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Original Research Article

Assessment of Knowledge of Women Regarding Iodine Nutrition during Pregnancy and Lactation at a Tertiary Care Centre

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ABSTRACT

Background: During the second half of pregnancy, there is an increase in the fetal thyroid hormone production which further contributes to increased maternal iodine requirements because iodide readily crosses the placenta. Renal excretion is the primary route of iodine excretion. It accounts for more than ninety percent of ingested iodine. Hence, we planned the present study to assess the knowledge of women in relation to iodine nutrition during pregnancy and lactation.

Materials & Methods: The present study included assessment of knowledge of 50 pregnant women and 50 lactating women reporting in Saraswathi Institute of Medical Sciences, Pilkhuwa, Hapur, Uttar Pradesh, India. For the present study, invitation for participation was given to women belonging to all the three trimesters. From early childhood care centre, lactating mothers within first six months of breast-feeding were recruited. A questionnaire was framed which was based on the supplement use and iodine knowledge and practices, and was filled by all the participants of the study. All the results were recorded and analyzed by SPSS software.

Results: Mean age of the pregnant women was 29.7 years18 subjects out of 100 were illiterate, while 42 were educated upto the level of high school. 24 and 16 subjects were educated upto the level of graduation and post-graduation respectively. Majority of the subjects were in their second trimester of pregnancy. More than 50 percent of the subjects were aware that iodine deficiency can also results in goitre.

Conclusion: Inadequate knowledge exists among pregnant and lactating women in relation to significance of iodine and iodine supplements in pregnancy and lactation.

Key words: Iodine, Lactation, Pregnant.

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INTRODUCTION

In response to increased levels of serum thyroxine-binding globulin and because of stimulation of thyrotropin (TSH) receptors by human chorionic gonadotropin during the period of beginning of early gestation, maternal thyroid hormone production normally increases by approximately 50%.[1] Rich source of type 3 inner ring deiodinase is placenta. Type 3 inner ring deiodinase enhances the degradation of thyroxine (T_4) to bioinactive reverse triiodothyronine (T_3). Therefore, there is increase in demand of thyroid hormones which needs an adequate iodine supply that is obtained primarily from the diet and/or as supplemental iodine.[2]

Moreover, during the second half of pregnancy, there is an increase in the fetal thyroid hormone production which further contributes to increased maternal iodine requirements because iodide readily crosses the placenta. Renal excretion is the primary route of iodine excretion.[3] It accounts for more than ninety percent of ingested iodine. Beginning in early pregnancy, the glomerular filtration rate of iodide increases by 30% to 50%, thereby further decreasing the circulating pool of plasma iodine.[4]

Although associated with low uptake, Iodised table salt is available through voluntary fortification. Other suggested reasons for the increasing prevalence of inadequate iodine intakes are the widespread replacement of iodophors with other cleansing agents in the dairy industry and a general lack of awareness within the population about the importance of iodine in the diet.[5] Hence, we planned the present study to assess the knowledge of women in relation to iodine nutrition during pregnancy and lactation.

MATERIALS & METHODS

The present descriptive study included assessment of knowledge of 50 pregnant women and 50 lactating women reporting in Saraswathi Institute of Medical Sciences, Pilkhuwa, Hapur, Uttar Pradesh, India.

For the present study, invitation for participation was given to women belonging to all the three trimesters. Ethical approval was taken from research ethical committee and written consent was obtained after explaining in detail the entire research protocol.

Exclusion criteria:

- Patients with history of any systemic illness,
- Patients on antihypertensive medication and/or diuretics
- Patients who had received any formal training in nutrition

From early childhood care centre, lactating mothers within first six months of breast-feeding were recruited. A questionnaire was framed which was based on the supplement use and iodine knowledge and practices, and was filled by all the participants of the study.

