

KNOWLEDGE, ATTITUDE AND BEHAVIOUR REGARDING USE OF IODISED SALT: AN EVALUATION OF NATIONAL IODINE DEFICIENCY DISORDERS CONTROL PROGRAMME IN INDIA

Pardeep Kumar ^a, Vijay K. Tiwari ^b, Rajesh K. Gautam ^c,

^a University of Delhi, Delhi, India.

^b National Institute Of Health & Family Welfare, New Delhi, India.

^c Department of Anthropology, Dr. H.S. Gaur University, Sagar, M.P., India.

^a Corresponding author: kambojpardeep@rediffmail.com

©Ontario International Development Agency ISSN: 1923-6654 (print)

ISSN 1923-6662 (online). Available at <http://www.ssrn.com/link/OIDA-Intl-Journal-Sustainable-Dev.html>

Abstract: An Evaluation of National Iodine Disorder Deficiency Control Programme (NIDDCP) in India was undertaken by National Institute of Health and Family Welfare on the behest of Ministry of Health and Family Welfare in the year 2005-06 in ten States of the country selected from North, East, South, West and Central Regions. The objective of evaluation was to find out the level of awareness about use of iodised salt by the community. The data was collected using semi-structured interview schedules from households regarding knowledge, attitude and behavior about consumption of salt. Salt samples from 2404 households, both from urban and rural areas, were tested on the spot using MBI kits. It was found that more than 72 per cent respondents were aware about the iodised salt. Regarding ban on sale of uniodised salt, only 10 per cent respondents were aware. Except Goitre, other ill-effects of IDD were hardly known to the community. Major source of information about this awareness was television. Iodised salt was easily available at a distance of less than a km. It was found that consumption of non-iodised salt was common in salt producing States because small producers were usually selling non-iodised salt in rural areas at cheaper rate as there was no check on transportation of salt through road. In rural areas salt was also being used for cattle consumption, bricks preparation, coconut trees, ice-cream preparation and burial purposes. Though the programme has been successful in ensuring the reach of iodised salt in remote areas

but people still found the price of iodised salt unaffordable. The average rate to which people may like to purchase iodised salt was between rupees 2 to 3/- per kg.

The study came out with suggestions to strengthen the programme at district level and below in terms of awareness generation through IEC, testing of iodine content in urine and salt, monitoring and evaluation, public private partnership initiatives in different components of the programme.

Keywords: Deficiency, Disorders, Evaluation, Goitre, Iodised, National, Programme.

INTRODUCTION

Iodine is an essential micronutrient with an average requirement of at 100-150 micrograms daily for normal human growth and development. The disorders caused due to deficiency of nutritional iodine in the food are called Iodine Deficiency Disorders (IDDs). These disorders include abortion, stillbirth, mental retardation, deaf-mutism, dwarfism, squint, cretinism, and goitre of all ages, neuro-motor defects etc.

Iodine Deficiency Disorders (IDDs) pose a serious threat to the health, economic productivity and advancement of several hundred million people throughout the world. Iodine deficient children suffer from tardy concentration, impaired co-ordination and sluggishness, which result in poor school

performance. The Ministry of Health and Family Welfare and the United Nations Children's Fund (UNICEF) estimated that around 26 million children born each year, of whom 13 million (nearly 50%) face the risk of IDD's (T.K. Rajalakshmi, 2005). Iodine deficiency is known to cause other health problems viz. stunting of growth, speech and hearing impediments and depleted levels of energy in children. Studies conducted all over the world revealed that 130 countries are affected by iodine deficiency, with a total population in excess of 2 billion at risk of brain damage (WHO/ UNICEF/ ICCIDD, 2001).

Therefore, the elimination of IDD's is a critical national development issue and has been given priority by government and international agencies. Recognizing the importance of preventing IDD's, the World Health Assembly in 1990 adopted the goal of the elimination of iodine deficiency as a public health problem by the year 2000 (Forty Third World Health Assembly, 1990). Salt iodisation was identified as the main intervention to deliver iodine on a continuous and self-sustaining basis to populations around the world.

India is the second most populous country in the world with a population of 1027 million (2001 Census). There is a high prevalence of goitre and cretinism in the Himalayan belt from Jammu and Kashmir in the West to Arunachal Pradesh in the East and along this entire length extending at least 500 kms south of the Himalayas into the flat sub-Himalayan Terai (plains). In addition to the well-known Himalayan endemic belt, iodine deficiency and endemic goiter has been reported from many other States in the country. In our country, it is estimated that more than 71 million persons are suffering from goitre and other iodine deficiency disorders (Annual Report, MOHFW, 2004-05).

Data from NFHS III, 2005-06 showed that in urban areas 71.5 percent of the population consumed adequately iodised salt while in rural areas only 41.2 percent used adequately iodised salt. A total of 51.1 per cent of households were using adequately iodised salt. The data also shows that in coastal states like Tamil Nadu (41.3%), Karnataka (43.3%), Andhra Pradesh (31.0%), Kerala (73.9%) and Gujarat (55.7%), the percentage of household consuming adequate iodised salt was much lower than many of the northern states like Delhi (86%), Punjab (74.6%) and Himachal Pradesh (82.5%). Only 41.2% of the households in rural areas were using iodised salt where as usage level was higher in large cities (76.7%), small city and town (66.5%). The survey underlines need for monitoring and surveillance in all the states.

