

Original Research Article

KNOWLEDGE, ATTITUDE, PRACTICES ABOUT GOITRE AND IODISED SALT AMONG WOMEN IN RURALLY LOCATED TERTIARY CARE HOSPITAL IN INDIA

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ABSTRACT

Background: Iodine deficiency remains a major public health concern in developing countries and is an important cause of preventable thyroid disorders. Adequate use of iodized salt is essential for preventing iodine deficiency disorders (IDDs), including goitre. Women play a crucial role in household food preparation and therefore influence family iodine intake.

Objectives: To assess the knowledge, attitude, and practices (KAP) regarding goitre and iodized salt among women attending a rurally located tertiary care hospital in India and to determine the association of KAP with selected sociodemographic factors.

Materials and Methods: A hospital-based cross-sectional study was conducted among 130 women aged 15 years and above using a structured interviewer-administered questionnaire from article- Knowledge, attitude and practice regarding household consumption of iodised salt among rural women of Tripura, India: A mixed method study.

Results: Most participants were married homemakers from nuclear families and belonged to the upper-lower socioeconomic class. The prevalence of goitre was 11.5%, with the majority having Grade 0 goitre (88.5%). Although awareness of iodized salt was moderate, detailed knowledge regarding iodine deficiency disorders was inadequate. Positive attitude towards iodized salt was observed in 96.9% of participants, and correct practices were reported by 96.2%. Most women used packed iodized salt and followed appropriate storage practices. Age showed a significant association with knowledge ($\chi^2 = 5.648$, $p = 0.017$), while attitude showed a significant association with practice ($\chi^2 = 4.997$, $p = 0.025$).

Conclusion: The study revealed that despite inadequate knowledge regarding iodine deficiency disorders, most women demonstrated positive attitudes and appropriate practices related to iodized salt usage. Strengthening community-based health education and nutritional awareness programs is essential to improve knowledge and further enhance preventive practices against iodine deficiency disorders.

Keywords: Iodized salt, Goitre, Iodine deficiency disorders, Knowledge, Attitude, Practice, Rural women.

INTRODUCTION

Iodine is an essential trace element required for the synthesis of thyroid hormones T3 and T4, which are fundamental to human growth, cellular metabolism, and physiological development.^[1] Adequate iodine intake is critical across the lifespan, particularly during fetal development and early childhood, when neurodevelopment is highly sensitive to thyroid hormone availability.^[2] Deficiency in this nutrient leads to a range of manifestations known as Iodine Deficiency Disorders (IDDs), including endemic goitre, physical growth retardation and irreversible cognitive impairments.^[3,4] The most visible clinical marker of prolonged iodine deficiency is goitre, characterized by diffuse or nodular enlargement of the thyroid gland resulting from compensatory TSH hypersecretion.^[5,6] Within the Indian context, the prevalence of goitre among women rose from 2.2% (NFHS-4) to 2.7% (NFHS-5), indicating that despite long-standing national initiatives, iodine deficiency remains a significant public health obstacle.^[7] Clinically, goitre may remain asymptomatic or progress to cause mechanical pressure symptoms such as dysphagia, dyspnoea and dysponia, while chronic, untreated cases carry risks of malignancy or functional thyroid failure.^[8,9] To combat these issues, the Government of India established the National Iodine Deficiency Disorders Control Programme (NIDDCP), which emphasizes Universal Salt Iodization (USI) as the primary strategy to ensure adequate iodine delivery via the most commonly consumed dietary vehicle.^[10,11] However, the efficacy of USI at the community level is often mitigated by poor household practices, including improper storage in non-airtight containers, exposure to high temperatures (near cooking stoves), and the addition of salt during the initial stages of boiling, which results in the sublimation and loss of volatile iodine content.^[12,13] As women are the primary household food managers, their baseline knowledge regarding these preventive culinary practices is the most significant determinant of a family's micro-nutritional health.^[14] Given the persistency of these deficits in rural settings, this study was conducted to evaluate the KAP profiles of women attending a rurally located tertiary care hospital, providing data to bridge the gap between national policy and household practice.^[15]

MATERIALS AND METHODS

A community-anchored, hospital-based mixed-methods cross-sectional study was conducted to evaluate the clinical profiles and knowledge, attitude and practice (KAP) indices concerning goitre and household consumption of iodized salt. The study was carried out among female patients attending the outpatient and inpatient departments of a rurally located tertiary care hospital- Government

Villupuram Medical College and Hospital, Villupuram, Tamil Nadu, India.

