

Frequency and Awareness of Iodized Salt among the General Population of Karachi

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ABSTRACT

Objective: To assess the frequency of people using iodized salt and to assess the awareness of people about its harmful effects.

Study Design: Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Community Medicine, Jinnah Postgraduate Medical Centre, Karachi from February to May 2018.

Materials and Methods: A study was conducted on a sample of 384 individuals. The sample was taken through Non-Probability Purposive Sampling from all the districts of Karachi. An informed verbal consent was taken from the people. A self-administered structured questionnaire was developed for the interview, Pilot study was conducted to assess the authenticity of the questionnaire. The questionnaire was then distributed, got filled, data was entered and analyzed using SPSS version 20, with 95% confidence interval and 0.05 p-value was taken as statistically significant.

Results: A total of 384 adults were interviewed. Out of them 21.6% were males and 78.4% were females. Only 36.5% people were using the iodized salt while the majority i.e. 63.5% were using the salt devoid of iodine. 42.7% of the individuals knew that not using iodized salt can cause diseases, on the contrary, a significant amount i.e. 57.3% of the persons were unaware that iodine deficiency can lead to pathological issues as well. Only 47.4% people knew that iodized salt is beneficial for pregnant ladies, while just 37.5% of the respondents were aware that goiter is caused by iodine deficiency. 57.6% of the public knew that surgery is suggested by the doctor for goiter. On the other hand, only 32.0% individuals were aware that iodine deficiency can cause stunted growth. And just 18.2% people believed that iodine deficiency can cause delayed puberty.

Conclusion: The study concluded that majority of population had meager knowledge of the benefits of iodized salt and are not well aware of the outcomes of its deficiency. The main factor responsible for iodine deficiency is a low dietary supply of iodine.

Key Words: Iodine, Benefits, Deficiency, Goiter, Mental retardation, General Public

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INTRODUCTION

Iodine plays the pivotal role in metabolism of the body since it is the key component of the thyroid hormone (T₃,T₄).¹ Thyroid hormone is essential for normal development, growth, neural differentiation, and metabolic regulation.^{2,3} Deficiency of thyroid hormone makes a person suffer in various ways. The action of thyroid hormones (THs) in the brain is strictly regulated, since these hormones play a crucial role in the development and physiological functioning of the central nervous system (CNS).⁴ The establishment of the essential link among iodine deficiency, thyroid function and brain development has emerged from a

fascinating combination of clinical, epidemiologic and experimental studies. The central human phenomenon that focuses this relationship is the condition of endemic cretinism, described from the Middle Ages and characterized in its fully developed form by severe brain damage, deaf mutism and a spastic state of the hands and feet.⁵

It is demonstrated that iodine deficiency can be considered as sole cause of many thyroid abnormalities including mental disorders. Iodine deficiency of sufficient degree to cause hypothyroidism during fetus life and early infancy will be accompanied with brain abnormality possibly to the stage of mental retardation.⁶ Not everyone has an ample access to the natural sources of iodine. 2 billion individuals worldwide have insufficient iodine intake, with those in south Asia and sub-Saharan Africa particularly affected. Iodine deficiency has many adverse effects on growth and development.⁷

The adverse effects of iodine deficiency (ID) intellectual impairment, damaged reproduction, goiter and hypo- and hyperthyroidism are well known and easily corrected with salt iodization, but they continue to impair health and socioeconomic development, with

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more than two billion people at risk worldwide. During the major global expansion of salt iodization over the past four decades, much of Europe has remained iodine deficient.⁸

Therefore, these ailments can be avoided by adding iodine artificially in the diet to cater for the deficiency. Universal salt iodization (USI) and iodine supplementation are highly effective strategies for preventing and controlling iodine deficiency. USI is now implemented in nearly all countries worldwide, and two-thirds of the world's population is covered by iodized salt.⁹

Iodine deficiency early in life impairs cognition and growth, but iodine status is also a key determinant of thyroid disorders in adults. Severe iodine deficiency causes goitre and hypothyroidism because, despite an increase in thyroid activity to maximize iodine uptake and recycling in this setting, iodine concentrations are still too low to enable production of thyroid hormone. In mild-to-moderate iodine deficiency, increased thyroid activity can compensate for low iodine intake and maintain euthyroidism in most individuals, but at a price: chronic thyroid stimulation results in an increase in the prevalence of toxic nodular goitre and hyperthyroidism in populations.¹⁰ The iodine content of the Pakistani diet is significantly lower than the intakes recommended by the U.S. Food and Nutrition Board (150 µg/d) and the International Commission of Radiological Protection Board (200 µg/d). The iodine intake of the Pakistani population needs to be improved substantially¹¹