National IDD Control Programme in India

Realizing the magnitude of the problem, the Government of India launched a 100 per cent centrally assisted National Goitre Control Programme (NGCP) in 1962. Evaluation of NGCP by the Nutrition Foundation of India in the year 1981 revealed that the programme could not achieve the desired objectives. The Central Goitre Control Review Committee (CGCRC) has recommended universalizing iodisation of edible salt for human consumption in the country. Accepting the recommendations of CGCRC, Government of India in 1984 took a historic policy decision for Universal Salt Iodisation (USI) i.e. to fortify all edible salt in the country with iodine. The elimination of goitre was included in the Prime Minister's 20 Point Programme. The PFA Act in 1988 was amended to specify that iodised salt should have, on the minimum, iodine in the concentration of 30 ppm at production level and 15 ppm at consumer level.

In August 1992, the National Goitre Control Programme (NGCP) was renamed as National Iodine Deficiency Disorders Control Programme (NIDDCP) with a view to cover a wide spectrum of Iodine Deficiency Disorders like mental and physical retardation, deaf-mutism, cretinism, stillbirth, abortion etc. with the goal of reducing the prevalence of IDD below 10 percent in endemic districts of the country (7 Policy guidelines on NIDDCP, MOHFW, 2003)

Production of Iodised Salt

The iodised salt production in India has been liberalized to private sector. In 1983 there were only 12 iodisation plants in the country producing 0.2 million tones of iodized salt, dramatic changes occurred in less than ten years after the liberalization. Policy initiatives taken by the Govt. over the last one decade have helped moving closer towards the goal of universal salt iodisation (USI). The Salt commissioner's office facilitated establishment of 813 Units including 42 refineries with a total annual installed capacity of 117 lakh tones (as on 31-06-2006) which is more than 54 lakh tones required for entire human consumption in the country per annum. These units have annual production capacity of 124.30 lakh tones of iodated salt. The production of iodised salt, which was 36.89 lakh tons during 2002-03, has increased to 42.53 lakh tons during the year 2003-04, against the target of 52.0 lakh tons. It is increased to 46.10 lakh tones by the end of 2004-05. In the year 2005-06 the production was 49.83 lakh tons. This is expected to rise further in near future (5 Annual report of Salt Department, 2004-05).

Table 1: Target and Production of Iodised Salt

Year	Target	Production (Lakh tons)
1999-2000	50.00	46.16
2000-2001	50.00	45.35
2001-2002	50.00	47.92
2002-2003	52.00	36.89
2003-2004	52.00	42.53
2004-2005	52.00	46.10
2005-2006	52.00	49.83

Source: MOCI, Salt Deptt. 2004-05

Various studies related to Iodine Deficiency Disorders have been conducted in the country during the last number of years and almost all of them have demonstrated the decline of goitre in the country and suggested the need of strengthening the system of monitoring of quality of iodised salt made available to population, strengthening IEC (Information, Education, Communication) component for elimination of IDD and increasing the coverage of adequately iodised salt. However, none of the studies have focused on comprehensive evaluation of NIDDCP.

The NIDDCP has now been under implementation for more than four decades and had undergone several changes. Therefore, the Nutrition Cell, Directorate General of Health Services, MOHFW, desired that the programme may be evaluated as a whole to see how far the programme has been able to achieve its objectives. The study on Evaluation of National Iodine Deficiency Disorders was assigned to National Institute of Health and Family Welfare and funded by Ministry of Health and Family Welfare (MOHFW) in the March 2005.

METHODOLOGY

The present evaluation was conducted to evaluate the policy and managerial process regarding implementation of National Iodine Deficiency Disorders Control Programme (NIDDCP) in the country with respect to assess the awareness.

For the present evaluation ten States from five regions of the country viz., Assam, Punjab, Himachal Pradesh, Gujarat, Uttar Pradesh, Orissa, Sikkim, Tamil Nadu, Kerala and Rajasthan were selected. Keeping in view the prevalence of IDD and implementation status of NIDDCP, a multistage random sampling design was adopted for the study. At the first stage, the country was stratified into five

major regions i.e. East, West, North, South and Northeast. Next to this, from each region, two States were selected based on the prevalence rates of Iodine Deficiency Disorders (i.e. one with higher and the other with lower). At the third stage, from each selected State, two districts (one higher endemic and the other lower) were selected. Further, one Block PHC/CHC was selected randomly from each district. Thereafter, from each selected Block PHC/CHC, two Sub-Centres and two villages (one headquarter and another non-headquarter village from each selected Sub-centres) were randomly selected for the study. From each village, 20 households were randomly selected.

For the urban areas, from the selected district, one UFWC/Health Post was selected. From the selected center two urban blocks- one adjacent to District UFWC/Health Post and another away from it were randomly selected and from each ward, 20 households were selected randomly. Salt samples collected from Households were tested by MBI kits on the spot and findings were demonstrated to HHs.