Study Participants and Eligibility Criteria

The target study population comprised adult women seeking clinical consultation or care services at the rurally located tertiary care hospital.

Inclusion Criteria: Permanent female residents within the local rural blocks mainly from Marakkanam and Vanur (goitre endemic area) aged ≥ 15 years who were primary food preparers for their respective households and voluntarily provided written informed consent.

Exclusion Criteria: Women with severe cognitive impairment, critically ill patients requiring emergency resuscitation, or those who refused to participate or who are not from marakkanam and vanur taluk.

Sample Size

sample size will be calculated based on the following formula for estimating proportions:

$$n = Z^2 \times p(1-p) / d^2$$

Where:

n = required sample size

Z = standard normal deviate corresponding to 95% confidence level (1.96)

p = expected prevalence of goitre (taken as 8% based on NFHS-5 data)

d = desired precision (0.05)

Substituting the values:

$$n = (1.96)^2 \times 0.08 \times 0.92 / (0.05)^2 = 113$$

After rounding off and accounting for 10% non-response, the final sample size is approximately 130 participants

Sampling Method

A non-probability convenience sampling technique was deployed to select respondents from the hospital outpatients and inpatient, optimizing the identification of distinct culinary practice pathways and baseline clinical presentation matrices within rural household setups.

Data Collection

Data collection tool and Operationalization

Data collection was facilitated via an interviewer-administered structured questionnaire from article-Knowledge, attitude and practice regarding household consumption of iodised salt among rural women of Tripura, India: A mixed method study. The quantitative and clinical tool was divided into four distinct components:

Sociodemographic Characteristics

Documented age, marital status, education, Occupation, type of family and socioeconomic status calculated using an updated modified B.G Prasad scale.

Clinical, Obstetric and Physical Examination

Evaluated presenting signs and symptoms of thyroid dysfunction and Examination of neck (thyroid gland) were performed and determine thyroid enlargement using the standardized World Health Organization Goitre Grading system.

Grade 0: No palpable or visible goitre

Grade 1: Palpable thyroid gland but not visible when the neck is in a normal position.

Grade 2: visible and palpable goitre.

Menstrual history and family history of goitre were obtained.

Knowledge, attitude and practice domains

questionnaire from article- Knowledge, attitude and practice regarding household consumption of iodised salt among rural women of Tripura, India: A mixed method study.

Knowledge and Attitude Modules has cognitive variables, including awareness of the term “iodized salt”, understanding its dietary meaning, recognition of mandatory packet validation indices (e.g., printed iodine levels or specific logistical symbols like the smiling sun), and functional health literacy regarding clinical outcomes of sustained deficiency (such as goitre, childhood growth retardation, child brain development hampering, or congenital birth defects). Attitudinal variables measured individual dietary salt preferences, primary drivers for those selections (e.g., health value vs pricing/ quality) and perceived importance of iodized salt within regular family meals.

Household practice attributes Evaluated actionable behaviors regarding salt handling, including the explicit type of salt utilized and storage conditions, addition sequences during culinary preparations

Data Entry and Statistics

The collected data were entered in SPSS software, version 17.0 and represented in proportions with the help of frequency distribution tablets. variables were summarised using means (standard deviations) and frequency (percentage), as applicable. chi square test and fisher’s exact test wherever applicable were used to find out association between sociodemographic factor with KAP of the participants and $p < 0.05$ was considered statistically significant.