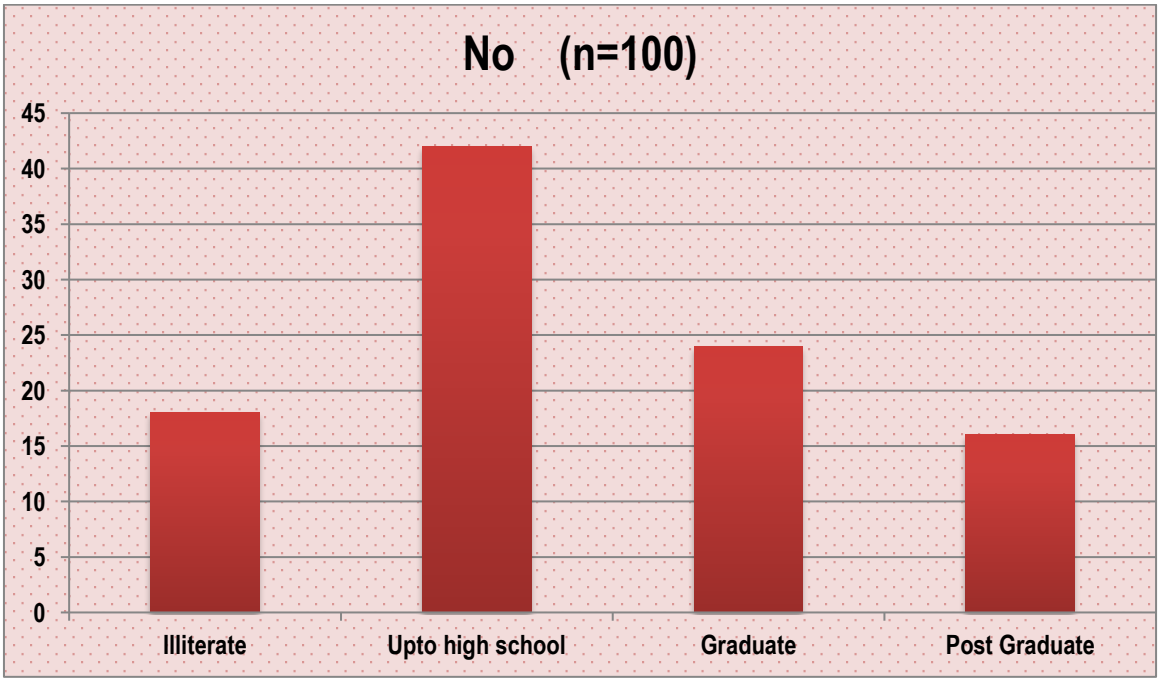
The questionnaire asked about intake over the past month of the food categories like dairy, eggs, cereal products including bread, fish and seafood, meat, vegetables, fruit and mixed dishes.

The questionnaire was adapted from previous studies and modified for use in pregnancy or lactation, where necessary.[3,5] Questions related to knowledge of iodine nutrition included health implications associated with inadequate iodine in the diet and sources of dietary information. Questions related to practices included changes made to the diet with the intention to increase iodine intake, reported nutritional supplement use and the use of iodised salt. Participants were asked about their current level of awareness of iodine as a public health problem and whether they felt confident they had received enough information to make informed choices on various nutrition concerns (during pregnancy/lactation). All the results were recorded and analyzed by SPSS software. Chi- square test and student t test were used for the assessment of level of significance.

Table 1: Demographic and personal details of the subjects included in the present study

Parameter		(n= 100)
Mean age (years)		29.7
Level of education	**Illiterate**	18
	Upto high school	42
	Graduate	24
	Post- graduate	16
Trimester (n=50)	**First**	12
	Second	28
	Third	10

Graph 1: Education levels of the subjects included in the present study



RESULTS

Mean age of the pregnant women was 29.7 years (Table 1). 18 subjects out of 100 were illiterate, while 42 were educated unto the level of high school. 24 and 16 subjects were educated upto the level of graduation and post-graduation respectively (Table 1 Graph 1). Majority of the subjects were in their second trimester of pregnancy. Knowledge of pregnant and lactating subjects about the potential sources of iodine is shown in Table 2 and Graph 2.

Non-significant results were obtained while assessing the knowledge of lactating women about source of iodine. 22 and 27 subjects knew that meat and fish were good source of iodine respectively. 21 and 27 subjects knew that iodine deficiency can cause malformation during pregnancy and weak bones respectively. More than 50 percent of the subjects were aware that iodine deficiency can also results in goitre. Non-significant

results were obtained while comparing the knowledge of pregnant women about sources of iodine (p-value > 0.05). While comparing the knowledge of pregnant women and lactating women in relation to consequences associated with iodine deficiency, non-significant results were obtained (p-value > 0.05). Non-significant results were obtained while comparing the knowledge of pregnant and lactating women in relation to adverse consequences related to iodine deficiency (Table 3).