In all, a total of 10 States, 20 Districts, 20 CHCs/Block-PHCs, 40 Sub-centres, 80 villages and 1600 households were selected from the rural areas. On a similar pattern from urban areas, 20 UFWCs/Health Posts, 40 urban blocks, and 800 households were selected. Thus, a total of 2400 Households, 240 retailers and 82 wholesalers were included in the study.

The data for the study was collected by using the interview technique and record study. The data was analysed manually and also through computer using SPSS Software. Schedules filled from household were scrutinized, edited and then data were directly entered into SPSS and analysed as per objectives of the study.

FINDINGS

Socio-Demographic Characteristics

A total sample of 2404 HHs was covered in the study from urban and rural areas. This consisted of 1528 rural HHs (63.56%) and 876 urban HHs (36.44%) from 10 selected States of the country. The Schedule Cast population consisted of 16%, Schedule Tribe 8% and rest 76% were belonging to General and Other categories. A total of 84% were Hindus, 9% were Muslims and rests 7% were Christians and Others. As literacy is concerned, 21% were illiterate, 28% were having elementary schooling, 33% were high school pass and 18% were graduates. Regarding occupation, nearly 25% were labourer, 22% were cultivators, 25% were from service background and rest 18% were unemployed.

Knowledge, Attitude, Consumption and Availability of Iodised Salt

It was found from the analysis that about 72% respondents were aware about the iodised salt. The highest percentage was 89% in Himachal Pradesh and lowest percentage was 49% in Uttar Pradesh. Though awareness about iodised salt was high but knowledge about iodised salt was low. Only 26% of respondents were knowing about meaning of iodised salt. The highest percentage was in Rajasthan 52% and lowest was in Tamil Nadu 8%. States of Assam (36%), Kerala (40%), Rajasthan (52%) and Sikkim (26%) were relatively better than Gujarat (21%), H.P. (30%), Orissa (12%), Punjab (22%), T.N. (8%) and U.P. (9%). The logo of 'Smiling Sun' was known to only 4% of respondents and printing of iodine level on salt packet was known to only 15% of respondents. Across States similar percentage of responses were noticed except Orissa, Rajasthan and UP where it was relatively low.

Regarding availability of iodised salt, 93% respondents told that it was always available without much variations across States. Most of the HHs were consuming salt between 1-3 kg per month. Majority of HHs were spending upto Rs. 10/- per month. In tribal areas of Orissa, it was found that crystal/crushed salt (non-iodised) in 20 kg bag was given to labourers in lieu of wages. Also, barter system was in vogue in remote tribal areas in the State of Orissa. The uniodized salt used to be exchanged in lieu of local forest fruits/other products. Nearly 81% of respondents told that they purchased salt from local shop in same village/town. Rest 9% were buying from shops in nearby town and 2% were buying salt from weekly market. It was observed in different States that in weekly market most of the vendors were selling non-iodised/duplicate brand salt without any objection from community leaders or officials from health department or PFA Cell. It was

found that 64% of HHs were using refined iodised salt, 17% were using crystal salt and 10% were using crushed salt. It was observed that uniodized crystal salt was mostly being used in producing Sates like Rajasthan, Tamil Nadu, Gujarat and Kerala. However, in State of UP crystal salt was mainly used in rural areas. Reason for use of uniodized crystal/crushed salt was mostly cheaper price and easy availability through hawkers. These hawkers were selling crystal salt in exchange of waste items. Majority of users of non iodised crystal/crushed salt were using it for cooking purpose but some were found to be using it for animal's consumption, coconut plants, burial of dead bodies, ice preparation, brick kiln etc. Majority of HHs (81%) were purchasing salt in packets of 1kg or 1/2 kg. Relatively less percentage of HHs viz 46% HHs in UP, 61% in Orissa and 69% in Tamil Nadu were purchasing packaged salt. Rest was using loose salt usually non-iodised one. Though the majority of respondents (75%) had no problem with affordability of price, 25% said that price should be between Rs.1 to 3 per kg.

Only 87% of respondents were keeping salt in closed jar and 6% were keeping in same packet. Rest 7% were keeping it open. This percentage of HHs keeping salt in closed jar was more than 80% in all States except in Rajasthan (73%).

Only 10% of respondents were aware about ban on sale of non-iodised salt. This varies from 21% in Himachal Pradesh to 1.3% in Kerala. States of Rajasthan (14.3%), Assam (15%) were better placed than other States. Only 2.4% of respondents were aware about MBI Kits to check the iodine content in salt. The better aware States were Sikkim (11%), Assam (5.4%), Gujarat (2.9%) and HP (2.5%). This percentage was below 1 in rest of the six States.

In the community survey, HHs were asked about ill effects of consuming non-iodised salt. All possible health problems were probed. In aggregate terms goiter was known to about 97% of respondents. Other health problems were poorly known i.e. cretinism (3.4%), mental retardation (17.1%), abortion (5.1%), still birth (2.6%), deaf mutism (1.8%), dwarfism (2.3%), squint (1.4%), neuro-motor defects (1.8%), others (2.0).

