



Knowledge and Practices of Households in South Kordofan, Sudan, with Regard to Iodine Deficiency Disorders and Intake of Iodized Salt

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ABSTRACT

The objective of this study was to assess the knowledge and practices of iodized salt intake and use by households in South Kordofan, with regard to iodine deficiency disorders. The focus of the study was on people who have role in making decision about which food and cooking material to be used in the home. A combination of cluster and simple random sampling techniques was used to select the respondents from all the districts in South Kordofan. A total sample of 380 households was interviewed. Analysis of the findings was carried out using SPSS and significance tested using χ^2 . Only 252 household heard about iodized salt. The results revealed that only 7.2% of respondents indicated that, they used iodized salt for cooking. The reason given by users of common salt was the price of iodized salt which is expensive than common salt and knowledge of iodized salt was relatively high, as 66.4% (20.3 % for male & 46.1% for female) of the respondents indicated that they had heard about iodized salt. Awareness about health benefits of iodized salt among female was extremely good than male (56.7% for female & 17.9 % for male respectively). 49.6% of the female stored their salt in Polythene bag, Also results shows that 41.1% of the respondents (9.9% for male and 30.2 for female) adding iodized salt at the end of cooking. The study found that 29.2% of the respondents had diagnosis with iodine deficiency disorders (IDD). There is an urgent need to increase efforts to using iodized salt and know the correct methods of conservation and add-on and existing laws and policies on universal salt iodization and quality assurance of iodized salt from the production stage to the distribution/selling stage had to be enforced.

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INTRODUCTION

Iodine-deficiency disorders (IDD) are some of the public health problems that confront 118 countries worldwide, and approximately 1.5 billion people are at risk of preventable IDD (Takele, 2003). In Sudan the prevalence of goiter ranges from 5.4 per cent to 42 per cent, and the average rate nationally is 22 per cent (FMOH, 1979). The Iodine-deficiency disorders (IDD) problem in Sudan is severe in the mountainous areas of Darfur and Blue Nile state where goiter rates are as high as 87 per cent and 75 per cent, respectively. Kordofan state known for its high prevalence of goiter, with rates of 59–79 per cent (Hussein, 2006). Iodine deficiency in Sudan is widespread with less than 10% of the population having access to iodized salt (ICCIDD, 2012). ICCIDD and the Nutrition Directorate in Khartoum agreed to draw up a Plan of Action for the 5-year period 2012-2017; the plan aims to increase the knowledge and awareness of the population, increase coverage of iodized salt to 90% of the population (ICCIDD, 2012). An IDD Control Program initiated in Sudan in 1989 using iodized oil capsules and this program continues in endemic regions of the country. Sudan adopted Universal Salt Iodization (USI) as a National IDD prevention strategy in 1994 and Ministerial decrees issued at the time require all edible salt would be iodized to level of 50 ppm using potassium iodide, Several amendments to these decrees had been issued but these have not been enforced. One declaration called on all salt producers to ensure that their salt was iodized (Bani, 2007). UNICEF supplied the two major salt producers with 12 iodizing machines – six each for the Ba'aboud Company and the Sudan Salt Company. The Federal

Ministry of Health (FMOH) received 150 tons of iodide for distribution, the equipment and materials supplied to producers in 1995 through the FMOH. Major challenges have stood in the way of universal salt iodization in Sudan. The two main problems were the high level of moisture in the coarse salt and the large size of the crystals, only around 3 per cent of total salt production is iodized (Bani, 2007). In July 2006, the Industry Ministry instructed all salt producers to fortify all salt with iodine. The governments in the States most affected by IDD, Darfur and Kordofan, are politically committed to enacting, and enforcing, the required legislative measures to ensure that only iodized salt marketed in the areas under their jurisdiction. The tariffs, taxes and duties attached to this commodity are also been waived. Use of iodized salt in the State is still low because of a lack of awareness and insufficient social marketing, no health communication strategies have implemented to increase the awareness of the population of the importance and to promote the use of iodized salt. This study aimed to assess the knowledge and practices of iodized salt, with regard to iodine deficiency disorders and intake of iodized salt used by households in South Kordofan.