MATERIALS AND METHODS

A Cross-sectional survey was conducted on a sample of 384 individuals. The sample was taken through Non-Probability Purposive Sampling from five districts of Karachi, within a study period of four months from February to May 2018. An informed verbal consent was taken from the people. A self-administered structured questionnaire was developed for interview. Pilot study was conducted to assess the authenticity of the questionnaire. The questionnaire was then distributed, got filled, data was entered and analyzed using SPSS version 20, with 95% confidence interval and 0.05 p-value was taken as statistically significant.

RESULTS

A total of 384 adults were approached. Out of them 21.6% were males and 78.4% were females. Only 36.5% people were using the iodized salt while the majority i.e. 63.5% were using the salt devoid of iodine. 42.7% of the individuals knew that not using iodized salt can cause diseases, on the contrary, a significant amount i.e. 57.3% of the persons were unaware that iodine deficiency can lead to pathological issues as well. Only 47.4% people knew that iodized salt is beneficial for pregnant ladies, while just 37.5% of the respondents were aware that goiter is caused by iodine deficiency. 57.6% of the public knew that surgery is suggested by the doctor for goiter. On the other hand, only 32.0% individuals were aware that iodine deficiency can cause stunted growth. And just 18.2% people believed that iodine deficiency can cause delayed puberty.

Table No.1: Questionnaire

S.No	Questions Asked	Yes %	No %	Chi-square	p-value	Mean	Confidence interval 95%
1	Do you use the salt promoted by the Govt.?	36.5	63.5	91.904	0.000	1.635	1.59-1.68
2	Do you know by not using iodized salt can cause diseases?	42.7	57.3	23.659	0.000	1.573	1.52-1.62
3	Do you think iodized salt is beneficial for pregnant ladies?	47.4	52.6	8.015	0.005	1.525	1.48-1.58
4	Do you know that lump in neck is caused by not using iodized salt?	37.5	62.5	9.034	0.003	1.625	1.58-1.67
5	Do you know that surgery is suggested by the doctor for neck swelling?	57.6	42.4	.047	0.829	1.424	1.37-1.47
6	Do you know that iodine deficiency can cause stunted growth?	32.0	68.0	26.273	0.000	1.680	1.63-1.73
7	Do you know that iodine deficiency can cause delayed puberty?	18.2	81.8	31.124	0.000	1.818	1.78-1.86

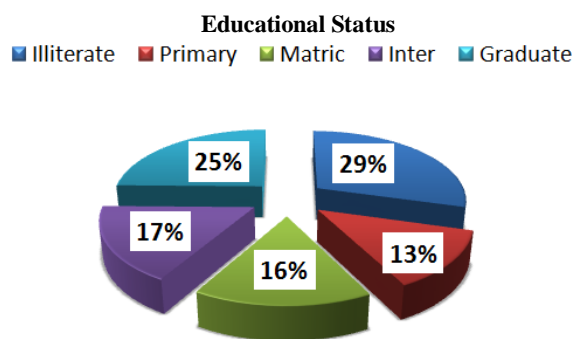


Figure No.1: The frequency of individuals belonging to different educational statuses participating in the study (N=384)

Do you use the salt promoted by the Govt.?

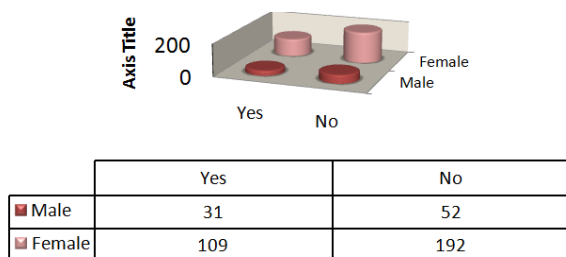


Figure No.2: The frequency of individuals using iodized salt promoted by the government (N=384)

Do you know by not using iodized salt can cause diseases?

