Increasing Awareness Regarding Iodine and its Deficiency Among Mess Workers of Colleges' Hostel and Assessing Impact of Nutrition Education Intervention on Their KAP Levels

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Abstract

Iodine deficiency disorder (IDD) affects over 1500 million people in the world are at risk of IDD. In 1990s WHO and UNICEF recommended universal salt iodization (USI) as the main strategy to achieve elimination of IDD. WHO says Iodine deficiency is the world's most prevalent, yet easily preventable, a cause of brain damage. Proper knowledge on a topic is the first step to practice healthy habits hence a person should be first checked for the level of knowledge he has and then secondly focus should be made on imparting nutrition education to the respondent in order to improve the levels of knowledge and a deeper understanding of the significance of the subject. This study focussed on women working in mess. Nutrition education was imparted to them regarding iodine and its deficiency. The levels of KAP pre and post intervention were calculated and an increase in average KAP was observed. Hence it can be concluded that nutrition education intervention results in increased levels of KAP.

Introduction

Iodine deficiency disorder (IDD) occurs in populations living in areas where iodine in the soil has been washed away by glaciers and rains and in areas of frequent flooding. Over 1500 million people in the world are at risk of IDD. This deficiency may lead not only to visible goitre but also to impaired physical and mental development. IDD is the most common cause of preventable mental retardation. In severe cases, IDD leads to serious disorders such as deaf-mutism, cretinism and increased rates of spontaneous abortion, stillbirth and birth defects. It is estimated that over 200 million people suffer from goitre and 20 million have mental retardation, including 6 million who are classed as cretins as a result of iodine

deficiency. Seafood, which is a good source of iodine, is often not available to groups vulnerable to iodine deficiency. Adding iodine to salt is the most common and effective method of preventing iodine deficiency.

Iodine deficiency, through its effects on the developing brain, has condemned millions of people to a life of few prospects and continued underdevelopment. On a worldwide basis, iodine deficiency is the single most important preventable cause of brain damage. People living in areas affected by severe IDD may have an intelligence quotient (IQ) of up to about 13.5 points below that of those from comparable communities in areas where there is no iodine deficiency (Universal salt iodization (USI) is defined as when all salt for human and animal consumption is iodized to the internationally agreed recommended levels.). This mental deficiency has an immediate effect on child learning capacity, women's health, the quality of life of communities, and economic productivity. On the other hand, IDD are among the easiest and cheapest of all disorders to prevent. The addition of a small, constant amount of iodine to the salt that people consume every day is all that is needed. The elimination of IDD is a critical development issue, and should be given the highest priority by governments and international agencies. Recognizing the importance of preventing IDD, the World Health Assembly adopted in 1991 the goal of eliminating iodine deficiency as a public health problem by the year 2000. In 1990, the world's leaders had endorsed this goal when they met at the World Summit for Children at the United Nations. It was reaffirmed by the International Conference on Nutrition in 1992. In 1993, WHO and UNICEF recommended universal salt iodization (USI) as the main strategy to achieve elimination of IDD. (**WHO, 2001**.)

Iodine Deficiency Disorder or endemic goitre is a global problem occurring in many remote places where dietary intake is below 7μg (**Zimmermann, 2009; Gunnarsdottir & Dahl, 2012**). The most serious consequence of IDD is increased mortality and mental retardation in infants (**FAO/WHO, 2005; Brownstein, 2006; WHO, 2007).**

Studies have indicated that iodinated salt is effective in reducing the impact of IDD (**WHO/UNICEF/ICCIDD, 2008; Zhao et al., 2014**). Therefore, Ethiopia like many other developing countries has adopted the universal salt iodination targeting to reach 90% of the population (**Global Alliance, 2018**). Contrary to that expectation, a recent report in Ethiopia shows that while about 88% of the salt in the country is iodised, only 23.2% of the population have access to adequately iodinated salt **(EPHI, 2014).**

WHO says Iodine deficiency is the world's most prevalent, yet easily preventable, a cause of brain damage.

