



Knowledge on low-iodine diet among thyroid cancer patients preparing for radioactive iodine therapy: A cross-sectional study in Hanoi

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ABSTRACT

Objectives: This study aimed to describe patients' knowledge of the low-iodine diet (LID) and to assess patients' needs for nutritional counseling related to LID among thyroid cancer patients preparing for radioactive iodine (RAI) therapy. **Methods:** A cross-sectional study was conducted among 232 thyroid cancer patients at two large hospitals in Hanoi between May and October 2024. Data were collected using a self-administered questionnaire. **Results:** The mean knowledge score was moderate (5.95 ± 2.10 out of 11 points). Nearly all participants (98.7%) expressed a need for nutritional counseling regarding LID prior to RAI therapy. **Conclusion:** Participants demonstrated insufficient knowledge regarding the low-iodine diet, indicating substantial unmet educational needs among thyroid cancer patients before RAI therapy.

Keywords: Knowledge, Low iodine diet, Radioactive iodine therapy, Thyroid Cancer, food.

INTRODUCTION

Thyroid cancer ranks among the ten most prevalent malignancies worldwide and is currently the ninth most common cancer globally. Its incidence varies markedly by geographic region and age group, with pediatric cases (under 15 years) being rare¹. According to GLOBOCAN, thyroid cancer was the sixth most common malignancy in Vietnam, with 6,122 new cases and 642 deaths reported, corresponding to age-standardized incidence rates of 3.52 per 100,000 males and 7.8 per 100,000 females. This represents a substantial increase from its tenth-ranking position in 2020,

highlighting a rapidly rising disease burden in Vietnam².

Radioactive iodine-131 (I-131) therapy is a cornerstone treatment for differentiated thyroid cancer. To optimize therapeutic effectiveness, patients are required to follow a low-iodine diet (LID) for approximately 1–2 weeks prior to treatment³. However, many patients report insufficient guidance and confusion regarding appropriate food choices during this period⁴. In Vietnam, limited study has evaluated patients' knowledge of LID prior to I-131 therapy. Therefore, this study aimed to address this gap through objectives: To describe

patients' knowledge of the low-iodine diet in preparation for I-131 therapy, To assess patients' needs for nutritional counseling related to LID.

METHODS

Study design: A cross-sectional survey was conducted among 232 thyroid cancer patients who were preparing for, currently undergoing, or had previously received I-131 therapy at two large oncology hospitals in Hanoi. Data were collected from May to October 2024.

Participants: Eligible participants were adults (≥18 years) diagnosed with papillary thyroid cancer who had undergone, were undergoing, or were preparing for I-131 therapy. Patients lacking legal capacity to provide informed consent were excluded.

Measurements: The instrument comprised three sections:

Section 1: Sociodemographic and clinical characteristics data

Section 2: Knowledge assessment regarding foods and iodine-containing products. 11 questions were included, each question offered three response options: correct, incorrect, or undecided/unknown. One point was awarded for each correct response, with maximum section score of 11 points. The questionnaire was adapted from an instrument developed by Jeong-Ah Moon et al. and translated into Vietnamese following World Health Organization forward-translation guidelines by two doctoral-level nursing professionals⁵. The Cronbach's Alpha of the scale was 0.87.

Section 3: Three items assessing educational counseling needs and preferred delivery modalities for LID.

Data analysis: Statistical analyses were performed using SPSS version 22.0 employing descriptive statistical algorithms.

Ethics approval: The study received ethical approval from the Phenikaa University Institutional Ethical Review Board.

RESULTS

Participant's characteristics

Table 1. Participant's characteristics (N = 232)

Variable	Frequency	Percentage (%)	Mean ± SD
Gender			
Male	32	13.8	
Female	200	86.2	
Age (Mean ± SD)			45.93 ± 10.50
Education level			
Primary school	5	2.2	
Secondary school	23	9.9	
High school	44	19.0	
College/University	130	56.0	
Post-graduate	29	12.5	

Variable	Frequency	Percentage (%)	Mean ± SD
BMI (Mean ± SD)			23.24 ± 2.31
Marital status			
Married	189	81.5	
Single/Divorced/Widowed	43	18.5	
Surgical history			
Total thyroidectomy	218	94.0	
Partial thyroidectomy	14	6.0	
Current daily thyroid hormone replacement			
Yes	186	80.2	
No	46	19.8	
Mean duration since diagnosis			45 months
Metastatic Status			
Yes	173	74.6	
No	58	25.4	
Mean frequency of RAI treatment			1.5 times
Most recent RAI dose (mCi)			100 – 150

The majority of participants were female (86.2%, n = 200), with a mean age of 45.93 ± 10.50 years. More than half (56.0%) had completed college or university education. The mean body mass index was 23.24 ± 2.31 kg/m².

