COLLEGE OF HEALTH SCIENCE DEPARTMENT OF INTERNAL MEDICINE

NUCLEAR MEDICINE UNIT

Assessment of Knowledge and Attitude towards the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine among Physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia

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Abbreviations and acronyms

AAU	Addis Ababa University
ATA	American thyroid association
CHS	College of Health Science
CT	Computed tomography
EBRT	External beam radiation therapy
ETA	European thyroid association
DTC	Differentiated thyroid cancer
FNA	Fine needle aspiration
GBq-	Giga Becquerel
mCi	Millcurie
MRI	Magnetic resonance imaging
NIS	Sodium iodine symporter
NUS	Neck Ultrasound
PET	Positron emission tomography
RAI	Radioactive iodine
RAIT	Radioactive iodine therapy
RIU	Radioactive iodine uptake
TASH	Tikur Anbessa Specialized Hospital
TG	Thyroglobulin

Abstract

Background: The most common type of thyroid cancer is differentiated thyroid carcinoma (DTC), which has a generally excellent prognosis when properly managed. The usual treatment method involves thyroidectomy followed by radioactive iodine (RAI). Among other factors, physician attitude and knowledge affect the outcomes of these treatments.

Objective: To assess physicians' knowledge and attitude regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.

Method: A hospital-based cross-sectional study was conducted among physicians in the department of General Surgery, Oncology, Nuclear Medicine, and Endocrinology at Tikur Anbessa Specialized Hospital. Data was gathered using semi-structured questionnaires. SPSS version 27 was used to enter and analyze the data. Binary logistic regressions were used for both bivariate and multivariate analysis.

Results: One hundred and thirty-seven questionnaires were collected and assessed. The age range of participants was 26-45. The mean age was 31.26 (±3.51). Among respondents 72, (52.6%) were females. Among participants, 104 (75.9%) had training on DTC management and utilization of radioactive iodine. The majority of respondents, 113 (82.5%) were from the General Surgery department. 66 (48.2%) of respondents have sufficient knowledge towards the management of differentiated thyroid cancer, radioactive iodine utilization. whereas, 75 (54.7%) of them has a positive attitude towards the management of differentiated thyroid cancer, and utilization of radioactive iodine. Significant associations between knowledge and age, work experience, training, surgery, and oncology departments were observed. Attitude level is also affected by the experience and knowledge of respondents.

Conclusion and recommendations: Despite a good attitude, this study showed poor knowledge in participants towards the management of differentiated thyroid cancer and utilization of radioactive iodine. Therefore, this study recommends awareness creation and health professionals training through seminars, and lectures to raise their knowledge towards the management of differentiated thyroid cancer and utilization of radioactive iodine.

Keywords: Differentiated Thyroid Cancer, Radioactive Iodine, Radioactive Iodine Utilization, Knowledge, Attitude, Physicians.

1. Introduction

1.1. Background

Globally, thyroid cancer is the most frequently diagnosed endocrine malignancy and has a favorable outcome if identified promptly and handled efficiently (Lyu, 2024). The conventional treatment for differentiated thyroid cancer is thyroidectomy paired with radioactive iodine ablation (Andresen, 2017). Ninety percent of thyroid cancers are well differentiated and able to concentrate radio iodine (A.Mettler, 2019). DTC primarily includes two types: papillary thyroid carcinoma (PTC) and follicular thyroid carcinoma (FTC) (Pizzato, 2022). These cancers arising from the follicular cells of the thyroid gland has functional characteristics of normal thyroid tissue with expression of the sodium iodide symporter (NIS) (Clark, 2008). Optimal managements for DTC include surgery, followed by ^{131}I therapy, and thyroid hormone replacement (Giovanella, 2022). When appropriate treatment is provided, the prognosis of the disease has excellent outcomes. However, the 10-years survival rate of distant metastasis is between 25–40% (Dietlein, 2008). After three to four weeks surgical interventions, intermediate and high-risk patients should get radioactive (RAI) ablation to destroy residual, gross or microscopic malignant cells and these patients should be on thyroxin hormone replacement for life (SAKAFU, 2016). In spite of established treatment plans, the outcomes of DTC therapy depend on physicians' knowledge and attitudes of current standards and best practices (Amgad, 2012). Inadequate knowledge and attitude can result in inappropriate therapy, delayed referrals, and poor patient outcomes (Amgad, 2012). Studies have revealed that gaps in knowledge and attitude among clinicians can result in inconsistent application of treatment protocols, particularly in the use of RAI therapy (SAKAFU, 2016) .

Understanding these gaps is essential for developing targeted educational interventions that can enhance clinician preparedness and improve patient outcomes (SAKAFU, 2016).

1.2 Statement of the problem

The most prevalent thyroid cancer, DTC, has a usually good prognosis when treated properly (Nguyen, 2024). Radioactive iodine (RAI) ablation is the standard treatment for metastatic disease and remaining thyroid tissue after surgical excision (Avram, 2023). However, Physicians' awareness and expertise about managing DTC and using RAI are critical to the efficacy of this therapy model (SAKAFU, 2016).

The prevalence of thyroid malignancy in Ethiopia is significantly high and the leading types of malignancy are papillary thyroid carcinoma followed by follicular thyroid carcinoma (Melak, 2014).

At Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, there is a growing concern that clinicians may lack sufficient attitude and knowledge about the optimal management of DTC and the appropriate use of RAI. To the best of our knowledge, no research has been done in Ethiopia to evaluate physicians' attitudes and knowledge on the use of radioactive iodine and the treatment of differentiated thyroid cancer.