Iodine Deficiency Disorder is significant public health problem in 130 countries affecting 740 million people, and an estimate done one third of the world's population is currently exposed to its risk, iodine problem decreased from 110 to 54 between 1993 and 2003 still in several studies conducted around the world, the pregnant women have been found to be particularly vulnerable to IDD most probably due to increased demand and other physiological adaptation. (**Lisa et al., 2017)**

Justification

Dietary Iodine is a key nutrient in neurodevelopment of the unborn child; it is entirely dependent on the iodine intake of the mother to fulfil this important requirement for proper brain function. Iodine Deficiency Disorders (IDDs) can impact on people of all ages, but most severely on the baby while it is developing in the womb. Hence it is important to educate young women of the society so that they consume adequate amount of iodine in their diet. Focus on older women is also required so that they further pass on the knowledge to the women of their families and support them in maintaining an optimum level of iodine in their diet. Timely and adequate consumption of iodine around conception goes a long way in avoiding serious health complications of the mother and the child both. Hence first step is to know the level of knowledge that people already have, the attitudes they carry and the actual practices and habits that they adorn. Secondly, on finding a gap or insufficiency in the levels of Knowledge, attitude and practices focus should be made on lessening the gap. This can be best done imparting knowledge, teaching them about the subject to bring about a change in their attitudes and telling those ways and reasons why they should incorporate certain practices into their daily life. Various studies have shown how Nutrition education has brought about a change in how people perceive the topic of nutrition and how their eating habits and ways have changed for good after detailed nutrition education intervention. Hence targeting homogenous groups one by one and covering a large population is expected to show an improvement in the perception regarding iodine and its importance.

Review of literature

Wang *et al.* conducted a cross-sectional investigation during 2016–2017 in Zhejiang province, China. The Urinary Iodine concentration (UIC) and iodine content in household salt were determined. 2642 pregnant women were enrolled for the study. A 3-point Likert scale questionnaire was used to record knowledge. It was recorded that coastal participants were iodine deficient (median UIC 127.6 μg/L) while inland participants were iodine sufficient (median UIC 151.0 μg/L). The coastal participants had lower average knowledge score (24.2 points vs. 25 points for the inland participants; $p < 0.001$). The coastal participants consumed lesser iodized salt (88.9% vs. 96.0% for those inland; $p < 0.001$). A generalized linear model analysis showed that non-iodized salt consumption, coastal region, and low knowledge scores were independently associated with a low UIC. Hence, Comprehensive interventional strategies are needed to develop and achieve an optimal iodine status. It was recommended that coastal pregnant women should take iodine supplements based on the consumption of iodized salt, and improvement of iodine-related knowledge. (**Wang et al , 2019**)

Abraham *et al.* showed that women did not have enough knowledge regarding the importance of iodine in fetal brain development. Educational intervention provided on this topic by nurses positively impacted their the women's knowledge. The findings underscore evidence-based nursing is one approach that may enable future healthcare providers to manage the explosion of new literature and technology and ultimately may result in improved patient

outcomes. Hence it helps to implement in their caregiving as a nurse educator, midwife, and as public health nurse. (**Abraham et al, 2018**)

Abessa explored the knowledge about goitre and preventive measures among female school children aimed at reducing the occurrence of goitre. Quantitative, descriptive cross-sectional study design was used to explore the knowledge about goitre among school-going children in three schools in Wellega Province, Ethiopia. A total of 364 girls aged between 15–19 years participated in the study. Overall, 71.4% did not have the knowledge about goitre, one third (28.6%) knew that goitre is caused by iodine deficiency and less than half (48.4%) knew that iodinated salt prevents occurrence of goitre. Sixty one per cent did not know which local foods aggravate goitre, 35.7% indicated that goitre affects both males and females and a small proportion identified pregnant women, children and adolescents as vulnerable groups for goitre. Only 38% received information about goitre from the schools. The level of knowledge about goitre among school girls in Wellega Province came out to be low. It is recommended that concerted efforts targeting adolescents to acquire knowledge about the causes and prevention of goitre should be made and further studies should be done to explore perceptions and cultural factors that may contribute to the knowledge gap.**(Abessa *et al*., 2018)**