Table 2: Knowledge of pregnant women about source of iodine

Source of food	Good Source (N)		Do Not Know (N)	
	Pregnant Women	Lactating Women	Pregnant Women	Lactating Women
Meat	22	26	28	24
Milk	20	19	30	31
Fish	27	20	23	30
Bread	20	27	30	23
Fruits	27	20	23	30
Salt	19	22	31	28
Eggs	20	27	30	23
Vegetables	26	26	24	24

Graph 2: Knowledge of pregnant and lactating women about known good source of iodine deficiency

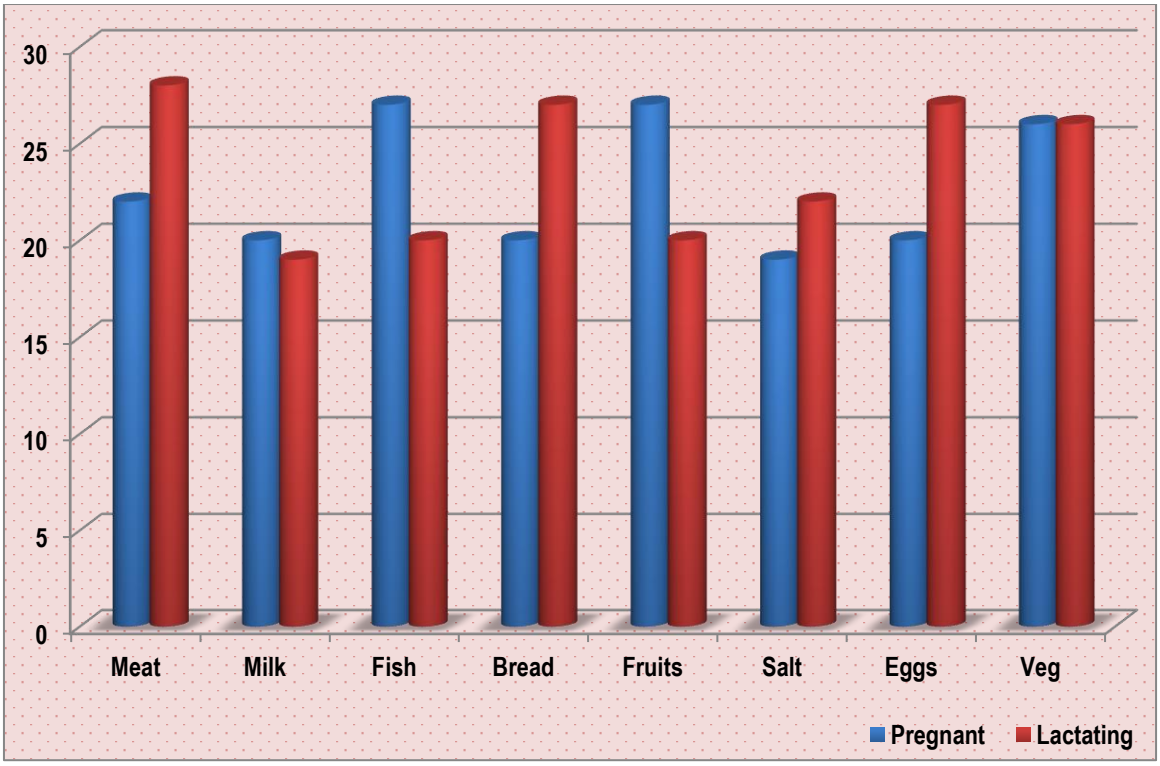


Table 3: Comparative evaluation of knowledge of pregnant and lactating women in relation to adverse consequences related to iodine deficiency

Adverse consequences	No. of pregnant subjects aware	No. of lactating subjects aware	p- value
Malformation in pregnancy	21	24	0.52
Weak bones	27	28	0.33
Goitre	28	21	0.14
Impaired physical development	22	20	0.54
Blindness	24	26	0.84
Mental retardation	21	22	0.79

DISCUSSION

Child development can be adversely affected by iodine deficiency. Across the world, it is one of the most widespread micro-nutrient deficiencies.[3] It can result in a number of developmental and functional abnormalities, the spectrum of which is referred to as the Iodine Deficiency Disorders (IDD).[6,7] As an essential micronutrient and component of the thyroid hormones, which regulate growth and development from conception to adulthood, iodine plays a major role in normal physical growth and development until well after birth.[8] Hence, we planned the present study to assess the knowledge of women in relation to iodine nutrition during pregnancy and lactation.