MATERIALS AND METHODS:

The focuses of the study were on peoples who have role in making decisions about which foods and cooking materials used in the households, their aged were less than 20 and above fifty years. A combination of cluster and simple random sampling techniques used to select the households to participate in the study .from all the five districts in South Kordofan. A total sample of 380 households were interviewing, but only 252 households

heard about iodized salt and were interviewing to assess the knowledge and practices of iodized salt, with regard to sources of information about it, use of iodized salt and any reasons for not using it. Information about the presence of goiter and awareness of IDD also sought, in August 2013 to January 2014. Data were obtained by face-to-face interviewing using a structured questionnaire with both open-ended and closed-ended questions were used as an interview guide by the researchers to collect the data. Analysis of the findings carried out using SPSS version 16 and significance tested using χ^2 .

RESULTS AND DISCUSSION:

Table (1) shows the comparison between male and female groups regarding to Socio-demographic characteristics in South Kordofan. As shows in the results the majority of the respondents, 65.8% were females, suggesting that in the Sudan setting women are usually responsible for meal preparation. Statistically significant differences between the two groups were found regarding, educational level, family size and diagnosis with iodine-deficiency disorders (IDD).

Table 1: Socio-demographic characteristics of peoples in South Kordofan

Item	Male		Female		Chi-square	P-value
	No	%	No	%		
Age group:						
Less than 20 years	16	4.2	18	04.7	0.000	28.17
20 - 29 years	25	6.6	109	28.7		
30 - 39 years	39	10.3	73	19.2		
40 – 49 years	28	7.4	26	06.8		
50 and above	22	5.8	24	06.3		
Educational level :						
Illiterate	05	1.3	16	04.2	0.003	35.91
Basic education	14	3.7	93	24.5		
Secondary	63	16.6	94	24.7		
Higher	48	12.6	47	12.4		
Family size:						
< 4 persons	41	10.8	62	16.3	0.003	13.60
5 – 6 persons	21	5.5	84	22.1		
7 -9 persons	40	10.5	67	17.6		
10 -13 persons	28	7.4	37	9.7		
Diagnosis with iodine-deficiency disorders						
Yes	54	14.2	57	15.0	0.000	14.53
No	76	20.0	193	50.8		

The majority of participants were in the age range 17-39years (21.1%for male and 42.6%for female).while 18.4%for male and 46.6%for female were married. The educational levels of 29.2%for male and 37.1%for female were secondary and university level. 27.1%for male and 47.4%for female were extended families, 89.2%for male and 83.7%for female their family sizes range between 5 – 13

persons, this result agrees to Nikšić *et al.* (2006). In addition, the results shows that 14.2%for male and 15.0%for female had Diagnosis with IDD, in 2006, a national study showed that the prevalence of The Total Goiter Rate (TGR) reached 38.8% and ranged from 12.2% to 77.7 % (Medani *et al.*, 2011). As shown in Table (2). There were significant differences between male &

female groups in relation to heard about iodized salt, awareness about health benefits of iodized salt among households, why did respondents not intake iodized salt & type of container used to store salt at. 66.4% (20.3 % for male &46.1% for female) of the respondents indicated that they had heard about iodized salt. Ebrahim and Muhammed (2012) found in Irag 92.6% of the respondents had heard about iodized salt. 17.1 % for male and 38.1% for female informed about the sources of iodized salt by radio and television. In general, the female used iodized salt two and half times greater than male, as shown in Fig1. the results revealed that only 7.2% (5.2% of female &2.0% of male) of households used iodized salt, whereas 21.4% for male &38.1% for female used common salt (unionized salt), and 33.2% (7.1% for male &26.1% for female) of the households used both common and iodized salt. The households used common salts, because the cost of iodized salt was expensive, this may be due to the absence of government controls on the price of salt, market forces determine its availability and price to the consumer (IDD NEWSLETTERS, 2007). Only less than 0.6% of households were consuming iodized salt in Sudan in 2000 ("Multiple Indicator Cluster Survey (MICS)," 2001), while in 2005, 10.0% of households in Sudan were using adequately iodized salt (>15 parts per million-ppm) with wide variation between states (Gaffar & Mahfouz, 2011; "Sudan Household Health Survey (SHHS)," 2006). This finding supported by a similar study, which reported that, the majority of occasional users and non-users of iodized salt indicated that the price of iodized salt was higher than that of common salt (Yamada et al., 1998).

