition, AIIMS, New Delhi. UIE levels were analyzed using wet digestion method of the Sandell-Kolthoff [5]. One hundred twenty-one salt samples were checked in school with a MIB kit provided by UNICEF, and iodine concentration was recorded as 0, <15 and ≥15 ppm [3].

Only 40 children were having Grade I goiter (thyroid palpable but not visible) giving prevalence rate of 5.2%. Not a single student had Grade 2 goiter (thyroid visible with neck in normal position). The prevalence of goiter was significantly higher in females than in males (6.9% *vs* 3.4%) and higher in 10- to 12-year-old children than in younger children (**Web Table I**). The MUIE was 150 µg/L. The proportion of students having normal range of UIE (≥100 µg/l) was 77.5%. 22.5% of students had biochemical iodine deficiency (<100 µg/L) (**Web Table II**) [3].

Only 50.4% households were consuming adequately iodized salt (≥15 ppm). Nearly 55% of households consume powdered salt, rest consumed crystalline salt. 91% samples of the powdered salt had adequate iodine (≥15 ppm) while iodine level was nil in all samples of crystalline salt.

Our result is similar to goiter prevalence of 4.78% reported by Toteja, *et al*. [6] in 15 districts of 10 states . Like NFHS-3, higher goiter prevalence was observed in girls and older children [7]. The MUIC was 150 µg/L suggesting adequate iodine intake (>100 µg/L) [3]. Studies elsewhere have also shown similar results [8,9]. A recent study done by Kapil, *et al.* [10] had shown that in India 86% of districts had a MUIC above 100 µg/L.

Only 50.4% households were consuming adequately iodized salt (≥15 ppm), similar NFHS-3 data [10].

Our area is far from the goal of 90% in terms of proportion of household using adequately iodized salt. This may pose a future risk of iodine deficiency. We should create awareness among community to consume only powdered packeted iodized salt.

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Prevalence of Obesity and Overweight Among School Children Aged 8-18 Years in Rajkot, Gujarat

A total of 1496 school children aged 8-18 years (79.1% boys) participated in this study. Prevalence of obesity and overweight was estimated by using three different growth standards. Revised IAP 2015 growth standards detected more obese and overweight children than WHO 2007 and IOTF standards.

Keywords: *Epidemiology, Manutrition, Thinness.*

High prevalence of childhood and adolescent obesity and overweight is being reported in developing countries, including India [1-5]. These problems have shown rapid increase, especially in cities and among affluent youth [6,7]. Obesity in children and adolescents leads to health consequences among them, and increases risk of obesity in adulthood [2]. A rapid epidemiological and nutritional transition along with demographic transition in India leads to double threat of over- and under-nutrition [3]. Different studies conducted during last decade in India reported prevalence of obesity in range of 2.9% to 14.3% [5-9], and of overweight in range of 1.5% to 24.0% [2-6]. These studies were conducted at different times in India by using different standards with different cut-off points to assess the prevalence of obesity and overweight. The present study was conducted to estimate the prevalence of obesity and overweight by using the Indian Academy of Pediatrics (IAP) 2015 standards [8], WHO 2007 standards [9] and International Obesity Task Force (IOTF) standards [10], among school children and adolescents aged 8-18 years from Rajkot city.

Four out of five selected schools agreed to participate in the study, and anthropometric data was collected from 3rd to 12th standard children aged 8-18 years between January to April 2015. The children studying in these schools belonged to affluent families. The data were collected from 1496 school children and adolescents. An ethical clearance was taken from the institutional ethical committee to conduct the study.

A total of 1496 students (1183 boys) participated in the study. Prevalence of obesity was 14.0% by IAP 2015 standards, 11.1% by WHO standards and 5.1% by IOTF standards (*Table* I). Obesity prevalence for boys was 16.2% by IAP standards, 12.8% by WHO standards and 5.8% with IOTF standards. Overweight prevalence for boys by IAP 2015 standards was 19.6%. Prevalence of obesity among girls was found low for all three standards. The prevalence rates of obesity and overweight as per IAP 2015 standards were higher than WHO 2007 and IOTF

Web TABLE I PREVALENCE OF GOITER ACCORDING TO SEX AND AGE GROUP

Sex	No. of students		G0	G1	% Goiter	Statistics
Male	379		366	13	3.4	$\chi^2 = 4.793$, df=1 p =0.029
Female	389		362	27	6.9	
Total	768		728	40	5.2	
Age group (years)						
6-9	378	367	11		2.9	$\chi^2 = 7.964$, df=1 p =0.005
10-12	390	361	29		7.4	
Total	768	728	40		5.2	

Web TABLE II DISTRIBUTION OF UIE ACCORDING TO SEX AND AGE GROUP

Variable	UIE <100 (µg/l)	UIE e"100 (µg/l)	Total	OR	95% C.I.	Statistics
Sex						$\chi^2 = 4.881$, df=1 $p = 0.027$
Female	19 (30.7)	43 (69.3)	62	2.76		1.09-6.93
Male -	8 (13.8)	50 (86.2)			58	1
Total	27 (22.5)	93 (77.5)	120	-	-	
Age group (years)						$\chi^2 = 3.825$, df=1 $p = 0.050$
6-9	6 (13)	40 (87)	46	0.38		0.14-1.02
10-12	21 (28.4)	53 (71.6)	74	1	-	

Figures in parenthesis are in percentages