Clinically, 74.6% of participants had metastatic disease. Most patients underwent total thyroidectomy (94.0%), and 80.2% required daily thyroid hormone replacement therapy. The mean duration since diagnosis was 45 months. Participants had received an average of 1.5 RAI treatments, with the most recent dose ranging from 100 to 150 mCi.

Participants' knowledge of low-iodine diet (LID)

Table 2. Participants' knowledge of low-iodine diet (LID)

Item	Survey Question	N* (%)
B1	Seafood such as shrimp, crab, marine fish and seaweed has a high iodine content	204 (87.9%)
B2	Sauces containing eggs can be used in a low-iodine diet	123 (53%)
B3	A low-iodine diet must be maintained after completing radioactive iodine therapy	87 (37.5%)
B4	Pickled vegetables (mustard greens, eggplant, kimchi, etc.) without sea salt are allowed	40 (17.2%)

Item	Survey Question	N* (%)
B5	Soy-based foods and soy sauce are allowed in a low-iodine diet	166 (71.6%)
B6	Multivitamins that do not contain iodine are permitted in a low-iodine diet	151 (65.1%)
B7	Fermented shrimp/fish paste, canned foods, and sausages contain high iodine levels	161 (69.4%)
B8	Consuming more than one serving of milk or dairy products per day is allowed	161 (69.4%)
B9	Processed and instant foods should be avoided	200 (86.2%)
B10	Consumption of sugar and red chili powder should be limited in a low-iodine diet	29 (12.5%)
B11	A low-iodine diet is essentially a low-salt diet	59 (25.4%)
Mean Knowledge Score (Mean \pm SD, min – max)		5.95 \pm 2.1 (1-11)

*N: Number of correct answers

Knowledge scores ranged from 1 to 11, with a mean score of 5.95 ± 2.18 , indicating a moderate level of knowledge. While most participants correctly identified high-iodine foods such as seafood and seaweed (87.9%) and processed foods (86.2%), substantial misconceptions persisted.

Only 25.4% of participants correctly understood that a low-iodine diet is not equivalent to a low-salt diet. Knowledge regarding condiments, dairy products, and hidden iodine sources was particularly limited.

Nutritional counseling program needs

Vast majority of participants need a nutritional counseling program to follow the LID (99.1%). Almost all participants (99.1%) reported a need for nutritional counseling during LID implementation.

Table 4. Patient preferences for LID counseling delivery methods

Survey Question	Answers			
	Direct consultation with a dietitian (%)	Telephone-based counseling (App/ Hotline) (%)	Counseling via guides/ books (%)	Video-based counseling (%)
Preferred Counseling Modalities	156 (67,2%)	22 (9,5%)	45 (19,4%)	8 (3,4%)

Direct consultation with a dietitian was the preferred modality (67.2%), followed by printed educational materials (19.4%).

Table 5. Content for low-iodine diet health education

Content	N	%
Types of allowable and prohibited foods	37	15.9
Practical meal planning and recipe suggestions	3	1.3
Strategies for managing hypothyroidism-related fatigue	2	0.9
Types of allowable and prohibited foods, meal planning and food preparation suggestions	148	63.8
Types of allowable and prohibited foods, strategies for managing hypothyroidism-related fatigue	5	2.2
Practical meal planning and recipe suggestions, strategies for managing hypothyroidism-related fatigue	1	0.4
All topics	35	15.1

The most frequently requested educational content combined information on allowable and prohibited foods with practical meal planning and food preparation guidance (63.8%).

