Changing Prevalence of Iodine Deficiency Disorders in Amreli District, Gujarat, India

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Abstracts: Research Question: What is the situation of iodine deficiency disorder (IDD) and salt consumption in Amreli district? Hypothesis: The prevalence of IDD has increased markedly as a result of medical as well as socio-economic factors. Objective: To assess the magnitude of IDD in Amreli district and also assess the salt consumption patterns in the region. Design: Cross-sectional study. Setting: Primary schools in rural areas. Study Tools: Clinical examination of study population for goiter, laboratory assessment of casual urine sample for urinary iodine estimation of Iodine content of salt samples collected from sub-samples of study population. Participants: Study was conducted among 2,940 School children in the age group of 6-12 years were selected for study using WHO 30-cluster methodology, urine samples were collected from 15% of selected children and salt samples from 43% of sub-sample. Ethical Concern: No ethical issues were involved. Results: An overall goitre prevalence of 25.2% was observed in the region. Females had a prevalence of 25.4% and males 25.1%. The median urinary iodine excretion in the region was 120.0 µg/l (range: 29.0-190.0 µg/l). Forty-eight percent of subjects reported biochemical iodine deficiency with 5.2% having severe deficiency, 6.7% moderate and in 26.4% mild iodine deficiency. In Amreli region, only 39.29% households consume powdered salt having an Iodine content of greater than 15 ppm. Conclusion: Present study shows moderate goitre prevalence in primary school children in Amreli district. [Amin D et al. NJIRM 2011; 2(3) : 77-80]

Key Words: Goitre, Iodine deficiency, Salts, Cross-sectional studies, Urinary Iodine, Prevalence

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Introduction: Iodine deficiency once considered a minor problem, causing goitre, an unsightly, but seemingly benign cosmetic blemish, is now known to be the most common preventable cause of mental handicap in the world. Previously it was thought that Iodine deficiency is present only in the foothill areas and some pockets in the tribal areas of the country, but now it is known that the problem of Iodine deficiency disorders is prevalent all over the country.[1] About 200 million people are at the risk of IDD in our country. The survey conducted by the Central & State Health Directorates, ICMR and medical Institutes have clearly demonstrated that not even a single State/UT is free from the problem of Iodine Deficiency Disorders. It is estimated that 71 million population are suffering from goitre and other iodine deficiency disorders. Samples surveys have been conducted in 28 States and 7 Union - Territories of the country which revealed that out of 324 districts surveyed so far IDD is a major public health problem in 263 districts where prevalence is more than 10%.[1] Government of India made it compulsory to sell only iodized salt to prevent this problem. However, recently Government of India and then Government of Gujarat have withdrawn the ban on sale of non-iodization of salt. We have tried to reemphasize the importance of Universal Salt Iodization (USI) in this paper.

Material and Methods: The 30 cluster cross sectional study was conducted in the entire 11 Talukas of Amreli district from 8th-14th July 2009. The list of villages, primary schools and population were obtained from the Jilla Panchayat of Amreli. As per guideline provided, total 30 villages were selected from the Amreli district by using cluster sampling technique. Census 2001 population was used for sampling. Areas mentioned as urban areas like cities, towns, taluka headquarters were excluded from the village list to focus only the rural population of Amreli district. The survey was done among these villages in children studying in primary schools from 1st to 7th standard in age group of 6 to 12 years. Total 70 children (35 boys and 35 girls) were examined for iodine deficiency from each primary school of selected villages. Urine sample was also collected from one boy and one girl from each standard (total 14) to know their status of iodine excretion in urine. As per guidelines provided, about 30% school dropout rate & absenteeism was considered, 28 students (14 boys and 14 girls) were examined in the

community for iodine deficiency on same day in same village. Salt sample was taken from each of these children and tested by using salt testing kit supplied to all district level for the this purpose to know the level of iodization at the household level. Cases of goitre were identified and classified by using the latest classification given by W.H.O.[2]

Result: To know the prevalence of goitre among school children, a total of 2940 children were examined; out of them 742 (25.2 %) were found to be having goitre (638 (21.7%) were of grade I and only 104 (3.5%) were of grade II) [Table I]. It indicates the total prevalence of 25.2%. The total prevalence is high in Girls (25.4%) for both grade 1 (21.7%) & grade 2 (3.7%) as compare to Boys (25.1%) for both grade 1 (21.7%) & grade 2 (3.4%) which is much more than other study.[3,4,5]

Table I : Age & Sex wise Prevalence of Goitre in the Amreli District

Age (Years)	Sex	Grade 0	Grade 1	Grade 2	Prevalence of Goitre (Gr 1+2)
6-8 yrs (n=1260)	M (n=630)	491	129	10	139 (22.10%)
	F (n=630)	490	121	19	140 (22.20%)
9-10 yrs (n=840)	M (n=420)	305	97	18	115 (27.40%)
	F (n=420)	315	94	11	105 (25%)
11-12 yrs (n=840)	M (n=421)	291	104	24	128 (27.30%)
	F (n=419)	72.7	22.1	5.2	27.3 (30.50%)
TOTAL (n=2940)	M (n=1471)	1102	319	50	369 (25.10%)
	F (n=1469)	1096	319	54	373 (25.40%)
	Total	2198	638	104	742 (**25.20**%)

When current prevalence was compared with the baseline data of 1988 and 2000 and 2009 survey, it was found that prevalence rate of goitre has increased in all the Talukas [Figure 1].