O'Kane *et al*. showed the importance of intake of Adequate Iodine before conception and during pregnancy for normal neurodevelopment of the infant. 520 Females (aged 18–45 years) were assessed for their knowledge on Iodine and estimated dietary Iodine intake was calculated using a FFQ. Results showed that knowledge on Iodine was poor; only one-third (32 %) of the participants correctly identified pregnancy as the most important stage of the lifecycle, and 41 % of participants could not correctly identify any health problem related to Iodine deficiency. The median daily Iodine intake was estimated as 152 µg/d. Almost half (46 %) of the participants failed to meet dietary recommendations (140 µg/d) for Iodine. A higher dietary Iodine intake was positively associated with greater Iodine knowledge (r 0·107; P =0·016). This study suggests that knowledge of Iodine nutrition is low among women of childbearing age, and those with a greater knowledge of Iodine nutrition had a higher dietary Iodine intake. Initiatives to educate women of childbearing age on the importance of Iodine nutrition should be considered as part of a larger public health strategy to address Iodine deficiency**. (O'Kane *et al.* , 2016)**

Lowe *et al.* conducted a cross-sectional survey which was used to assess the use of iodised salt and focus group discussions explored the attitudes and barriers to its use. Thematically analysed transcripts informed the design of a 4-month intervention. Iodised salt sales and urine iodine concentration (UIC) were monitored to assess the effectiveness of the intervention. At baseline, 2.6% of households reported use of iodised salt and barriers included its higher cost and belief about a negative impact on reproduction. During the intervention, sales of salt labelled as iodised increased by 45%, however this was not reflected in an increase in UIC. This study highlighted the positive impact of education and awareness rising on iodised salt consumption in a hard to reach, marginalised community.

However, issues regarding adequate iodisation by local producers and appropriate storage also need to be urgently addressed at a provincial level. **(Lowe et al, 2015)**

Objectives

1. To provide nutrition education to women regarding Iodine deficiency.
2. To assess the Knowledge, Attitude and Practices (KAP) of women pre and post nutrition education intervention.

Methods and Materials

Design of the study- Cross sectional design of study was be opted.

Area of the study- The study was conducted in SHUATS, Prayagraj.

Technique of sampling- Random Sampling was the Technique of sampling followed.

Population of the study- Women

Sample size of the study-

For Adult women- 30 Women working in the mess area of the University was taken.

Tools and techniques

Educational aid- Folder (in Hindi).

Content of Educational aid-

Basic Knowledge regarding iodine and consequences of its deficiency, attitude that one should have and the practices to be followed in order to to prevent iodine deficiency.

Method of data collection- The KAP Questionnaire was distributed before and after imparting nutrition knowledge; thereafter the responses was collected. Thereafter the two sets of data was compared for any changes.

The Questionnaire for women regarding Iodine deficiency had the following heads-

The Knowledge regarding signs of iodine deficiency and its consequences for the unborn baby, the cause of iodine deficiency, prevention of iodine deficiency. Attitudes towards a health or nutrition-related problem related to iodine deficiency and the perceived susceptibility and severity. Attitudes towards an ideal or desired nutrition-related practice regarding preparation of meals with iodized salt and the perceived benefits and barriers. The practices were assessed by enquiring about the use of iodized salt and the kind of salt used.