However, we came across with perception of people that for those using plenty of seafood, iodised salt is not necessary and by consuming iodised salt serious health problems like diabetes, heart attack etc. would occur because of excess iodine in body. When asked about source of information regarding IDD, T.V. was found as major source (87%) followed by Radio (20%), Streets play/Newspaper and Magazine (8.3%), Doctor/Health Worker/ICDS worker (10.0%), Shopkeeper (2.3%), Poster (1.3%). The pattern is

almost same across States. Thus, it can be inferred that TV and Radio are major source of information on IDD.

Activities Conducted under the NIDDCP

When HHs visited were asked whether anybody visited to check salt sample in their houses during last one year, in aggregate terms only 4% respondents said 'yes'. The figure was highest among Rajasthan (13%) followed by Gujarat (12%), Tamil Nadu (6%), Orissa (4%) and Sikkim (3%). In rest of the States, it was less than 1%. Regarding conduct of Goitre/IDD Survey, 98.4% respondents said nobody visited their house but about 2% respondents in Gujarat and Rajasthan said 'yes'. Regarding any IEC activities conducted during last one-year, 96% respondents said 'no' but only in States of Gujarat (8.3%), Orissa (6.6%) and Rajasthan (9%) respondents said 'yes'. In aggregate, less than 2% respondents were aware about any related activity conducted by Panchayat/School but in few States viz Gujarat (6.2%), Rajasthan (4.5%) and Tamil Nadu (5%) respondents were aware about some activities conducted by Panchayat/School.

During the household survey salt samples from household were also tested. Nil iodine was found in 17.3% samples followed by 7ppm in 8.7% households, 15ppm in 18.2% households. 30ppm in 54% households and >30ppm in 2% households. Therefore, it can be concluded that still more than 1/4th households consuming salt having nil/inadequate iodine level. The State wise distribution describes that in State of Assam 21%, Gujarat 39%, Himachal Pradesh 0.4%, Kerala 6.3%, Orissa 44%, Punjab 22%, Rajasthan 35%, Sikkim 6%, Tamil Nadu 42.5% and in Uttar Pradesh 45% households were using inadequately iodised salt.

Subsequently, households were asked about measures to promote consumption of iodised salt. Half of the respondents replied for awareness creation. About one fourth opined to ban non-iodised salt in market. About 7% favored punishing vendors. For improving availability of salt, distribution of subsidized salt (34%) and regulation of salt price (20%) were main suggestions emerged from people.

Differentials in Awareness and Consumption of Iodised Salt

Regarding accessibility of salt, highest percentage of ST population (15%) buy salt from another village while majority of other caste including SC buy salt from the same village where they live. Relatively higher percentage of SC (2.3%) and ST (11.5%) population buy salt from weekly market. As already described weekly markets are major source of supply

of non-iodised salt. Again, the use of iodised refined salt is relatively less among SC (47%) and ST (51.4%) population as compared to OBC (53%) and General Population (73%). Awareness about iodised salt was low among SC (60%) and ST (65%) population as compared to OBCs (72%) and General (78%) population. The knowledge about ill effects of iodine deficiency was also poor among SC (41%) and ST population (46%) as compared to OBCs (55%) and General population (60%). The consumption of non-iodised salt was relatively higher between SC (23%) and ST (26%) population as compared to OBCs (11.8%) and General (11.8%) population. Higher percentage of SC (33%) and ST (29%) population were buying loose salt as compared to OBCs (16%) and General (13%) population. Thus, it can be safely concluded that all parameters under study were more in favour of General and OBC population than SC/ST population.

The urban/rural differential also found to be affecting different parameters under study. More urban HHs (76%) were aware about iodised salt as compared to rural HHs (69%). Awareness about logo of smiling sun was half in rural areas (2.5%) as compared to urban areas (5.6%). Knowledge about ban on non-iodised salt was low in rural areas (9.0%) as compared to urban areas (11%). The knowledge about ill effects of iodised salt was less (54%) in rural areas as compared to urban areas (61%). Availability of iodised salt in rural areas was relatively low (90%) as compared to urban areas (96%). Percent of HHs using non-iodised salt is more (21%) in rural areas as compared to (12%) in urban areas. More HHs in rural areas (25%) purchase loose salt as compared to 8.8% HHs in urban areas. Thus, it can be safely concluded that all parameters under study were more in favour of urban areas than in rural areas.

It was also found that parameters under study were different in endemic as well as non-endemic areas. Non-iodised salt is used in 36.8% HHs in endemic districts as compared to 21.8% HHs in non-endemic districts. Significantly low HHs (67%) in endemic districts were aware about iodised salt as compared to 78% HHs in non-endemic districts. Knowledge about ban on non-iodised salt was low 7% in endemic districts as compared to non-endemic districts (13%). Again, knowledge about ill effects of iodine deficiency was low in endemic districts (53%) as compared to non-endemic districts (61%). More HHs in endemic districts (20%) were using non-iodised salt as compared to HHs in non-endemic districts (15%). Loose salt is purchased more in endemic areas (24%) as compared to non-endemic areas (13%).