9.1% of male &31.3% of female reported that taste is different from common salt. The report of a similar study conducted in Mongolia, that more than half of the study participants indicated that the taste of iodized salt was not the same as that of common salt. (Yamada et al., 1998).Health education and awareness programmes should be aim at targeting groups and organizations at the community level to promote the consumption of iodized salt .In Sudan only three states namely South Darfur, West Darfur, and Sinnar succeeded to pass laws that prohibit selling of non-iodized salt in their jurisdictions. State ministries of health and health authorities at locality level are responsible for the enforcement and implementation of these laws (Gaffar, 2012). Until 2012, the implementation of the law had not been formally approval and this remained a major obstacle. (IDD Newsletter, 2012), Awareness about health benefits of iodized salt among female was extremely good than male (56.7%for female & 17.9 %for male respectively) and statistically significant differences were found. Majority of the female (49.6%) stored their salt in Polythene bag , 4.8% (1.2% for male and 3.6 for female) of the households stored their salt in containers without a lid, and a third (34.6%) of the households (18.3% for male and 16.3 for female) stored their salt in the recommended way in closed containers (Waszkowiak & Szymandera, 2008). Iodine content of iodized salt reduces when it is not stored in enclosed containers, by virtue of its volatile characteristic. The findings of a study conducted by Sebotse (2009) indicated that when iodized salt was not stored in closed plastic bags, sealed waterproof materials or closed containers, iodine

losses occurred leading to a reduction in the iodine content of the salt before it is consumed.

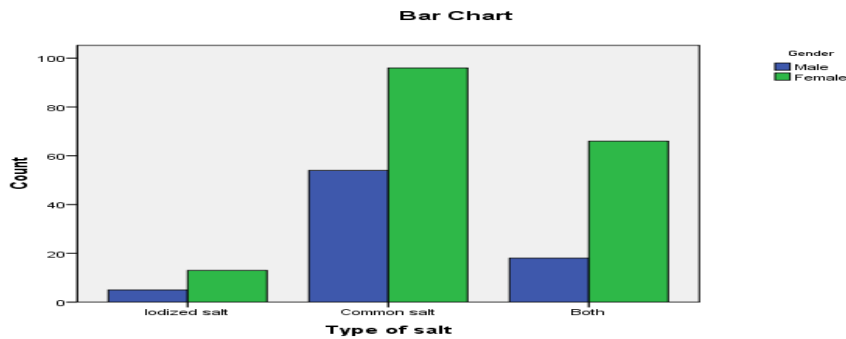


Figure 1: Type of salt used

Table 2: Knowledge and perceptions of people about iodized salt and iodine-deficiency disorders:

Item	Male		Female		P-value	Chi-square
	No	%	No	%		
Heard about iodized salt :						
Yes	77	20.3%	175	46.1%	0.035	4.44
No	53	13.9%	75	19.7%		
Source of information's about iodized salt:						
Radio and Television	43	17.1	96	38.1	0.617	1.79
Friends/relatives	08	3.2	28	11.1		
Magazine and newspaper	09	3.6	15	6.0		
Health workers	17	6.7	36	14.3		
Type of salt used :						
Iodized salt	05	2.0	13	5.2	0.065	5.45
Common salt	54	21.4	96	38.1		
Both	18	7.1	66	26.1		
Awareness about health benefits of iodized salt among households:						
Yes	45	17.9	143	56.7	0.000	15.29
No	32	12.7	32	12.7		
Why Did you not intake iodized salt						
Cost :	54	21.4	96	28.1	0.023	5.17
Taste is different from common salt :	23	9.1	79	31.3		
Type of container used to store salt at :						
Container with a lid	46	18.3	41	16.3	0.000	31.43
Container without a lid	03	1.2	9	3.6		
Polythene bag	28	11.1	125	49.6		
Awareness about adding iodized-salt at cooking:						
at the beginning	52	20.6	99	39.3	0.102	2.68
at the end	25	9.9	76	30.2		
Awareness about sources of foods contain iodine						
Correct	60	23.8	151	59.9	0.098	2.75
Incorrect	17	6.7	24	9.5		

