Concerns of iodized salt and its effects for women seeking antenatal care in Pakistan

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ABSTRACT

Background and Objective: Pregnant women are the most susceptible group for Iodine deficiency disorder (IDD) whose neonate are at the risk of brain impairment, if they are iodine deficient in utero. The study was carried out to analyze the concerns and effects regarding iodized salt and IDD in women seeking antenatal care in Pakistan.

Methods: A descriptive cross-sectional study was conducted in Obstetrics OPD at Civil Hospital Karachi from April 2017 to January 2018. In this study, antenatal care seeking women (n=360) visiting obstetric outpatient department (OPD) at public sector tertiary care hospital of Karachi were interviewed face to face using a structured questionnaire. Systematic random sampling method was employed. Kruskal Wallis test was applied to assess the significance among study variables.

Results: Sixty-three (63.6%) of pregnant women heard about iodized salt. Approximately 40.6% of them received iodized salt related information through mass media. Ninety (90.6%) were ignorant that their unborn child needs iodine for brain development. A statistically significant association was found between the educational status (p<0.001), household income (p<0.001), age (p=0.016), ethnicity (p=0.018), trimester (p=0.005) with the knowledge of study participants regarding iodized salt and IDD.

Conclusion: There is an immense need to address the present concerns of women seeking antenatal care by advocacy and health education on individual and at mass level regarding the use of iodized salt among women seeking antenatal care. Advocacy can be done by governmental initiatives, medical personnel and through mass media in all tertiary care hospitals of Pakistan.

KEYWORDS: Iodized Salt, Concerns and effects, Antenatal care, Pakistan.

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INTRODUCTION

IDDs during pregnancy and infancy are the leading cause of a preventable cognitive impairment and intellectual disabilities which irreversibly hinders development of brain and growth in children.¹ Iodine is a trace element essential for the synthesis of thyroid hormone by the thyroid gland. Pregnant women are the most susceptible group for IDD whose neonate are at the risk of brain impairment, if they are iodine deficient in utero. Globally about 241 million (29.8%) of school age children are estimated to have inadequate iodine intake. Among 241 million
children, 76 million belong to the WHO South East Asia region and 58 million children belong to African region. IDD due to insufficient thyroid hormone production has numerous adverse effects on health.

Globally two billion individuals have an inadequate iodine intake. The regions which are particularly affected with iodine deficiency are South Asia and Sub-Saharan Africa. Mild iodine deficiency is also affecting approximately 50% Continental Europe. According to National Nutrition Survey (NNS) of Pakistan, prevalence of low Urinary Iodine excretion among women of reproductive age (i.e., 17.5%) is higher in countryside as compared to metropolitan areas. In 1993, Universal Salt Iodization (USI) has been recommended as the main strategy to achieve elimination of IDD. It was introduced in Pakistan in 1994 as a widely used cost effective strategy. According to NNS, the reported consumption of iodized salt at household level in Pakistan is 79.6% which is less than the WHO benchmark of > 90% household coverage of iodized salt to achieve the goal of USI. Pakistan is moving forward towards attaining USI, the program focus has now been shifted for sustaining USI. Therefore, The study was carried out to analyze the concerns and effects regarding iodized salt and IDD in women seeking antenatal care in Pakistan.

METHODS

A descriptive cross-sectional study was carried out in Obstetrics OPD at Civil Hospital Karachi. The study population included pregnant women aged 16-45 years seeking routine antenatal care and who were willing to participate in the study. Those who were having chronic diseases, taking chronic medications and who did not give consent to participate in the study were excluded. A Systematic random sampling method was employed in which every 5th pregnant woman who were enrolled in the OPD register were included and interviewed after taking informed consent. Sample size was estimated using the software OpenEpi. Sample size estimation was based on proportion of inadequate iodine intake (37.4%) with 5% level of significance and 95% CI. The proportion of people with inadequate iodine intake for EMRO was taken from WHO global database i.e., 37.4%. Using the above mentioned values, the calculated sample size was found to be 360. Data was collected from April 2017 to January 2018. Pilot testing of a questionnaire was performed on 36 pregnant women. After this final survey was implemented. Data collection tool included a validated structured questionnaire administered on 360 study participants through face to face interview.