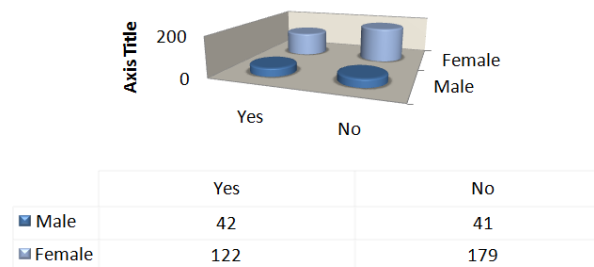


Figure No.3: The frequency of individuals knowing the pathological consequences of not using the iodized salt (N=384)

Do you think iodized salt is beneficial for pregnant ladies?

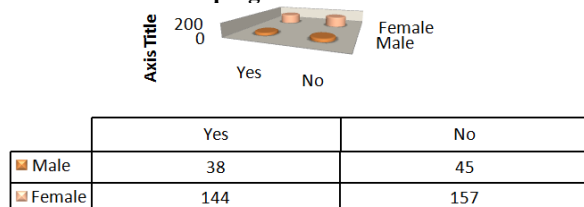


Figure No.4: The frequency of individuals considering iodized salt beneficial for pregnant ladies (N=384)

Do you know lump in neck is caused by not using iodized salt?

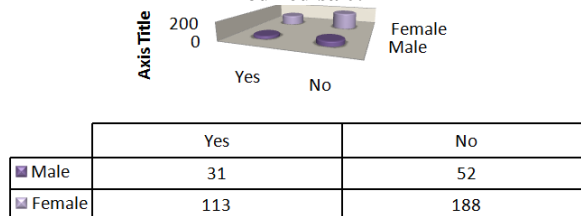


Figure No.5: The frequency of individuals knowing the lump in neck as one of the consequences of not using the iodized salt (N=384)

Do you know that iodine deficiency can cause stunted growth?

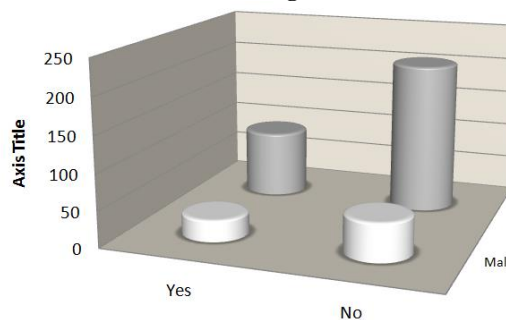


Figure No.6: The frequency of individuals knowing stunted growth as one of the outcomes of iodine deficiency (N=384)

Do you know that iodine deficiency can cause delayed puberty?

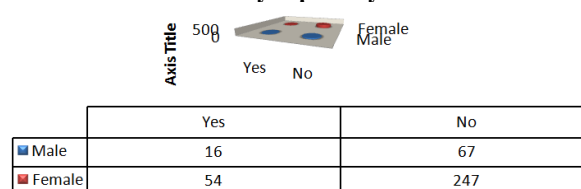


Figure No.7: The frequency of individuals knowing delayed puberty as one of the aftermaths of iodine deficiency (N=384)

DISCUSSION

The non-metal iodine is needed for the synthesis of thyroid hormone. Since the metabolism of our body is dependent heavily over this hormone, therefore, the deficiency of iodine makes a person suffer in various ways ranging from the most visible manifestation goiter, to cretinism and reduced metabolic activities etc. When it come to the treatment, all of the aforementioned sufferings can be costly, time consuming and at times non-treatable too e.g. cretinism. Therefore, it is quite justified to say that the mere use of an iodized salt is the best, handy and cheapest method of avoiding all the diseases mentioned previously.

It is estimated that 1,570 million people are at risk of iodine deficiency. Because of the wide spectrum of disorders that IDD includes, and lack of any obvious association between iodine deficiency and its health effects, IDD is not perceived as a major public health problem. Approximately 2.2 billion (2200 million) of the world population are living in the area with Iodine deficiency (ID), most of them in the developing countries¹. In IRAN about 2 million are exposed to Iodine deficiency. Most of the complications of ID are not curable, especially brain damage. On the other hand, adding iodine to daily salt is a suitable program for decreasing iodine deficiency¹²

Goiter is the most visible manifestation of IDD. Endemic goiter results from increased thyroid stimulation by thyroid stimulating hormone (TSH) to maximize the utilization of available iodine and thus represents mal adaptation to iodine deficiency. However, the most damaging disorders induced by iodine deficiency are irreversible mental retardation i.e. cretinism. While conventionally associated with cretinism and goiter, iodine deficiency has broad effects on central nervous system development that can occur in the absence of either condition. Any maternal iodine deficiency results in a range of intellectual, motor, and hearing deficits in offspring. This loss in intellectual capacity limits educational achievement of populations and the economic prowess of nations¹³