Variables and Scoring

The independent variables were age, marital status, education, Occupation, type of family and Socioeconomic status. The dependent variables were “Good and Poor Knowledge”, “positive and negative attitude” and “Correct and Wrong Practice”.

One mark was awarded for every Correct answer and zero for every Wrong answer. Later, scores below or equal to mean value and above mean value, respectively, were categorized as having “good and poor knowledge” (mean score 3.52 ± 2.89), “Negative and positive attitude” (mean score 2.77 ± 0.59) and “correct and wrong practice” (mean score 7.08 ± 0.97)

Ethical Clearance

The study proposal was submitted to the Institutional Ethics Committee of Government Villupuram Medical College, Villupuram, Tamil Nadu and ethical clearance was taken before commencing the study.

RESULTS

The majority of the participants belonged to the age group of 31-40 years (33.1), followed by 41-50 years (24.6) and 21 -30 years (24.6). only 3.1% were aged 20 years or below, while 5.4% belonged to the 61-70 years age group. Most participants were married (87.7%), whereas only 8.5% were unmarried and 3.8% were widowed or divorced. Regarding education, 27.7% had completed higher secondary education, 24.6% had secondary education, 20% were graduates or above and 7.7 % were stop at primary education. Only 7.7% were illiterate. The majority of women were homemakers (70.1%), followed by employed women (11%), farmers (9.4%), students (3.1%), labourers (4.7%), and business workers (1.6%). Most women belonged to nuclear families (74.6%), while only 25.4% belonged to joint families. Nearly half of the participants belonged to the upper lower socioeconomic class (46.9%), followed by lower middle class (29.2%), lower class (18.5%), and upper middle class (5.4%). None belonged to the upper class. Only 12 number of women reported symptoms suggestive of hypothyroidism. Weight gain despite poor appetite was reported by 11 women, constipation by 8 women, cold intolerance by 5 women, and amenorrhea by 4 women. No participant reported hyperthyroid symptoms. Pressure symptoms such as dysphagia and dyspnoea were reported in 6 participants each. About 23.1% of women had attained menopause, while 76.9% had not. Only 1.5% reported family history of thyroid disease or goitre. Among women with comorbid conditions, diabetes mellitus was the most common, followed by hypertension and arthritis. Most participants (88.5%) had Grade 0 goitre, meaning no visible or palpable thyroid enlargement. Grade 1 goitre was seen in 6.9% and Grade 2 goitre in 4.6% of participants. Among women with goitre, all had bilateral thyroid enlargement. Diffuse goitre was more common than multinodular goitre. All thyroid swellings were firm in consistency, and only one case showed tenderness. Among the participants, 63.8% had heard about iodized salt, while 33.1% had never heard about it and 3% gave no response. When asked about the meaning of iodized salt, only 51.5% correctly identified it as ordinary salt containing a small quantity of iodine. About 31.5% considered it simply common salt, while 16.1% did not know its meaning. More than half of the women (54.6%) knew that edible salt contains iodine. However, 16.1% believed that edible salt does not contain iodine, while 29.2% gave no response. Half of the participants (50%) did not know whether iodized salt tastes different from ordinary salt. Only 26.9% believed there was a taste difference, while 23.1% believed there was no difference. Knowledge regarding identification of iodized salt packets was poor. Only 17.7% recognized the smiling sun symbol, while 30.7% identified the iodine level

printed on the packet as an indicator of iodized salt. Around 32.3% did not know how to recognize iodized salt packets, and 19.2% gave no response. Only 47.7% believed that intake of iodized salt is important for health, while 42.3% believed it was not important and 10% did not know. When participants were asked why iodized salt is important: 26.2% said it prevents goitre, 11.5% said it prevents iodine deficiency, 10.8% believed it helps maintain health, 2.3% said it promotes growth, while 60.7% did not know the reason. Regarding health problems caused by iodine deficiency: 32.3% identified goitre, 16.9% recognized impaired brain development in children, 11.5% mentioned generalized weakness, 3.8% identified growth retardation, 3.1% mentioned birth defects, while 56.2% did not know any consequences. Almost all participants (99.2%) preferred packed salt, while only one participant did not respond. Among participants: 46.2% preferred packed salt because of its quality, 38.5% preferred it for health benefits, 9.2% preferred it because of taste, very few preferred it because it was cheaper or free of cost. Most women (82.3%) considered iodized salt very