There were two main sections in the questionnaire that included sociodemographic characteristics, assessment of level of knowledge of antenatal women regarding iodized salt. Study participants were asked regarding the iodized salt, sources of iodized salt related information, adverse effects of iodine deficiency and importance of iodized salt in pregnant women.

Data was entered and analyzed using SPSS version 22. Descriptive analysis was performed by calculating frequencies and percentages for categorical variables and mean and standard deviation for continuous variables. The Kolmogrov-Smirnov test was applied to determine the nature of response distribution. Association of Sociodemographic characteristics with the level of knowledge of antenatal women regarding the iodized salt and IDD were assessed through Kruskal Wallis test. Inferential statistics (Kruskall Wallis tests, p < 0.05) were used to assess the significance among study variables. All analyses were performed using SPSS version 22.

Ethical consideration: The study plan was approved by the Ethical Review Committee (Ref: of Baqai Medical University, Karachi, Pakistan. (16/2014/Sl and Dated: February 8, 2016).

RESULTS

Among 360 participants, (43.3%) belonged to the third trimester of pregnancy. Fifty percent of pregnant women belonged to the age group of 16-25 Years. A large percentage of study participants i.e., 46.1% (n=166/360) were found illiterate while 23.9% (n=86/360) had primary education and
only 6.9% (n=25/360) achieved higher education. Around 87.2% of pregnant women belonged to low socioeconomic status. More than half of pregnant women 55% (n=198) had a monthly household income of Rs. 10,000-20,000 (Table-I).

Out of 360 participants, 82.5% (n=297) of respondents did not know about what iodine is. 63.6% (n=229/360) of the respondents heard about iodized salt. Among (n=229/360) participants who received iodized salt related information through mass media was 40.6%. About 90.8% (n=327/360) of respondents did not know about the consequences of iodine deficiency in newborn, children and adults (Table-II).

A statistically significant association was found between the educational status (p<0.001), household income (p<0.001), age (p=0.016, 0.004), religion (p=0.008), ethnicity (p=0.018) with the level of knowledge regarding iodine, iodized salt and IDD of antenatal care seeking women (Table-III).

### DISCUSSION

Our study findings revealed lack of concern about IDD, its consequences, benefits of iodine and importance of iodized salt in antenatal women. Ninety percent of respondents had no knowledge that iodine deficiency results in mental retardation and goitre. Despite the introduction of a National IDD Control Program in 1994, approximately half of population of Pakistan is afflicted with IDD. Since the guidelines of National USI program do not include the measures for the utilization of iodized salt in processed foods which is affecting program sustainability. However adequately iodized salt is not available and acceptable by several regions.
Table-II: Knowledge of antenatal care seeking women (n=360) regarding Iodized salt and IDD, Karachi, Pakistan.