RESULT

General information

		Before Intervention		After Intervention	
Questions	**Options**	**Frequency (n=30)**	**Percentage (%)**	**Frequency (n=30)**	**Percentage (%)**
Age	**29-33**	**4**	**13.3**	**4**	**13.3**
	34-38	**8**	**26.6**	**8**	**26.6**
	39-43	**5**	**16.7**	**5**	**16.7**
	44-48	**6**	**20**	**6**	**20**
	49-53	**6**	**20**	**6**	**20**
	54-58	**1**	**3.3**	**1**	**3.3**

The study included 30 women workers from the mess of SHUATS. The mean age was with a range of 29 to 58 years old.

Anthropometric Measurement

		Before intervention		After intervention	
Questions	**Options**	**Frequency (n=30)**	**Percentage (%)**	**Frequency (n=30)**	**Percentage (%)**
Height	140cm-150cm	12	40	12	40
	151cm-160cm	15	50	15	50
	161-170cm	3	10	3	10
Weight	40-45kg	4	13.33	4	13.33
	46-50kg	14	46.6	14	46.6
	51-55kg	7	23.3	7	23.3
	56-60kg	3	10	3	10
	61-65kg	2	6.6	2	6.6

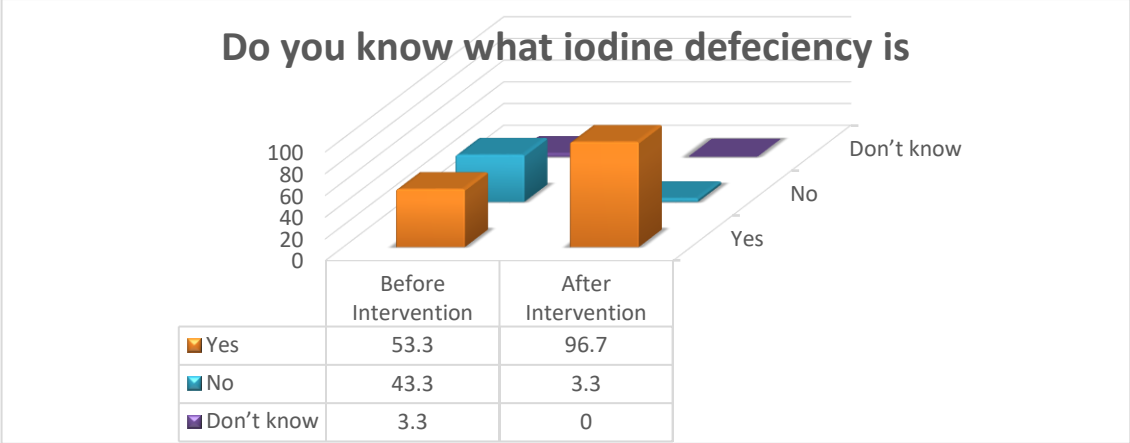
Anthropometric Measurement

The maximum (50%) number of respondents had a height in the range of 151cm- 160cm. The maximum (46.6%) number of respondents had a weight in the range of 46-50kg.