important in their diet, while 15.4% considered it somewhat important. None of the participants reported that iodized salt was unimportant. Most participants (93.8%) used iodized packed salt, whereas only 6.2% used coarse unpacked salt. About 80.8% protected salt from sunlight exposure, while 9.2% exposed salt to sunlight and 10% were uncertain. Nearly all women stored salt in dry areas (98.5%), while only 1.5% kept salt near fire or heat sources. Most participants stored salt in covered containers (95.4%), whereas only 4.6% used uncovered containers. Most households stored salt for half to one month (60.8%). Smaller proportions stored salt for shorter or longer periods. Among participants:

43.1% added salt at the beginning of cooking, 27.7% added it during the middle stage, 92.2% added it at the end of cooking. Most households consumed half to one packet of salt per month (65.4%), while smaller proportions consumed more or less. Most participants purchased salt from local village shops (60%), followed by wholesale shops and nearby town shops.

Table 1

Demographic details	Frequency %
Age	
<=20	4(3.1%)
21-30	31(23.8%)
31- 40	43(33.1%)
41- 50	32(24.6%)
51- 60	13(10.0%)
61-70	7(5.4%)
Marital status	
Married	114(87.7%)
Unmarried	11(8.5%)
Widowed /divorced	5(3.8%)
Education	
Illiterate	10(7.7%)
Primary	10(7.7%)
Middle	16(12.3%)
Secondary	32(24.6%)
Higher secondary	36(27.7%)
Graduate and above	26(20%)

Table 2

Occupation	
Homemaker	89(70.1%)
Farmer	12(9.4%)
Labour	6(4.7%)
Business	2(1.6%)
Student	4(3.1%)
Employed	14(11%)
Old age or retired	0%
Type of family	
Joint	33(25.4%)
Nuclear	97(74.6%)
Socioeconomic status	
Lower	24(18.5%)
Upper lower	61(46.9%)
Lower middle	38(29.2%)
Upper middle	7(5.4%)
Upper	0%

Table 3

Symptoms related to Hypothyroidism	12response
Weight gain inspite of poor appetite	11
Constipation	8
Cold intolerance	5
Amenorrhea	4
Symptoms related to hyperthyroidism	0 response
Pressure symptoms	6 response
Dysponia	6
Dysphagia	6
Change in voice	0
Menopause	
Yes	30(23.1%)
No	100(76.9%)
Family history	
Yes	2(1.5%)
No	128(98.5%)
Comorbidities	36 response
Diabetes mellitus	25
Hypertension	12
Arthritis	5

WHO goitre grading	
Grade 0: no goitre	115(88.5%)
Grade1:palpable but not visible	9(6.9%)
Grade 2: visible swelling	6(4.6%)
Location	15response
Bilateral	15
Right lobe	0
Left lobe	0
Other	0
Type of goitre	15response
Diffuse	12
Solitary nodular	0
Multinodular	3
Consistency	15response
Soft	0
Firm	15
Hard	0
Tenderness	15 response
Yes	1
No	14

KNOWLEDGE SECTION	
Are you heard about iodised salt	
Yes	83(63.8%)
No	43(33.1%)
No response	4(3.0%)
Meaning of iodised salt	
Ordinary common salt with small quantity of iodine	67(51.5%)
Common salt	41(31.5%)
Don't know	21(16.1%)
No response	1(0.8%)
Edible salt contains iodine	
Yes	71(54.6%)
No	21(16.1%)
No response	38(29.2%)
difference in taste of iodised salt from that of common salt without iodine	
Yes	35(26.9%)
No	30(23.1%)
Don't know	65(50%)