		ASSAM	GUJARAT	HIMACHAL PRADESH	KERALA	ORISSA	PUNJAB	RAJAS- THAN	SIKKIM	TAMIL NADU	UTTAR PRADESH	Total	
EDUCATION OF RESPONDENT	ILLITERATE	52	78	15	2	79	64	43	30	49	82	494	
		21.7%	32.4%	6.3%	.8%	32.8%	26.7%	17.6%	12.3%	20.6%	34.6%	20.5%	
	ELEMENTARY SCHOOL	64	84	37	93	58	60	104	71	50	51	672	
		26.7%	34.9%	15.5%	38.8%	24.1%	25.0%	42.6%	29.1%	21.0%	21.5%	28.0%	
	HIGH SCHOOL	71	63	98	93	69	82	55	89	102	72	794	
		29.6%	26.1%	41.0%	38.8%	28.6%	34.2%	22.5%	36.5%	42.9%	30.4%	33.0%	
	COLLEGE/ PROFESSIONAL	50	14	88	51	35	34	41	52	37	23	425	
20.8%		5.8%	36.8%	21.3%	14.5%	14.2%	16.8%	21.3%	15.5%	9.7%	17.7%		
NO RESPONSE	3	2	1	1	0	0	1	2	0	9	19		
	1.3%	.8%	.4%	.4%	.0%	.0%	.4%	.8%	.0%	3.8%	.8%		
Total		240	241	239	240	241	240	244	244	238	237	2404	
OCCUPATION OF HEAD OF HOUSEHOLD	LABOUR	84	80	33	95	71	49	33	14	91	57	607	
		35.0%	33.2%	13.8%	39.6%	29.5%	20.4%	13.5%	5.7%	38.2%	24.1%	25.2%	
	SERVICE	51	51	90	43	50	58	59	115	31	53	601	
		21.3%	21.2%	37.7%	17.9%	20.7%	24.2%	24.2%	47.1%	13.0%	22.4%	25.0%	
	CULTIVATION	38	48	44	2	55	75	106	30	56	79	533	
		15.8%	19.9%	18.4%	.8%	22.8%	31.3%	43.4%	12.3%	23.5%	33.3%	22.2%	
	BUSINESS	54	58	60	35	44	34	38	80	25	31	459	
		22.5%	24.1%	25.1%	14.6%	18.3%	14.2%	15.6%	32.8%	10.5%	13.1%	19.1%	
	UNEMPLOYED	2	1	0	9	1	1	1	1	1	1	2	19
		.8%	.4%	.0%	3.8%	.4%	.4%	.4%	.4%	.4%	.4%	.8%	.8%
OTHERS	9	3	12	56	20	21	5	4	31	13	174		
	3.8%	1.2%	5.0%	23.3%	8.3%	8.8%	2.0%	1.6%	13.0%	5.5%	7.2%		
NO RESPONSE	2	0	0	0	0	2	2	0	3	2	11		
	.8%	.0%	.0%	.0%	.0%	.8%	.8%	.0%	1.3%	.8%	.5%		
Total		240	241	239	240	241	240	244	244	238	237	2404	
		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Table 2: State-wise Distribution of Knowledge about use of Iodised Salt

		ASSAM	GUJARAT	H.P.	KERALA	ORISSA	PUNJAB	RAJ	SIKKIM	TAMIL NADU	U.P.	Total
HEARD ABOUT IODISED SALT	YES	198 (82.5%)	149(61.8%)	212(88.7%)	191(79.6%)	153(63.5%)	154(64.2%)	204(83.6%)	188(77.0%)	164(68.9%)	115(48.5%)	1728(71.9%)
	NO	42(17.5%)	92(38.2%)	27(11.3%)	49(20.4%)	88(36.5%)	86(35.8%)	40(16.4%)	56(23.0%)	74(31.1%)	122(51.5%)	676(28.1%)
Total		240	241	239	240	241	240	244	244	238	237	2404
WHAT IS IODISED SALT	ORDINARY COMMON SALT WITH A SMALL QUANTITY OF IODINE	86(35.8%)	51(21.2%)	71(29.7%)	97(40.4%)	30(12.4%)	53(22.1%)	126(51.6%)	63(25.8%)	18(7.6%)	22(9.3%)	617(25.7%)
	OTHER SPECIFY	3(1.3%)	3(1.2%)	1(.4%)	3(1.3%)	1(.4%)	22(9.2%)	4(1.6%)	2(.8%)	18(7.6%)	2(.8%)	59(2.5%)