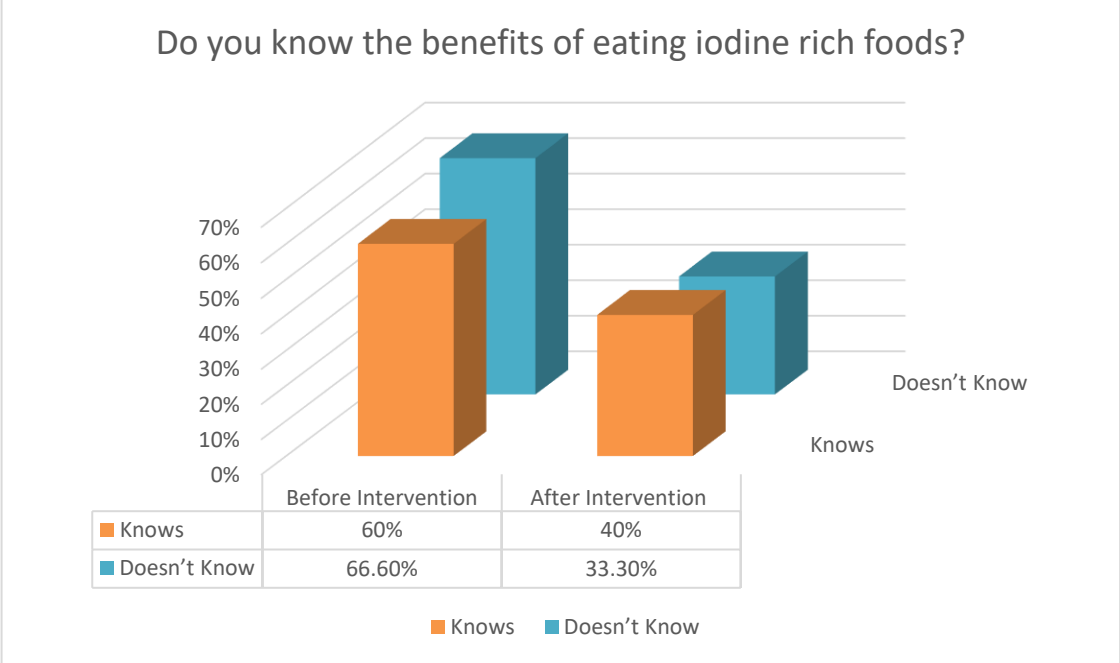
Result of pre and post nutrition counselling on Knowledge, Attitude, and Practice of selected respondents

Table 1 Result of pre and post nutrition counselling on Knowledge of selected respondents

			Before Intervention		After Intervention	
	Questions	**Options**	**Frequency (n=30)**	**Percentage (%)**	**Frequency (n=30)**	**Percentage (%)**
1.	Do you know what iodine deficiency is?	Yes	16	53.3	29	96.7
		No	13	43.3	1	3.3
		Don't know	1	3.3	0	0
2.	If Yes: Can you tell me what it is?	Knows	12	40	16	53.3
		Doesn't know	18	60	14	46.6
3.	Can you describe the signs of a lack of iodine in the body?	Knows	9	30	23	76.7
		Doesn't know	21	70	7	23.3
4.	What could be the consequences or health risks for the unborn baby of a lack of iodine in the diet of a pregnant woman?	Knows	15	50	27	90
		Doesn't know	15	50	3	10
5.	What causes iodine deficiency?	Knows	5	16.7	20	66.7
		Doesn't know	25	83.3	10	33.3
6.	How can iodine deficiency be prevented?	Knows	12	40	26	86.7
		Does not know	18	60	4	13.3
7.	Do you know benefits of eating iodine rich foods, e.g fish, meat, eggs, milk and of iodized salt?	Knows	18	60	20	66.6
		Doesn't know	12	40	10	33.3



	Before Intervention	After Intervention
Yes	53.3	96.7
No	43.3	3.3
Don't know	3.3	0



	Before Intervention	After Intervention
Knows	60%	40%
Doesn't Know	66.60%	33.30%

Table 2. Result of pre and post nutrition counselling on Attitude of selected respondents

Q. No.			Before Intervention		After Intervention	
	Questions	**Options**	**Frequency (n=30)**	**Percentage (%)**	**Frequency (n=30)**	**Percentage (%)**
8.	How likely do you think you are to lack iodine?	Not likely	16	53.3	19	63.3
		You're not sure	11	36.7	5	16.7
		Likely	3	10	6	20
9.	How serious do you think a lack of iodine in the body is?	Not serious	2	6	0	0
		You're not sure	12	40	4	13.3
		Serious	16	53.3	26	86.7
10.	How good do you think it is to prepare meals with iodized salt?	Not good	0	0	0	0
		You're not sure	8	26.8	1	3.3
		Good	22	73.3	29	96.7
11.	How difficult is it for you to buy and use iodized salt?	Not difficult	17	56.7	21	70
		So-so	9	30	6	20
		Difficult	4	13.3	3	10