Recognition of iodised salt packet by	
smiling sun on packet	23(17.7%)
Iodine level printed on packet	40(30.7%)
Don't know	42(32.3%)
No response	25(19.2%)
Intake of - iodised salt is important for health	
Yes	62(47.7%)
No	55(42.3%)
Don't know	13(10%)
Intake of iodised salt is important	

To prevent from goiter - swelling of neck	34(26.2%)
To keep healthy	14(10.8%)
To prevent iodine deficiencies	15(11.5%)
To grow well	3(2.3%)
Don't know	79(60.7%)
No response	3(2.3%)

when there is iodine deficiency in the body there is	
Generalized weakness	25(11.5%)
Goitre	42(32.3%)
Growth retardation	5(3.8%)
Brain development is hampered in children	22(16.9%)
Birth defects	4(3.1%)
Defect in hearing & speech	0
Don't know	73(56.2%)
No response	8(6.2%)
ATTITUDE SECTION	
opinion on salt preference	
Packed salt	129(99.2%)
No response	1(0.8%)
Reason for salt preference	
Taste	12(9.2%)
Quality	60(46.2%)
Health	50(38.5%)
Quantity	0
Free of cost	3(2.3%)
Cheaper	5(3.8%)

importance of iodised salt in your diet	
Very important	107(82.3%)
Somewhat important	20(15.4%)
Not at all important	0%
No response	3(2.3%)
PRACTICE SECTION	
type of salt used	
Iodised packed salt	122(93.8%)
Coarse salt(not packed)	8(6.2%)
Sunlight exposure to salt	
Yes	12(9.2%)
No	105(80.8%)
Don't know	13(10%)
salt storage place	
Dry area	128(98.5%)
Moist area	0
Near to fire	2(1.5)
Type of salt container	
With cover	124(95.4%)
Without cover	6(4.6%)

Duration of salt storage at household level	
Less than or equal to half month	25(19.2%)
Half to 1 month	79(60.8%)
1 to 1 and ½ month	19(14.6%)
1 and ½ to 2 month	7(5.4%)
More than or equal to 2 months	0%
No response	0%
Addition of salt in cooking during	
Beginning	56(43.1%)
Middle	36(27.7%)
End	34(26.2%)
Early and middle	4(3.1%)
Number of salt packets consumed per month	
Half packet	20(15.4%)
Half to 1 packet	85(65.4%)
1 to 2 packet	23(17.7%)
2 to 3 packet	2(1.5%)
More than 3 packet	0%

Usually bought salt from	
Local shop in the same town or village	78(60%)
Shop in the nearby town or village	10(7.7%)
From the wholesale shop	33(25.4%)
From weekly market	9(6.9%)

Among participants aged ≤ 35 years, 51% had good knowledge and 49% had poor knowledge. In contrast, among participants aged > 35 years, only 29.6% had good knowledge while 70.4% had poor knowledge. The association between age and knowledge was statistically significant ($\chi^2 = 5.648$, $p = 0.017$). Regarding attitude, 98% of participants aged ≤ 35 years and 96.9% of participants aged > 35 years demonstrated a positive attitude. The association was not statistically significant ($p = 0.612$). Similarly, good practices were observed among 95.9% of younger women and 96.3% of older women. No significant association was found between age and practice ($p = 0.917$). Among married women, 39.5% had good knowledge while 60.5% had poor knowledge. Among unmarried, widowed, or divorced women, only 25% had good knowledge and 75% had poor knowledge. However, the association was not statistically significant ($p = 0.277$). Positive attitude was observed among 96.5% of married women and 100% of women in the other marital category. Similarly, good practices were observed among 95.6% and 100% respectively. No statistically significant associations were found. Among illiterate women, only 20% had good knowledge while 80% had poor knowledge. Among literate women, 39.2% had good knowledge and 60.8% had poor knowledge. Despite this difference, the association was not statistically significant ($p = 0.219$). All illiterate women demonstrated positive attitudes and correct practices. Among literate women, 96.7% had positive attitudes and 95.8% had correct practices. No significant association was observed between education and attitude or practice. Among homemakers, 36% had good knowledge and 64% had poor knowledge. Among women engaged in other occupations, 41.5% had good knowledge and 58.5% had poor knowledge. The difference was