	DON'T KNOW/N.R	151(62.9%)	187(77.6%)	167(69.9%)	140(58.3%)	210(87.1%)	165(68.8%)	114(46.7%)	179(73.4%)	202(84.9%)	213(89.9%)	1728(71.9%)
Total		240	241	239	240	241	240	244	244	238	237	2404
RECOGNITION OF IODIZED SALT PACKET	SMILING SUN ON PACKET	5(2.1%)	7(2.9%)	17(7.1%)	7(2.9%)	6(2.5%)	27(11.3%)	1(4%)	8(3.3%)	7(2.9%)	2(8%)	87(3.6%)
	IODINE LEVEL PRINTED ON PACKET	64(26.7%)	50(20.7%)	55(23.0%)	70(29.2%)	1(4%)	36(15.0%)	0(0%)	34(13.9%)	33(13.9%)	5(2.1%)	348(14.5%)
	GREEN LEAVES	0(0%)	0(0%)	1(4%)	0(0%)	1(4%)	0(0%)	0(0%)	0(0%)	1(4%)	1(4%)	4(2%)
	ANY OTHER	0(0%)	4(1.7%)	3(1.3%)	3(1.3%)	4(1.7%)	1(4%)	0(0%)	1(4%)	13(5.5%)	3(1.3%)	32(1.3%)
	DON'T KNOW/N.R	171(71.3%)	180(74.7%)	163(68.2%)	160(66.7%)	229(95.0%)	176(73.3%)	243(99.6%)	201(82.4%)	184(77.3%)	226(95.4%)	1933(80.4%)
Total		240	241	239	240	241	240	244	244	238	237	2404
AVAILABILITY OF IODIZED SALT IN YOUR AREA	ALWAYS AVAILABLE	232(96.7%)	237(98.3%)	232(97.1%)	236(98.3%)	227(94.2%)	235(97.9%)	220(90.2%)	238(97.5%)	175(73.5%)	193(81.4%)	2225(92.6%)
	NEVER AVAILABLE	7(2.9%)	1(4%)	3(1.3%)	1(4%)	8(3.3%)	4(1.7%)	3(1.2%)	2(8%)	18(7.6%)	11(4.6%)	58(2.4%)
	NOT AVAILABLE WITHIN LAST 1 MONTH	0(0%)	0(0%)	0(0%)	1(4%)	1(4%)	0(0%)	0	0	4(1.7%)	0	6(2%)
	NOT AVAILABLE WITHIN LAST 6 MONTHS	0	0	1(4%)	0	0	0	0	0	0	0	1(4%)
	NO RESPONSE	1(4%)	3(1.2%)	3(1.3%)	2(8%)	5(2.1%)	1(4%)	21(8.6%)	4(1.6%)	41(17.2%)	33(13.9%)	114(4.7%)
Total		240	241	239	240	241	240	244	244	238	237	2404
WHERE DO YOU USUALLY BUY SALT	LOCAL SHOP IN THE SAME TOWN/VILLAGE	236(98.3%)	189(78.4%)	224(93.7%)	219(91.3%)	169(70.1%)	186(77.5%)	181(74.2%)	202(82.8%)	143(60.1%)	205(86.5%)	1954(81.3%)
	ANOTHER SHOP IN NEARBY TOWN/VILLAGE	2(8%)	19(7.9%)	8(3.3%)	20(8.3%)	25(10.4%)	52(21.7%)	21(8.6%)	37(15.2%)	12(5.0%)	28(11.8%)	224(9.3%)
	FROM THE WHOLESALE SHOP IN DISTRICT IN HQ	1(4%)	1(4%)	3(1.3%)	0	0	0	19(7.8%)	0	4(1.7%)	2(8%)	30(1.2%)
	FROM WEEKLY MARKET	1(4%)	0	1(4%)	0	45(18.7%)	0	3(1.2%)	0	1(4%)	0	51(2.1%)
	OTHERS	0	32(13.3%)	3(1.3%)	1(4%)	2(8%)	2(8%)	19(7.8%)	2(8%)	78(32.8%)	0	139(5.8%)
	NO RESPONSE	0	0	0	0	0	0	1(4%)	3(1.2%)	0	2(8%)	6(2%)
Total		240	241	239	240	241	240	244	244	238	237	2404

(MULTIPLE RESPONSES)