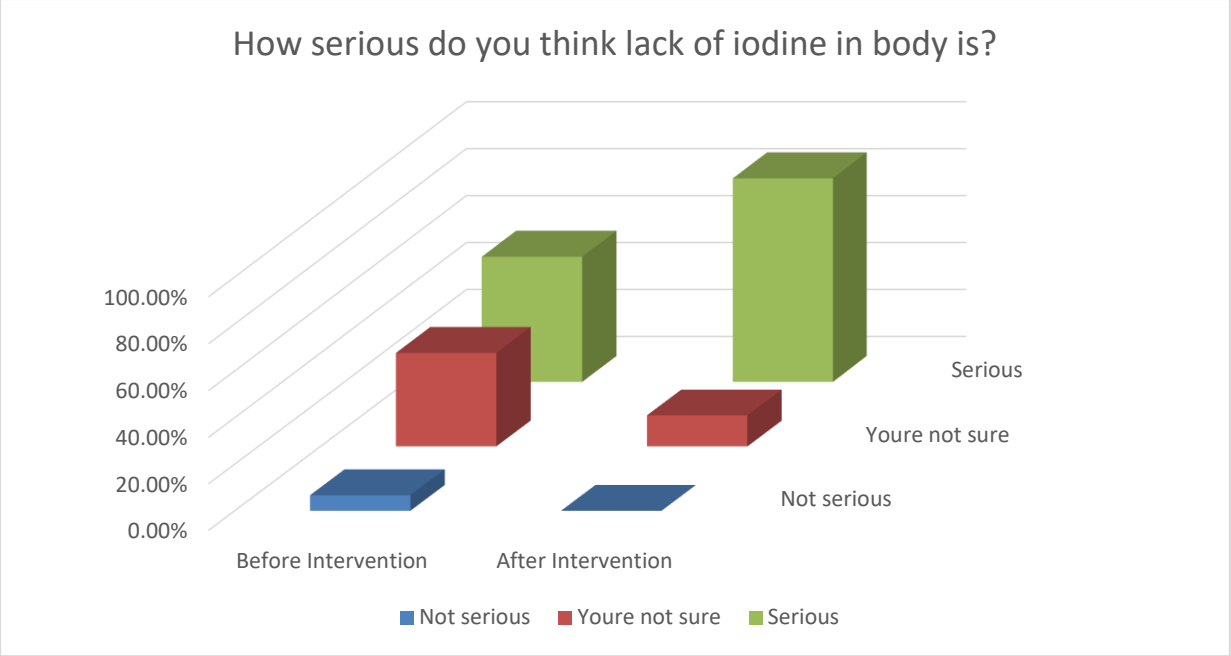


TABLE 3. RESULT OF PRE AND POST NUTRITION COUNSELLING ON PRACTICES OF SELECTED RESPONDENTS

Q. No.			Before Intervention		After Intervention	
	Questions	Options	Frequency (n=30)	Percentage (%)	Frequency (n=30)	Percentage (%)
12.	Did you use salt in the main meal eaten by members of your family last night?	Yes	30	100	30	100
		No	0	0	0	0
		Don't know	0	0	0	0
13.	If Yes: What kind of salt did you use?	Iodized	11	36.7	15	50
		Not iodized	8	26.7	12	40
		No salt at home	0	0	0	0
		Don't know/no answer	11	36.7	3	10

Discussion regarding Knowledge level of respondents pre and post intervention- -

In the pre intervention session, More than half (53.3%) of the study population knew what iodine deficiency is. While post intervention it increased to 96.7%.

40% were able to tell what iodine deficiency is which increased to 53.3% post intervention.

Our findings are relatively better than reported in a study in South Africa where 86.9% of the respondents had no knowledge of what iodine is and even those who claimed to know, about 5% said it was a vitamin (**Sebotsa *et al.*, 2009)**.

30% were able to describe the signs of a lack of iodine in the body before intervention which increased to 76.7% post intervention.