In the present study, we observed that majority of the subjects were unaware of the iodine rich dietary sources (Table 2). Also most of the subjects didn't have adequate knowledge relation to the adverse effects of iodine deficiency (Table 3). Charlton et al assessed whether knowledge and practices related to iodine nutrition, supplementation and fortification has improved in Australian women since the introduction of mandatory iodine fortification in 2009.A self-administered questionnaire was completed and dietary intake of iodine was assessed using a validated food frequency questionnaire. A generally poor knowledge about the role and sources of iodine in the diet remained after fortification. Post-fortification, iodine-containing supplements were being taken by 60% and 45% of pregnant and lactating women, respectively. Dairy foods were the highest contributors to dietary iodine intake. A low intake of fish and seafood resulted in this food group contributing only 3%–8% of total intake. A low level of public awareness regarding the role of iodine in health supports the need for public health strategies in addition to fortification, such as an accompanying consumer education campaign, increased uptake of supplementation, and on-going monitoring.[9] Charlton et al conducted a study to assess changes in median urinary iodine concentration (MUIC) measurements, according to supplement use, in convenience samples of pregnant women attending a public antenatal clinic in Australia. Knowledge and practices related to iodine nutrition were investigated in 2012, using self-administered questionnaires. The mild iodine deficiency confirmed pre-fortification has steadily improved to 145.5 µg/L in 2011 and 166 in 2012. However, only women taking supplements containing iodine had MUIC indicative of sufficiency in both years surveyed post fortification. Despite bread being the vehicle for iodine fortification, dairy foods remained major contributors to total iodine intake (58%). Overall knowledge regarding health implications of iodine deficiency was poor. Iodine status of women has improved since the introduction of mandatory iodine fortification; however supplementation is indicated during pregnancy.[10]

Charlton et al assessed the iodine status of healthy women and to investigate consumer understanding and attitudes related to the proposed mandatory iodine fortification programme. Cross-sectional sample of 78 non-pregnant women aged 20-55 y was conveniently sampled in Wollongong, NSW. A single 24-hr urine sample was collected for urinary iodine concentration (UIC). A self-administered questionnaire assessed consumer understanding, perceptions and attitudes related to iodine fortification. Median UIC = 56 microg/L (IQR = 41-68), indicating mild iodine deficiency. 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 campaign.[11] Lucas et al assessed nutrition-related knowledge and practices, including supplement use, of both pregnant women and healthcare providers that participate in antenatal shared care (ANSC). Pregnant women enrolled in ANSC (n = 142) completed a knowledge and practices survey and a validated iodine-specific Food Frequency Questionnaire. General practitioners (GP) and nurses (N = 61) participating in the ANSC program completed a short survey which assessed their knowledge about nutrition for pregnancy, focussing on iodine. Both groups had poor knowledge about the importance and roles of iodine during pregnancy. Most women (82%) reported taking a supplement during their current pregnancy, and 70% were taking a supplement containing iodine. Only 26% of GPs discussed iodine supplementation with pregnant patients. The median (IQR) iodine intake of pregnant women was 189 (129-260) µg/day which meets the estimated average requirement (160 µg/day). Half (52%) of women's dietary iodine was provided by dairy foods, and only 7% came from fish and seafood. Most healthcare providers (74%) expressed interest in receiving ongoing professional education about iodine in pregnancy. Ongoing nutrition education for ANSC health practitioners is required to ensure that women receive sufficient dietary advice for optimal pregnancy outcomes. Further research is required to address reasons behind dietary choices of Australian pregnant women.[12]

Clifton et al characterised the iodine status of South Australian women during pregnancy and relate it to the use of iodine-containing multivitamins. The impact of fortification of bread with iodized salt was also assessed. Women (n = 196) were recruited prospectively at the beginning of pregnancy and urine collected at 12, 18, 30, 36 weeks gestation and 6 months postpartum. The use of a multivitamin supplement was recorded at each visit. Spot urinary iodine concentrations (UIC) were assessed. Median UICs were within the mildly deficient range in women not taking supplements (<90 µg/L). Among the women taking iodine-containing multivitamins UICs were within WHO recommendations (150-249 µg/L) for sufficiency and showed an increasing trend through gestation. The fortification of bread with iodized salt increased the median UIC from 68 µg/L to 84 µg/L ($p = .011$) which was still in the deficient range. Pregnant women in this region of Australia were unlikely to reach recommended iodine levels without an iodine supplement, even after the mandatory iodine supplementation of bread was instituted in October 2009.[13]

CONCLUSION

From the above results, the authors concluded that inadequate knowledge exists among pregnant and lactating women in relation to significance of iodine and iodine supplements in pregnancy and lactation. Therefore, there is a need of increasing the awareness iodine and its effect on the physiologic health and status of the growing child.

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