Table 3: Monthly Expenditure of Consumption of Salt by Family

		ASSAM	GUJARAT	H.P.	KERALA	ORISSA	PUNJAB	RAJAS- THAN	SIKKIM	TAMIL NADU	U.P.	Total
MONEY SPENT ON IODIZED SALT PER MONEY	0 – 10	118	176	130	211	61	146	136	148	69	61	1256
		49.2%	73.0%	54.4%	87.9%	25.3%	60.8%	55.7%	60.7%	29.0%	25.7 %	52.2%
	10 – 20	87	18	92	16	69	60	30	71	22	30	495
		36.3%	7.5%	38.5%	6.7%	28.6%	25.0%	12.3%	29.1%	9.2%	12.7 %	20.6%
	20 – 30	19	3	13	1	17	10	8	12	7	6	96
		7.9%	1.2%	5.4%	.4%	7.1%	4.2%	3.3%	4.9%	2.9%	2.5%	4.0%
	30 – 40	8	1	1	0	6	2	2	2	1	2	25
		3.3%	.4%	.4%	.0%	2.5%	.8%	.8%	.8%	.4%	.8%	1.0%
	40 - 50	0	1	2	0	1	0	0	1	0	1	6
		.0%	.4%	.8%	.0%	.4%	.0%	.0%	.4%	.0%	.4%	.2%
	>50	1	0	1	0	1	0	0	1	0	0	4
	.4%	.0%	.4%	.0%	.4%	.0%	.0%	.4%	.0%	.0%	.2%	
N.R./ N.A.	7	42	0	12	86	22	68	9	139	137	522	
	2.9%	17.4%	.0%	5.0%	35.7%	9.2%	27.9%	3.7%	58.4%	57.8 %	21.7%	
Total		240	241	239	240	241	240	244	244	238	237	2404
MONEY SPENT ON CRYSTAL SALT PER MONTH	0 – 10	6	46	2	38	104	137	38	0	131	139	641
		2.5%	19.1%	.8%	15.8%	43.2%	57.1%	15.6%	.0%	55.0%	58.6 %	26.7%
	10 - 20	0	0	0	0	29	3	3	10	24	3	72
		.0%	.0%	.0%	.0%	12.0%	1.3%	1.2%	4.1%	10.1%	1.3%	3.0%
	20 - 30	0	0	0	0	1	1	0	0	4	0	6
		.0%	.0%	.0%	.0%	.4%	.4%	.0%	.0%	1.7%	.0%	.2%
	30 - 40	0	0	0	0	2	0	0	1	1	1	5
		.0%	.0%	.0%	.0%	.8%	.0%	.0%	.4%	.4%	.4%	.2%
	40 - 50	0	0	0	0	2	0	0	1	0	0	3
		.0%	.0%	.0%	.0%	.8%	.0%	.0%	.4%	.0%	.0%	.1%
	>50	0	0	0	0	0	0	0	2	1	0	3
N.R./ N.A.	234	195	237	202	103	99	203	230	77	94	1674	
	97.5%	80.9%	99.2%	84.2%	42.7%	41.3%	83.2%	94.3%	32.4%	39.7 %	69.6%	
Total		240	241	239	240	241	240	244	244	238	237	2404

Table-4: Source of Information about IEC Activities regarding use of Iodised Salt

SOURCE OF INFORMATION ABOUT IODISED SALT	NAME OF THE STATE										Total N=1728
	ASSAM N=198	GUJARAT N=149	HIMACHAL PRADESH N=212	KERALA N=191	ORISSA N=153	PUNJAB N=154	RAJASTHAN N=204	SIKKIM N=188	TAMIL NADU N=164	UTTAR PRADESH N=115	
TELEVISION	187	109	203	170	130	148	177	168	137	102	1531
	94.4%	73.6%	94.4%	89.0%	85.5%	96.1%	87.2%	89.4%	83.5%	88.7%	88.6%
RADIO	80	13	65	62	17	47	16	30	4	10	344
	40.4%	8.8%	30.1%	32.5%	11.2%	30.9%	7.9%	16.0%	2.4%	8.7%	19.9%
POSTER	2	0	9	3	1	1	4	0	3	0	23
	1.0%	.0%	4.2%	1.6%	.7%	.7%	2.0%	.0%	1.8%	.0%	1.3%
NEWSPAPER/MA GAZINE	3	9	44	19	6	5	19	17	14	8	144
	1.5%	6.1%	20.4%	9.9%	3.9%	3.3%	9.4%	9.0%	8.5%	7.0%	8.3%
STREET PLAY/PUPPET SHOW	0	0	1	0	2	0	7	0	0	1	11
	.0%	.0%	.5%	.0%	1.3%	.0%	3.4%	.0%	.0%	.9%	.6%
DOCTOR/HEALT H WORKER/ ANM/AWWs	1	40	21	5	9	3	28	21	27	19	153
	.5%	27%	9.8%	2.6%	6%	2.0%	13.3%	11.7%	15.3%	16.5%	10.1%
NEIGHBOURS	2	3	3	2	2	6	1	2	12	0	33
	1.0%	2.0%	1.4%	1.0%	1.3%	3.9%	.5%	1.1%	7.3%	.0%	1.9%
SCHOOL GOING CHILDREN	1	3	2	3	0	3	3	2	10	0	27
	.5%	2.0%	.9%	1.6%	.0%	2.0%	1.5%	1.1%	6.1%	.0%	1.6%
SHOPKEEPER	4	1	13	0	1	1	8	3	3	6	40
	2.0%	.7%	6.0%	.0%	.7%	.7%	3.9%	1.6%	1.8%	5.2%	2.3%
OTHERS	0	9	13	4	6	2	7	4	10	0	55
	.0%	6.1%	6.0%	2.1%	3.9%	1.3%	3.4%	2.1%	6.1%	.0%	3.2%