50% women knew the consequences or health risks for the unborn baby of a lack of iodine in the diet of a pregnant woman which increased to 90% post intervention.

5 (16.7%) knew the causes of iodine deficiency while 25 (83.3%) did not. This changed to 20 (66.7%) knowing the cause of deficiency and 10 (33.3%) still not knowing after intervention.

12 (40%) knew how iodine deficiency be prevented and 18 (60%) did not know about it. This distribution changed post intervention where 26 (86.7%) understood how to prevent iodine deficiency but 4 (13.3%) still couldn't.

18 (60%) knew the benefits of eating iodine rich foods, e.g fish, meat, eggs, milk and of iodized salt which increased to 20 (66.6%) post intervention.

Sebotsa et al. did a study in South Africa which showed that about three quarters of the respondents had no knowledge about the sources of iodine and only a few knew that iodised salt is a source of iodine. Only three quarters Children also had knowledge of the common food sources of iodine (milk, meat, sea foods) (**Sebotsa et al., 2009**).

Discussion regarding Attitude level of respondents' pre and post intervention-

3 (10%) thought they were likely to be iodine deficient while this thinking changed after they were taught about it. Post intervention 6(20%) believed they were iodine deficient.

While a study assessing the KAP of members of a brick kiln community in Pakistan , 24% of respondents felt at risk of developing iodine deficiency, while 28% didn't and 48% did not know. (**Lowe *et al.*, 2015**)

16 (53.3%) thought a lack of iodine in the body is serious while post intervention it changed to 26 (86.7 %). While 2 (6.7%) did not find lack of iodine in the body as a serious issue pre intervention while post intervention none believed so.

While a study assessing the KAP of members of a brick kiln community in Pakistan ,Twenty Eight percent of respondents felt that iodine deficiency was serious, 20% that it was not serious, and 26% did not know. **(Lowe et al., 2015)**

22 (73.3%) found it good to prepare meals with iodized salt which increased to 29 (96.7%) post intervention

17 (56.7%) did not find it difficult to buy and use iodized salt but after intervention where the respondents were taught about the difference between non iodised and iodised salt in terms of money and nutritional value the number changed to 21 (70%) who no longer found it difficult buy and use iodized salt.

Discussion regarding Practices level of respondents' pre and post intervention- -

This survey revealed that, despite various national salt iodisation programme going on, this group community was unaware of the benefits of iodised salt. The present study was done in an attempt to increase health literacy levels with regards to the importance of iodized salt.

In order to respond to health literacy needs, the **WHO,2013** calls for action at different levels: to ensure better health communication; to create and strengthen health literacy-friendly settings; and to develop policies for health literacy. These actions should be integrated to empower and enable people to make sound health decisions in the context of their everyday life. (**Van,2014**). **Sørensen *et al*., 2012** define health literacy as a concept which: "entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgements and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course." The intervention described here, with a particular focus on community engagement, is situated within this global initiative to improve health literacy.

All 30 (100%) respondents used salt in their main meals the night before. But only 11 (36.7%) of them used iodised salt. After intervening them about the difference in non iodised and iodised salt in terms of packaging and their respective advertisements 15 (50%) of them realised that it was iodised salt that they used the night before. Rest 15 (50%) decided to use iodised from now on.

A study assessing the KAP of members of a brick kiln community in Pakistan Most of the households (96%) were using iodised salt. **(Lowe et al., 2015**)

Summary and conclusion

Providing nutrition education to the respondents here showed an increase in the overall knowledge. Few of them were using iodised salt but did not know about it, they did not know the benefits. Many respondents had iodine deficiency symptoms but did not know that they were caused due to lack of iodine. Hence complete and authentic knowledge was needed in their lives. It can be concluded that imparting nutrition education increases the knowledge which one requires to make healthy choices, improves attitudes towards taking care of health and increases the chances of promoting positive behaviour and practices.

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