Iodine is also essential for pregnant ladies. In pregnancy, the recommended mean daily iodine intake is of 220-250 microgram were estimated to correspond to a median UI concentration of about 150 microgram. In countries where the iodine intake is sufficient, most mothers have median breast milk iodine concentration (BMIC) greater than the concentration (100-120 microgram l- 1) required meet an infant's needs. The median UI concentration during infancy that indicates optimal iodine nutrition is estimated to be $> \text{ or } = 100 \text{ microg l- 1}$. In iodine-sufficient countries, the median UI concentration in infants ranges from 90-170 microg, suggesting adequate iodine intake in infancy.¹⁴ Certain studies illustrate the true status of some parts of the world with respect to iodine intake. 2 billion individuals worldwide have insufficient iodine intake, with those in south Asia and sub-Saharan Africa particularly affected⁵. One study showed that the iodine status of women in one region of New South Wales was low. These data add support to the need for a national approach to address iodine intake which includes an accompanying consumer education campaign⁶ yet another the study demonstrated that the children on the island of Tanna were in a state of moderate iodine deficiency¹⁵

In the district of Bargarh, Orissa state, India a knowledge-attitude-practices (KAP) study was conducted along with a prevalence study of iodine deficiency disorders (IDD) between 1998-99 and this

showed some astonishing results that only 37% of the males and 29.3% of the females perceived goiter as a disease. Less than 5% of both sexes knew how goiter is caused. Only 16.4% used iodized salt regularly¹⁶

In the past 80 years, salt has proved a reliable, safe, cheap and stable carrier to correct iodine deficiency on a large scale. The advantages of salt as a carrier largely outweigh its drawbacks, and today iodized salt is available to over one billion people¹⁷

Auditory disturbances may be present in iodine deficient children. Continuous iodine supplementation permanently improves the auditory thresholds of iodine deficient children¹⁸ Moreover, another study concluded that iodized salt is an effective means of improving iodine status¹⁹

Successful experience from developed countries needs to be adapted to the developing country context. The increasing availability of processed foods in Pakistan provides an opportunity to increase iodine intake. However, the impact of this intervention remains to be quantified.²⁰

The goal of our study is to figure out the perception of general population about the usage of iodized salt. We aimed at the people belonging to different areas of Karachi. Individuals pertaining to any age group were randomly approached.

The purpose of this study was to determine the concepts and the myths prevalent amongst the males and females of the society about the salt having iodine in it, whether the individuals know the beneficial effects or they deem it something harmful.

This study was planned to determine whether the general people have this much awareness or not. Our study brought into light that out of 384 being questioned only 36.5% were using an iodized salt. Amongst the rest, a significant number of the respondents didn't even know about this entity. While the remaining scarce amount of individuals had other reasons of not using the iodized salt including unwillingness, unaware of the benefits, unavailability etc.

Even some of our respondents complained that no one has ever informed them about the salt, had they been educated earlier they would have commenced using it straightaway. Even though the majority of public didn't have the knowledge about the iodized salt but the general attitude was a bit enthusiastic to know about it and a reasonable amount of individuals were keen to switch to iodized salt as soon as possible. By far the people were co-operative in answering the questions, but were felt a bit annoyed when the information about their children was probed.

For the upcoming researchers we strongly suggest that they should carry out the survey at villages and at other deprived areas, since we feel that the uneducated class is at a greater risk of iodine deficiency owing to their Ignorance. Moreover, we believe that both the genders

should be targeted equally in order to highlight the level of ignorance amongst the two so that appropriate measures can be taken.

CONCLUSION

The study concluded that majority of population has meager knowledge of the benefits of iodized salt and are not well aware of the outcomes of its deficiency. The most damaging disorders induced by iodine deficiency are irreversible mental retardation in children which is irreversible. Iodine Deficiency is a major public health problem in Pakistan and is a threat to the social and economic development of the country. The main factor responsible for iodine deficiency is a low dietary supply of iodine.

Author's Contribution:

Concept & Design of Study: Kiran Mehtab, Tafazzul H. Zaidi
 Drafting: Kiran Mehtab
 Data Analysis: Kiran Mehtab
 Revisiting Critically: Tafazzul H. Zaidi, Kiran Mehtab
 Final Approval of version: Kiran Mehtab, Tafazzul H. Zaidi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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