The difference observed in the prevalence of Goitre between those who were consuming iodated salt and who were not, was statistically significant in the Amreli district [Table II].

Table II: Comparison Goitre Grade and level of iodine content in Salt testing:

Goitre Grade	Salt Testing			
	Nil (n=550)	>0 to <15 ppm (n=215)	>= 15ppm (n=495)	TOTAL (n=1260)
No Goitre (Gr 0)	367 (41.2%)	150 (16.8%)	374 (42%)	891 (70.71%)
Goitre (Gr 1)	158 (50.2%)	56 (17.8%)	101 (32.1%)	315 (25.0%)
Goitre (Gr 2)	25 (46.3%)	9 (16.7%)	20 (37%)	54 (4.29%)
Goitre Total (Gr 1+ Gr 2)	183 (49.59%)	65 (17.62%)	121 (32.79%)	369 (29.29%)

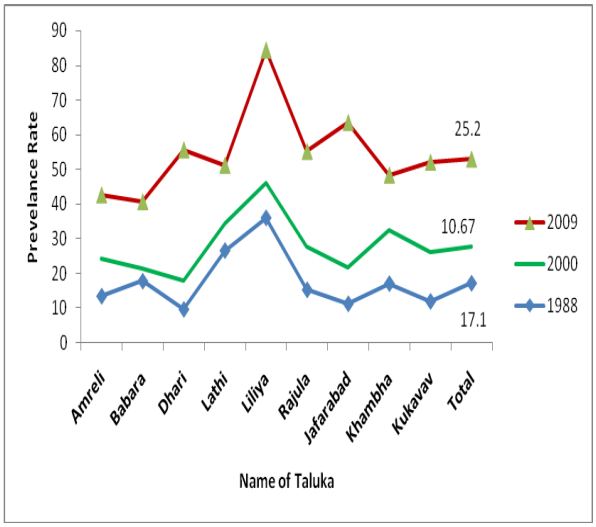
For difference in the Prevalence of goitre (Total i.e. Gr 1 & Gr 2) between those who are consuming salt with sufficient iodine (>=15 ppm) and those who are consuming salt with insufficient iodine (<15ppm or Nil). X^2 =10.3982, dF = 4, P value = 0.0342

Urine analysis : A total 420 casual urine samples were analyzed by Biochemistry Department for urinary iodine excretion (UIE) [Table III]. The median UIE was 120.0 µg/l which was comparable with study done in Delhi[7] and Jammu.[4] Assessment of severity of IDD in Amreli District based on Median Urinary Iodine level as recommended by WHO[2] given below:

Table III Assessing severity of IDD based on Median Urinary Iodine levels

Urinary Iodine Level (mcg/l)	Severity of IDD	Percentage (N=420)
<20	Severe	25 (5.95%)
20-49	Moderate	28 (6.67%)
50-99	Mild	109 (25.95%)
>100	Normal	258 (61.43%)

Figure I : Prevalence Rate of Goitre amongst Primary School Children of Various Talukas of Amreli District 1988 Vs 2000 Vs 2009 [6]



Discussion: To evaluate the severity of IDD in a region, the most widely accepted marker is the prevalence of endemic goitre in school children. WHO on the basis of IDD prevalence recommended the criteria to understand the severity of IDD as a public health problem in a region. According to these criteria, a prevalence rate of 5.0-19.9% is considered as mild; 20-29.9% as moderate and a prevalence rate of above 30% considered as a severe public health problem.[6] In the present study, the total goitre prevalence was 25.2% indicating that IDD is a moderate public health problem in the region.

The government of India launched a centrally assisted national goitre control programme in 1962. The programme was renamed as National iodine deficiency disorder control programme (NIDDCP) in 1992. Government also took a policy decision to universal iodization of edible salt in the same year. The goal of NIDDCP was to reduce the prevalence of IDD below 10% by 2010.[8] The present survey conducted after 17 years of implementation of universal iodization of edible salts did not show much impact on the prevalence of goitre in rural areas of Amreli district as only 39.29% households consume powdered salt having an Iodine content of greater than 15 ppm which was also less as compared to other states[5,7] and prevalence of Goiter in the region is in rising trend[2]. The difference in the prevalence of goitre in the baseline survey of 1988, 2000 and re-survey of 2009 is highly significant. These results are in line of re-surveys of other districts.[3,4,6] Since January, 2001 in Gujarat, the ban of the availability of non-iodized salts in the market increased. In November 2005, the Central government issued notification banning the sale of non-iodized salt for direct human consumption in the entire country.[9] Looking at our results, it is desirable that government should continue Universal Salt Iodization and ensure that only Iodized salts consumed by all.

Conclusion: The present study shows moderate prevalence of goiter in Amreli with significant difference of goiter between those consuming iodized salt & those not consuming iodized salt which indicates universal iodization and consumption will definitely reduce prevalence of iodine deficiency in the area.

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