In addition, results shows that 41.1% of the respondents (9.9% for male and 30.2 for female) adding iodized salt at the end of cooking. Iodized salt must be added to a meal at the end of cooking (Panigrahi, 2009). Female more aware (59.9%) than male (23.8%) about sources of foods contain iodine. Soils from mountain ranges, are particularly likely to be iodine deficient, the problem is aggravated by accelerated deforestation and soil erosion. The food grown in iodine deficient regions can never provide enough iodine to the population and livestock living there, the correction

has to be achieved by supplying iodine from an external source (Mannar and Dunn, 1995).

The dietary intake of common Sudanese food groups in South Kordofan was shown in table (3) there were significant differences in intake between male and female ($p < 0.05$) in legumes, carbohydrates, vegetables, meats, fruit juices and beverages. Generally, female intake more food groups than male, this intake indicates the food item frequency more than quantity and quality of dietary intake.

Table 3. Dietary intake of common Sudanese food groups:

Food items frequency	Male		Female		Chi-square	P-value
	No	%	No	%		
Legumes						
Daily	34	13.5	60	23.8	0.011	9.01
4 - 6	20	7.9	28	11.1		
1 - 3	23	9.1	87	34.5		
Carbohydrates						
Daily	77	100.0	175	100.0	0.000	38.11
Vegetables						
Daily	74	29.4	174	69.0	0.05	3.78
4 - 6	3	01.2	1	00.4		
Meat						
Daily	74	29.4	174	69.0	0.05	3.78
4 - 6	3	01.2	1	00.4		
Milk, milk products and eggs						
Daily	36	14.9	114	47.3	0.008	11.89
4 - 6	11	04.6	14	05.8		
1 - 3	17	07.1	18	07.5		
Not taken	13	05.4	18	07.5		
Fruits						
Daily	16	06.3	33	13.1	0.086	6.59
4 - 6	19	07.5	24	09.5		
1 - 3	23	09.1	77	30.6		
Not taken	19	07.5	41	16.3		
Fruit juices and beverages						
Daily	53	21.0	149	59.1	0.011	9.05
4 - 6	11	04.4	13	05.2		
1 - 3	13	05.2	13	05.2		

The results disagree with the Sudanese habits in most region, because traditionally men had their foods firstly, then women and children next. The results show that female had diagnosis with IDD more than male, this may be due to the finding of the result, and about half of the female stored their salt in Polythene bag.

The knowledge on iodized salt of household in South Kordofan is medium, as 20.3% for male & 46.1% for female known about iodized salt. Female more aware (59.9%) about sources of foods contain iodine than male (23.8%), However, their knowledge levels were not translated into or reflected in their practices as only 2.0% for male & 5.2% for female of households exclusively used iodized salt for cooking. A commendable practice of a good proportion 18.3% for male and 16.3 for female of the household was storage the salt in Container with a lid to prevent iodine losses. Generally, female intake more food groups than male.

The study found that 29.2% of the respondents had diagnosis with iodine deficiency disorders, only 7.2% of respondents indicated that, they used iodized salt for cooking.

Recommendations and suggestions for further study based on the findings of the study; there is an urgent need to increase efforts to generate awareness about the health benefits of iodized salt. , using iodized salt and know the correct methods of conservation and add-on and existing laws and policies on universal salt iodization and quality assurance of iodized salt from the production stage to the distribution/selling stage had to be enforced.

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