| Items in questionnaire                                      | Frequency (N) | Percentage (%) |
|-------------------------------------------------------------|---------------|----------------|
| Do you know what iodine is?                                 |               |                |
| Mineral                                                     | 50            | 13.9           |
| Vitamin                                                     | 4             | 1.1            |
| Something in the food we eat                                | 8             | 2.2            |
| Other                                                       | 1             | 0.3            |
| Do not know                                                 | 297           | 82.5           |
| Do you know about main sources of iodine?                   |               |                |
| Seafood                                                     | 40            | 11.1           |
| Vegetable                                                   | 17            | 17             |
| Meat                                                        | 1             | 1              |
| Dairy products                                              | 3             | 3              |
| Other                                                       | 4             | 4              |
| Don’t know                                                  | 295           | 81.9           |
| Have you ever heard about consequence of iodine deficiency? |               |                |
| Yes                                                         | 46            | 12.8           |
| No                                                          | 314           | 87.2           |
| Can you enumerate any disease that results from iodine deficiency in our body? |               |                |
| Yes                                                         | 48            | 13.3           |
| No                                                          | 312           | 86.7           |
| Have you ever heard about iodized salt?                     |               |                |
| Yes                                                         | 229           | 63.6           |
| No                                                          | 131           | 36.4           |
| Sources of iodized salt-related information                 |               |                |
| Mass media                                                  | 146           | 40.6           |
| Print Media                                                 | 4             | 1.1            |
| Members of your family                                      | 35            | 9.7            |
| Neighbors, acquaintances, friends                           | 17            | 4.7            |
| Heard from Doctor                                           | 9             | 2.5            |
| From grocery store                                          | 9             | 2.5            |
| Others                                                      | 6             | 1.7            |
| Are you aware of the grave consequences of IDD in newborn, children & adult? |               |                |
| Abortion                                                    | 3             | 0.8            |
| Stillbirth                                                  | 4             | 1.1            |
| Congenital anomalies                                        | 5             | 1.4            |
| Mental retardation                                          | 10            | 2.8            |
| Perinatal mortality                                         | 0             | 0              |
| Goitre                                                      | 3             | 0.8            |
| Heard about it first time                                   | 5             | 1.4            |
| Don’t know                                                  | 327           | 90.8           |
| All                                                         | 3             | 0.8            |
| Do you know that iodine deficiency in your children results in mental retardation? |               |                |
| Yes                                                         | 36            | 10.0           |
| No                                                          | 324           | 90.0           |
| Do you know that during pregnancy your baby needs iodine for the brain development? |               |                |
| Yes                                                         | 34            | 9.4            |
| No                                                          | 326           | 90.6           |
| Do you know iodine is required in which trimester in pregnancy? |               |                |
| 1st trimester                                               | 3             | 0.8            |
| 2nd trimester                                               | 0             | 0              |
| 3rd trimester                                               | 0             | 0              |
| Do not know                                                 | 357           | 99.2           |
| Does your health care provider inform you about importance and requirement of iodine during pregnancy? |               |                |
| Yes                                                         | 8             | 2.2            |
| No                                                          | 352           | 97.8           |
| Do you know that iodine deficiency causes goiter?           |               |                |
| Yes                                                         | 32            | 8.9            |
| No                                                          | 328           | 91.1           |
| Do you know that iodized salt consumption is essential during pregnancy? |               |                |
| Yes                                                         | 40            | 11.1           |
| No                                                          | 320           | 88.9           |
Table-III: Association of level of knowledge towards iodized salt, IDD with the demographic characteristics of antenatal care seeking women (n=360), Karachi, Pakistan.