DISCUSSION

The use of iodized salt varies dramatically from one state to another. The variations are due to a number of factors, including the scale of salt production, transportation requirements, enforcement efforts, differences in state regulations, the pricing structure, and storage patterns. The use of adequately iodized salt is uniformly high (72 percent or higher) throughout the Northeast Region, in most states in the North Region, and in Kerala, reaching a high of 94 percent in Manipur. The use of adequately iodized salt is lowest (less than 40 percent) in Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, and Orissa. Despite the fact that the overall use of adequately iodized salt has not changed since NFHS-2, several states have made substantial improvements over time but the situation has deteriorated in other states. The largest gains have been made in Kerala (from 39 percent in NFHS-2 to 74 percent in NFHS-3), Goa (from 42 percent to 65 percent), Jammu and Kashmir (from 53 percent to 76 percent), Tamil Nadu (from 21 percent to 41 percent), Meghalaya (from 63 percent to 82 percent), and Nagaland (from 67 percent to 83 percent). The states in which the use of adequately iodized salt has deteriorated substantially are Haryana (from 71 percent to 55 percent), Himachal Pradesh (from 91 percent to 83 percent), and Assam (from 80 percent to 72 percent). As per the findings of the study, in Assam the use of iodised salt has been reported 79.6 per cent, in Gujrat 58.9 per cent, in Himachal Pradesh 95.8 per cent, in Kerala 85.4 per cent, in Orissa 54.4 per cent, in Punjab 82.9 per cent, in Rajasthan 44.4 per cent, in Sikkim 88.1 per cent, in Tamil Nadu 66.4 per cent, in UP 38.8 per cent and in the country as a whole it is 63.5 per cent. These findings are similar with the results of NFHS III (8). Besides, in the present study 95.1 per cent of the households reported that they got their salt tested by AWW, ANM, Food Inspector etc. Among the religious groups, as per NFHS III the use of adequately iodised salt was highest among Jains (84 per cent), followed by Sikhs (74 per cent), and Christians (63 per cent). Again as per NFHS III, the use iodised salt among Schedule Caste is 44.8 per cent, among Schedule Tribe 36.7 per cent, among Other Backward Class 45.7 per cent and among General 65.3 per cent. The findings of the study are similar with NFHS III and the study revealed that the use of iodised refined salt is relatively less among SC (47%) and ST (51.4%) population as compared to OBC (53%) and General Population (73%). Higher percentage of SC (33%) and ST (29%) population were buying loose salt as compared to OBCs (16%) and General (13%) population.

CONCLUSION

Study found that the programme was able to achieve its objectives up to a remarkable extent. There was awareness among population about use of iodised salt. However regarding testing of salt by government functionaries such as ANM, AWW etc. was reported very less. For IEC, more emphasis should be given on celebrating Global IDD day in rural areas especially in schools and Panchayats. TV and Radio should be used for IEC rather than other methods in view of the cost effectiveness and better reach of messages. IEC messages should also include information about all types of IDD, proper storage and cooking practices of salts etc. Under NRHM focus should be given for publicity in local languages about IDD and consumption of iodised salt.

ACKNOWLEDGEMENT

The authors are extremely indebted to Nutrition Division, Ministry of Health and Family Welfare for approving National Institute of Health and Family Welfare as a nodal agency to undertake this evaluation and providing technical and financial support for the study. Authors are also grateful to Salt Commissioners of all zones of the country for their continuous interaction and timely feed back. Appreciations and acknowledgements are also due to the faculty and research staff of the Institute for conducting the fieldwork.

REFERENCES

- [1] Bleichrodt, N. And Born, M.A. (1994): Meta-Analysis of Research on Iodine And Its Relationship to Cognitive Development. In: *The Damaged Brain of Iodine Deficiency*, JB, Stanbury (Ed.). Cognizant Communication Corporation, New York, 195-200
- [2] Forty Third World Health Assembly (1990): WHA 43.2. World Health Organization, May 1990
- [3] ICCIDD, MI, USAID, UNICEF, WHO, PAMM, *Assessing Country Progress in Universal Salt Iodination Programme, Iodized Salt Programme Assessment Tool (ISPAT)*, 1999
- [4] ICCIDD, UNICEF and WHO *Assessment of IDD and Monitoring their Evaluation- A Guide for Programme Managers*. WHO/ NHD/01.1. 2001
- [5] Ministry of Commerce and Industry, GOI, Salt Deptt. Annual Report, 2004-05
- [6] Ministry of Health and Family Welfare, GOI, Annual Report, 2004-05
- [7] Ministry of Health and Family Welfare, Govt. of India (2003): *Policy Guidelines on National Iodine Deficiency Disorders Control Programme*. IDD and Nutrition Cell, Directorate General of

- Health Services, Government of India, New Delhi
- [8] National Family Health Survey-III (2005-06) Vol.1. International Institute of Population Sciences, Mumbai
- [9] National Health Programme Series 5, NIDDCP (2003). National Institute of Health and Family Welfare, New Delhi
- [10] Pandav C S; Arora NK; Rossi, LL; Karmarkar; M.G; Hetzel B.S. Tracking Progress Towards The Sustainable Elimination of Iodine Deficiency Disorders in Thailand. Ministry of Public Health Thailand; ICCIDD; UNICEF, Thailand; 1997
- [11] Planning Commission, Government of India. Sectoral Policies and Programme, Nutrition, Vol II, 2002-07
- [12] T.K. Rajalakshmi, Iodine for All, The Hindu, Vol. 22- Issue 14, July, 2005
- [13] UNICEF, PAMM, ICCIDD, WHO. Monitoring Universal Salt Iodination Programme, 1995
- [14] WHO/UNICEF/ICCIDD, Assessment of Iodine Deficiency Disorders and Monitoring their Elimination, Geneva, 2001, WHO/NHD/01.1