not statistically significant ($p = 0.550$). Positive attitudes and correct practices were observed in more than 95% of both occupational groups, and no significant associations were found. Among women from nuclear families, 40.2% had good knowledge compared to 30.3% among women from joint families. However, the difference was not statistically significant ($p = 0.307$). Positive attitudes and correct practices were high in both groups, and no statistically significant associations were observed. Among women belonging to socioeconomic classes below upper lower, only 31.8% had good knowledge, whereas 48.9% of women belonging to lower middle and above classes had good knowledge. However, the association did not reach statistical significance ($p = 0.056$). Positive attitudes and correct practices were observed in almost all participants irrespective of socioeconomic status, and no significant associations were found. Among women with Grade 0 goitre, 34.8% had good knowledge and 65.2% had poor knowledge. Among women with Grade 1 or Grade 2 goitre, 60% had good knowledge and 40% had poor knowledge. However, the association was not statistically significant ($p = 0.063$). Positive attitudes and correct practices were seen in nearly all participants regardless of goitre status, with no statistically significant associations. Among women with poor knowledge, 96.3% still followed correct practices. Similarly, among women with good knowledge, 95.9% followed correct practices. No statistically significant association was found ($\chi^2 = 0.000$, $p = 1.000$). Among women with negative attitudes, only 75% demonstrated correct practices. Among women with positive attitudes, 96.8% demonstrated correct practices. This association was statistically significant ($\chi^2 = 4.997$, $p = 0.025$).

	Knowledge			Attitude			practice		
	Good	Poor	χ^2 &p	Positive	Negative	χ^2 &p	Correct	Wrong	χ^2 &p
Age			5.648 0.017			0.257 0.612			0.011 0.917
<=35	25(51.0)	24(49.0)		48(98.0)	1(2.0)		47(95.9)	2(4.1)	
>35	24(29.6)	58(70.4)		78(96.9)	3(3.7)		78(96.3)	3(3.7)	
Marital status			1.184 0.277			0.576 0.448			0.738 0.390
Married	45(39.5)	69(60.5)		110(96.5)	4(3.5)		109(95.6)	5(4.4)	
Other	4(25.0)	12(75.0)		16(100.0)	0(0.0)		16(100.0)	0(0.0)	
Education			1.514 0.219			0.345 0.557			0.448 0.503
Illiterate	2(20.0)	8(80.0)		10(100.0)	0(0.0)		10(100.0)	0(0.0)	
Literate	47(39.2)	73(60.8)		116(96.7)	4(3.3)		115(95.8)	5(4.2)	
Occupation			0.357 0.550			0.534 0.465			0.174 0.677
Homemaker	32(36.0)	57(64.0)		87(97.8)	2(2.2)		86(96.6)	3(3.4)	
Others	17(41.5)	24(58.5)		39(95.1)	2(4.9)		39(95.1)	2(4.9)	
Type of family			1.042 0.307			0.342 0.559			0.091 0.763
Nuclear	39(40.2)	58(59.8)		96(99.0)	1(1.0)		93(95.9)	4(4.1)	
Joint	10(30.3)	23(69.7)		33(100.0)	0(0.0)		32(97.0)	1(3.0)	
Socioeconomic status			3.654 0.056			0.154 0.695			0.448 0.503
<Upper lower	27(31.8)	58(68.2)		82(96.5)	3(3.5)		81(95.3)	4(4.7)	
>Lower middle	22(48.9)	23(51.1)		44(97.8)	1(2.2)		44(97.8)	1(2.2)	

	Knowledge			Attitude			Practice		
	Good	Poor	χ^2 &p	Positive	Negative	χ^2 &p	Correct	Wrong	χ^2 &p
WHO goitre grading			3.451 0.063			0.536 0.464			0.671 0.413
Grade 0	40(34.8)	75(65.2)		111(96.5)	4(3.5)		110(95.7)	5(4.3)	
Grade 1,2	9(60.0)	6(40.0)		15(100.0)	0(0.0)		15(100.0)	0(0.0)	