| Items in questionnaire | Age  | Religion | Para | Gravida | Ethnicity | Education | Trimester | Income |
|------------------------|------|----------|------|---------|-----------|-----------|-----------|--------|
| Do you know what iodine is? | 0.615 | 0.601 | 0.404 | 0.651 | 0.018 | <0.001 | 0.168 | <0.001 |
| Do you know about main sources of iodine? | 0.872 | 0.691 | 0.371 | 0.496 | <0.001 | <0.001 | 0.456 | <0.001 |
| Have you ever heard about consequence of iodine deficiency? | 0.016 | 0.498 | 0.110 | 0.139 | 0.032 | <0.001 | 0.600 | <0.001 |
| Can you enumerate any disease that results from deficiency of iodine in our body? | 0.009 | 0.558 | 0.160 | 0.813 | 0.034 | 0.011 | 0.989 | <0.001 |
| Have you ever heard about iodized salt? | 0.080 | 0.075 | 0.674 | 0.645 | 0.011 | <0.001 | 0.424 | <0.001 |
| Sources of iodized salt-related information | 0.295 | 0.206 | 0.151 | 0.802 | 0.324 | 0.496 | 0.842 | 0.309 |
| Are you aware of the grave consequences of IDD in newborn, children & adult? | 0.176 | 0.298 | 0.738 | 0.849 | 0.195 | 0.001 | 0.005 | <0.001 |
| Do you know that iodine deficiency in your children results in mental retardation? | 0.070 | 0.367 | 0.128 | 0.311 | 0.011 | 0.007 | 0.418 | <0.001 |
| Do you know that during pregnancy your baby needs iodine for the brain development? | 0.081 | 0.331 | 0.391 | 0.569 | 0.030 | 0.007 | 0.647 | <0.001 |
| Do you know iodine is required in which trimester in pregnancy? | 0.115 | 0.979 | 0.733 | 0.412 | 0.768 | 0.005 | 0.216 | 0.897 |
| Does your health care provider inform you about importance and requirement of iodine during pregnancy? | 0.592 | 0.962 | 0.733 | 0.714 | 0.812 | 0.056 | 0.320 | 0.004 |
| Do you know that iodine deficiency causes goiter? | 0.065 | 0.299 | 0.060 | 0.397 | 0.009 | 0.009 | 0.331 | <0.001 |
| Do you know that iodized salt consumption is essential during pregnancy? | 0.061 | 0.008 | 0.965 | 0.372 | 0.799 | 0.011 | 0.652 | <0.001 |

Kruskal Wallis test.

of community. Therefore the availability and fortification of iodine in processed foods may contribute for increasing iodine nutrition. The findings of present study are supported by studies conducted. In present study and Addis Ababa city, monthly household income and educational status of participants were associated with knowledge related to iodized salt. However, a study carried out in North West Ethiopia reported that 63.6% were unaware about iodized salt and 18% received information about iodized salt through mass media. Moreover, in another Ethiopian and South Indian study which reported that more than half of respondents were acquainted that iodine deficiency results in goiter. A major bulk of respondents heard about...
iodized salt. Only 16.6% respondents acquired information regarding importance of iodized salt through health worker. More than half of participants knew that iodine deficiency results in mental and growth retardation. The difference could be because of difference in educational status where half of respondent’s attained secondary education and 12.1% had acquired university education. In the present study the educational status of participants is quite low with 67.9% of participants having secondary education and 12.1% had acquired university education. In another study which was carried out in Bangladesh, a significant correlation was found between knowledge level and educational status (p < 0.05) of participants.

In another study conducted in Somali Ethiopia which reported that most of the respondents were well aware about iodized salt and acknowledged mass media (31.3%) and health worker (8%) as a source of information. This difference could be because of their higher educational status. While in a study conducted in Norway which reported that 16.6% received information about iodine from their health professional, less than 17% of pregnant women replied that intake of iodine is important for normal fetal development. The difference could be due to difference in level of education, dietary habits and geographical location. The researcher through this study revealed lack of concern related to benefits of iodized salt and effects of IDD in antenatal women.

**Limitations of the study:** As this study carried out in a single tertiary care hospital, therefore the results cannot be generalized at population level. Limitation in retrieving information was observed among the study participants while conducting interview because of memory lapse.

**CONCLUSION**

Pregnant women are the most vulnerable population which are lacking knowledge regarding the importance of iodized salt. There is an immense need to address the present concerns of women seeking antenatal care by advocacy and health education on individual and at mass level. Advocacy can be done by governmental initiatives, medical personnel and through mass media in all tertiary care hospitals of Pakistan regarding the use of iodized salt by women seeking antenatal care.

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Author’s Contribution:

FS: Conceived, designed, data analysis, interpretation, manuscript writing, and accountable for all aspects of the work related to accuracy and integrity of the work appropriately investigated and resolved.

SM: Reviewed, data analysis, interpretation and final approval of the version to be published.

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