DISCUSSION

Participants demonstrated moderate but insufficient knowledge of the low-iodine diet. Although the mean score was slightly higher than that reported in a comparable Korean study⁵. The overall knowledge level of the participants is suboptimal regarding the dietary needs, but there are significant misconceptions about the use of condiments and the classification of permissible vs. prohibited foodstuffs during a low iodine diet (LID). This finding indicated a critical and clinically relevant gap in patient education. While participants demonstrated reasonable awareness of overt iodine-rich foods such as seafood and seaweed, their understanding of hidden iodine sources – especially condiments, processed foods, and composite dishes – was markedly limited. Similar findings have been documented in studies from Korea, Japan, and Western countries, suggesting that this misunderstanding is not region-specific but rather indicative of inadequate differentiation in patient education materials^{6,7}. Clinical guidelines,

including those issued by the American Thyroid Association, emphasize that sodium restriction is not the primary goal of LID; instead, iodine avoidance – particularly iodized salt and iodine-containing additives – is the critical determinant of dietary compliance⁸. These findings underscore the necessity of structured, context-specific nutritional education that explicitly addresses condiments and mixed dishes. Educational interventions should prioritize practical examples, culturally adapted meal plans, and individualized counseling to correct persistent misconceptions and support effective implementation of the low-iodine diet prior to RAI therapy.

Due to the rich food options available in Vietnam, especially in its salt-focused cuisine, there is often confusion among patients with thyroid cancer regarding the choice of food. Concerning the obvious high-iodine foodstuffs, a vast proportion of the respondents correctly identified the prohibition of seafood and seaweed (87.9%) as well as processed and instant foods

(86.2%). These data are remarkably similar to the findings of the study conducted among Koreans by Jeong-Ah Moon et al. in which 96.6% of the respondents identified the high iodine content of the former category of foodstuffs⁵.

Notwithstanding the relatively high accuracy rate of the former statement, a fundamental misconception remained among the respondents since only a meager proportion of them (25.4%) could identify the fact that a low iodine diet is not the same as a low-salt diet. Although the accuracy rate is significantly higher compared to the corresponding rate among the Koreans (13.4% vs. 12%), it is a fact that a vast proportion of the respondents are misinformed. There is a definite need for educational interventions among the patients in order to enable them to make a fundamental distinction between the restrictions on iodine vs. the restrictions on sodium.

The average knowledge score of 5.95 suggests that the group has a moderate but incomplete understanding of LID implementation. The fact that these results emerge in spite of regular hospital-based instruction being conducted as part of the treatment regimen suggests that the knowledge obtained by the patients is incomplete and erroneous in several key areas. In other words, many patients find it difficult to recognize hidden iodine in everyday life, such as in dairy products and iodized salt additives in processed foods, and do not have the necessary strategies for substituting these in their diets in such a way as to maintain their nutritional value. Such knowledge gaps increase the likelihood of inadvertent dietary noncompliance and its possible effects on efficacy and patient outcome.

As such, there exists an imperative and pressing need for the implementation of a structured nutritional educational program. The design and implementation of such an educational program will not only improve patient knowledge but also offer the necessary strategies for piecing together a scientifically based and compliant diet that maintains strict iodine restriction as its foundation.

Needs for nutritional counseling program

Need for education is almost universal (99.1%). This is a critical need in existing support services for patients. The preferred modalities for education are personal consultations with professionals (67.2%) and printed educational material (45%). Patients were looking for advice regarding differentiation of allowable from prohibited foods in a meal planning context. This is a significant need because patients are looking for more than just theoretical knowledge; they are quite anxious about their dietary adherence and its immediate impact on the management of thyroid cancer patients.

One of the main outcomes of this study has been the importance of structured and menu-driven support. The demand for scientifically valid diet plans has been articulated by the participants in this study. These plans should involve the restriction of iodine in the diet and focus on the consumption of other essential nutrients as well. By using sample menus and expert recipes, the issue of non-compliance and the mental stress associated with it can be reduced.

Despite the existing hospital protocols, there remain many gray areas regarding the iodine levels in common staples. Although

many patients are aware of the need for a low-iodine diet (LID), they often have difficulty distinguishing between high-iodine and low-iodine foods in practical settings. It is important to note that there remain many misconceptions about hidden sources of iodine in dairy products, eggs, and processed foods. There is a common misconception that vegetables, fruits, and grains are automatically 'safe'.