Characteristics	Total	Practice		χ^2 &p
		Wrong	Correct	
Knowledge				0.000 & 1.000
Poor	81(62.3)	3(3.7)	78(96.3)	
Good	49(37.7)	2(4.1)	47(95.9)	
Attitude				4.997 & 0.025
Negative	4(3.07)	1(25.0)	3(75.0)	
Positive	126(96.93)	4(3.2)	122(96.8)	

DISCUSSION

This is the community based study in rural India to assess KAP regarding iodized salt consumption. The majority of the participants were above 35 years of age (62.3%), married (87.7%), literate (92.3%), homemakers (68.5%), belonged to nuclear families (74.6%) and belonged predominantly to the upper lower socioeconomic class (65.4%). Most of the participants had Grade 0 goitre according to WHO grading (88.5%), while only 11.5% had Grade 1 or Grade 2 goitre. Regarding knowledge about iodized salt and goitre, 37.7% of participants had good knowledge whereas 62.3% demonstrated poor knowledge. The comparatively lower proportion of good knowledge indicates inadequate awareness regarding iodine deficiency disorders and appropriate iodized salt utilization among rural women. The present study observed that younger participants aged ≤ 35 years demonstrated significantly better knowledge regarding iodized salt usage compared to participants aged >35 years ($\chi^2 = 5.648$, $p = 0.017$). This finding suggests that younger women may have greater exposure to educational campaigns, media information and health education activities. Educational status did not show statistically significant association with knowledge, attitude or practice domains. However, literate participants demonstrated comparatively better knowledge scores than illiterate participants. This suggests that education may improve awareness regarding iodized salt usage, although the difference was not statistically significant in the present study. Marital status, occupation, type of family and socioeconomic status did not show statistically significant association with KAP domains. However, participants belonging to lower middle socioeconomic class demonstrated relatively better knowledge scores than the upper lower socioeconomic group. The lack of statistically significant association may be due to relatively uniform exposure to iodized salt awareness in the study area. The study revealed highly positive attitude regarding iodized salt usage among the participants. Nearly all participants demonstrated

positive attitude toward iodized salt consumption. This indicates that most women understood the importance of iodized salt for health even if detailed knowledge regarding iodine deficiency disorders was limited. Practice regarding iodized salt usage was also found to be good among the majority of participants (96.2%). Most participants reported using iodized packed salt and appropriate storage practices. The high proportion of good practices despite moderate knowledge levels may be attributed to public distribution systems, improved market availability of iodized salt and increased community-level awareness. A statistically significant association was observed between attitude and practice domains ($\chi^2 = 4.997$, $p = 0.025$). Participants with positive attitude demonstrated better practices regarding iodized salt usage compared to participants with negative attitude. This finding emphasizes the importance of positive health perception in translating awareness into actual household practices. No statistically significant association was observed between knowledge and practice domains ($\chi^2 = 0.000$, $p = 1.000$). This finding indicates that even participants with comparatively poor knowledge practiced appropriate iodized salt usage. The finding may be explained by widespread availability of iodized salt and routine household use irrespective of detailed understanding regarding iodine deficiency disorders. With regard to WHO goitre grading, no statistically significant association was observed between goitre status and knowledge, attitude or practice domains. However, participants with Grade 1 or Grade 2 goitre demonstrated comparatively better knowledge and practices than participants without goitre. This may be because individuals affected by goitre receive increased health education and counseling during healthcare visits. The present study also evaluated association between individual KAP variables and goitre findings. Recognition of iodized salt packets showed statistically significant association with goitre grading ($\chi^2 = 15.868$, $p = 0.014$). Similarly, type of salt container used demonstrated statistically significant association with goitre grading ($\chi^2 = 12.013$, $p = 0.002$). These findings suggest that correct identification of

iodized salt and appropriate household storage practices may contribute to prevention of iodine deficiency disorders. Overall, the study findings indicate that although detailed knowledge regarding iodine deficiency disorders remains inadequate among many participants, attitude and practice regarding iodized salt usage were generally favorable. Strengthening community-based educational interventions, nutritional awareness programs and counseling regarding proper storage and use of iodized salt may further improve awareness and contribute toward prevention of iodine deficiency disorders among rural women.

CONCLUSION

The study demonstrated that most participants had positive attitude and good practice regarding iodized salt usage, although knowledge regarding iodine deficiency disorders was comparatively inadequate. Age group showed significant association with knowledge, while attitude demonstrated significant association with practice. Recognition of iodized salt packets and proper storage practices were significantly associated with WHO goitre grading, indicating the importance of practical awareness and appropriate household salt handling practices in prevention of iodine deficiency disorders.

Despite widespread use of iodized salt, gaps in awareness regarding iodine deficiency disorders, proper identification of iodized salt and preservation of iodine content during storage and cooking still exist among rural women. Continuous health education programs, nutritional awareness campaigns and counseling by healthcare workers are therefore essential to improve knowledge and strengthen preventive practices.

The study emphasizes the need for sustained community-based interventions focusing on iodine nutrition and proper utilization of iodized salt. Strengthening awareness among women may contribute significantly toward prevention and control of iodine deficiency disorders and improvement of community health outcomes.

REFERENCES

1. Zimmermann MB, Boelaert K. Iodine deficiency and thyroid disorders. *Lancet Diabetes Endocrinol.* 2015;3(4):286-95.
2. Delange F. Optimal iodine nutrition during pregnancy, lactation and the neonatal period. *Int J Endocrinol Metab.* 2004;2(1):1-12.
3. World Health Organization (WHO). Assessment of Iodine Deficiency Disorders and Monitoring their Elimination. Geneva: WHO; 2007.
4. Andersson M, Karumbunathan V, Zimmermann MB. Global iodine status in 2007 and trends over the past decade. *J Nutr.* 2010;140(4):744-52.
5. Bahn RS, Burch HB, Cooper DS, et al. Hyperthyroidism and other causes of thyrotoxicosis: management guidelines of the American Thyroid Association and American Association of Clinical Endocrinologists. *Endocr Pract.* 2011;17(3):456-520.
6. Vanderpump MP. The epidemiology of thyroid disease. *Br Med Bull.* 2011; 99:39-51.
7. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-4 & NFHS-5), 2015-16 & 2019-21. India Fact Sheets.
8. Hegedüs L. Clinical practice. The thyroid nodule. *N Engl J Med.* 2004;351(17):1764-71.
9. Gharib H, Papini E, Paschke R, et al. American Association of Clinical Endocrinologists, American College of Endocrinology, and Associazione Medici Endocrinologi medical guidelines for clinical practice for the diagnosis and management of thyroid nodules. *Endocr Pract.* 2010;16(Suppl 1):1-43.
10. National Iodine Deficiency Disorders Control Programme (NIDDCP). Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India.
11. Pandav CS, Yadav K, Srivastava R, et al. Iodine deficiency disorders (IDD) control in India. *Indian J Med Res.* 2013;138(3):352-8.
12. Karmakar N, Datta A, Nag K, et al. Knowledge, attitude, and practice regarding household consumption of iodized salt among rural women of Tripura, India: A mixed-methods study. *J Educ Health Promot.* 2019; 8:21.
13. Assey VD, Peterson S, Kvale G, et al. Indices of iodine deficiency in a rural population in Tanzania. *Public Health Nutr.* 2009;12(11):2102-10.
14. Sakhalkar MN, Sultana MB. Assessment of knowledge and practices regarding use of iodised salt among housewives of Osmanabad District. *Int Interdiscip Res J.* 2015; 5:83-8.
15. Kumar P, Tiwari VK, Gautam RK. Knowledge, attitude and behaviour regarding use of iodised salt: An evaluation study. *Indian J Public Health.* 2017; 61:20-5.