The knowledge gap has important ramifications in the clinical arena because unintentional ingestion of foods high in iodine may affect the success of radioactive iodine (I-131) therapy. This is because there is a problem in the system of knowledge dissemination because of overcrowding in hospitals. Counseling is done in group settings because of the high volume of patients. However, nutrition is personalized because patients have different preferences. In conclusion, the above results provide evidence for a shift in treatment towards a personalized nutritional regimen. Continuous care by way of individualized counseling, in-depth educational resources, and helpful food preparation tips are required. Filling the existing divide between hospital care guidance and everyday eating habits will not only help in patient compliance but also maximize the success of treatment for thyroid cancer.

Strengths and limitations

This study represents the first systematic assessment of LID knowledge among thyroid cancer patients in Vietnam, providing foundational evidence for future intervention development. The relatively large sample size and use of a validated instrument enhance methodological rigor. However, the cross-sectional design precludes causal inference, and recruitment

from urban tertiary hospitals may limit generalizability to rural populations.

CONCLUSION

Participants demonstrated moderate but inadequate knowledge of the low-iodine diet (average score was 5.95 out of 11), particularly regarding differentiation between iodine and sodium restriction and identification of hidden iodine sources. Nearly all participants expressed a strong need for structured nutritional counseling, favoring individualized professional consultation and practical meal planning support.

Nearly all participants (99.1%) expressed urgent need for structured nutritional counseling, preferring direct professional dietitian consultation (67.2%) delivering practical meal planning guidance (63.8%). Findings underscore the critical mismatch between current group-based hospital education and patients' need for individualized, comprehensive nutritional support.

These findings highlight a significant gap between current hospital-based education and patients' real-world needs. Development and implementation of comprehensive, personalized nutritional counseling programs are urgently warranted to optimize preparation for radioactive iodine therapy in Vietnam.

REFERENCES

1. Dung DT, Trang LTH. Characteristics of some peripheral blood cell indicators in people with thyroid cancer diagnosed at the Central Endocrine hospital. Vietnam medical Journal. 2024;535(2). <https://doi.org/10.51298/vmj.v535i2.8467>.

2. Lyu Z, Zhang Y, Sheng C, Huang Y, Zhang Q, Chen K. Global burden of thyroid cancer in 2022: Incidence and mortality estimates from GLOBOCAN. *Chinese Medical Journal*. 2024;137(21):2567-76. doi: 10.1097/CM9.0000000000003284.
3. Pacini F, Fuhrer D, Elisei R, Handkiewicz-Junak D, Leboulleux S, Luster M, et al. 2022 ETA Consensus Statement: What are the indications for post-surgical radioiodine therapy in differentiated thyroid cancer? *European Thyroid Journal*. 2022;11(1). doi: 10.1530/ETJ-21-0046.
4. Thanh DTM, Huong HTX, Anh MH, Linh DTT, Huong DQ, Hong TTP, et al. Knowledge, confidence and barriers to implementing iodine-restricted diet in thyroid cancer patients at 108 Military central Hospital. *Institute of community Healthg*. 2026;67(1). [ttps://doi.org/10.52163/yhc.v67i1.4174](https://doi.org/10.52163/yhc.v67i1.4174)
5. Moon J-A, Yoo C-H, Kim MH, Lee SM, Oh YJ, Ryu YH, et al. Knowledge, self-efficacy, and perceived barriers on the low-iodine diet among thyroid cancer patients preparing for radioactive iodine therapy. *Clinical nutrition research*. 2012;1(1):13-22. doi: 10.7762/cnr.2012.1.1.13.
6. Sawka AM, Ibrahim-Zada I, Galacgac P, Tsang RW, Brierley JD, Ezzat S, et al. Dietary iodine restriction in preparation for radioactive iodine treatment or scanning in well-differentiated thyroid cancer: a systematic review. *Thyroid*. 2010;20(10):1129-38. doi: 10.1089/thy.2010.0055.
7. Ju DL, Park YJ, Paik HY, Song Y. The Impact of Low Adherence to the Low-iodine Diet on the Efficacy of the Radioactive Iodine Ablation Therapy. *Clin Nutr Res*. 2015;4(4):267-71. doi: 10.7762/cnr.2015.4.4.267
8. Ringel MD, Sosa JA, Baloch Z, Bischoff L, Bloom G, Brent GA, et al. 2025 American Thyroid Association Management Guidelines for Adult Patients with Differentiated Thyroid Cancer. *Thyroid®*. 2025;35(8):841-985. <https://doi.org/10.1177/10507256251363120>.