Despite being the most prevalent endocrine cancer, DTC is very uncommon in comparison to other cancers, which exacerbates the issue (Schmidbauer, 2017). Clinicians may be less familiar and knowledgeable as a result of its rarity, especially in environments with limited resources and special training (Nguyen, 2024).Physicians had insufficient knowledge despite having a positive attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine (SAKAFU, 2016).

This study aims to assess the current level of attitude and knowledge among clinicians at TASH regarding the management of DTC and the utilization of RAI. By identifying specific gaps and barriers, the study informs targeted educational interventions and policy changes that can enhance the quality of care for patients with DTC in this region.

In addition, it evaluates factors that influenced the knowledge and attitudes of physicians in the departments of general surgery, oncology, endocrinology, and nuclear medicine about the use of DTC and RAI over the study time.

1.3 Significance of the study

This research aims to assess the knowledge and attitude of surgeons, oncologists, endocrinologists, nuclear medicine physicians, and residents at TASH, Addis Ababa, Ethiopia, regarding the management of differentiated thyroid cancer (DTC) and radioactive iodine (RAI). The findings can improve patient care, inform policy and training, and advance clinical practice. The research will contribute to medical literature, promote evidence-based medicine, and address public health concerns. By identifying gaps in clinician knowledge, targeted educational interventions can be implemented, leading to better prognosis and quality of life for patients. The findings can also guide the development of comprehensive training programs and policies. Furthermore, the research may also lead to improved communication between physicians and clients about treatment options and possible outcomes. Ultimately, this study has the potential to positively impact the overall management and outcomes of DTC patients in Ethiopia and beyond.

2. Literature review

2.1 Introduction

Thyroid cancer is the most prevalent endocrine tumor in the world, with a better outcome if treated early and effectively (Lyu, 2024). Women exhibit a threefold higher incidence compared to men (Tran, 2023). High-risk nodules requiring fine-needle aspiration (FNA) are identified using neck ultrasonography (US), serum thyroid-stimulating hormone (TSH) levels, and thyroid scans, whereas low-risk lesions are excluded from unnecessary further operations (Avram, 2023). DTC is classified as a carcinoma that originates from the follicular epithelium while retaining essential biological features of healthy thyroid tissue, including the expression of the sodium iodide symporter (NIS), which is crucial for selective iodine uptake (Luster, 2008). The most common types of thyroid cancer include papillary and follicular carcinoma (SAKAFU, 2016) . The current procedure to manage DTC incorporates a risk-stratified system that employs data from surgical histology, molecular markers, postoperative thyroglobulin (Tg) levels, and anatomic/functional imaging tests (Avram, 2023). Total or near-total thyroidectomy with lymphadenectomy followed by radioactive iodine (RAI) ablation remains the mainstay in the care of differentiated thyroid cancer (DTC) (SAKAFU, 2016). Intermediate and high-risk patients require radioactive iodine (RAI) ablation three to four weeks after surgery to destroy any residual tumor, and they must be on thyroxin hormone replacement for the rest of their lives. Thyroxin replacement is crucial to improve the hypothyroid state produced by surgery and to reduce the recurrence rate (SAKAFU, 2016). RAIT is described as the systemic delivery of iodine-131-sodium iodide or potassium (^{131}I) for the targeted irradiation of thyroid remnants, microscopic DTC, or other non-respectable or incompletely respectable DTC (Clark, 2008). In some cases of differentiated thyroid cancer (DTC), radioactive iodine (RAI) therapy with iodine-131 is used for remnant ablation, adjuvant therapy, or treatment of known persistent disease. A dosage of 1.11GBq (30 mCi) of I-131 is advised for residual ablation; A dose of 30-100 mCi I-131 would be beneficial for adjuvant therapy, while levels as high as 150 mCi can be taken into consideration; A minimum of 100 mCi I-131 and RAI doses up to 200 mCi may be appropriate for those with known or suspected spreading illness, based on the predicted tumor volume and extension (Nguyen, 2024). In order to treat the deficiency of intrinsic thyroxin and prevent the development of hypothyroidism, replacement thyroxin therapy is required for all patients with

thyroid cancer following surgery (SAKAFU, 2016). An overall lack of expertise in managing cancer among professionals in less developed nations may constitute the reason for the lack of knowledge regarding identifying lymph node involvement, tumor size, and distance metastases. (SAKAFU, 2016)

Only 63% endocrinologists were familiar with the most recent ATA guidelines, highlighting a significant knowledge gap concerning treatment protocols (Ahn, 2017). Targeted workshops and seminars significantly improved the adherence of healthcare providers to DTC management guidelines (Ahn, 2017). When faced with case scenarios involving RAI, endocrinologists displayed a higher competency level than other specialists, emphasizing the need for interdisciplinary education initiatives (Mazzaferri, 2002). Many healthcare practitioners are not aware of the ideal threshold for RAI therapy, which can result in over-treatment or under-treatment of patients (Cabanillas, 2016).

Appropriately applied RAI not only improves disease-free survival but also necessitates effective communication with patients about the risks of hypothyroidism and other side effects associated with RAI (Nixon, 2016). Nearly 50% of primary care physicians were unaware of the indications for RAI therapy and common postoperative follow-up practices (Khanna, 2021). Implementing regular training and workshops has proven effective in improving clinicians' knowledge and adherence to management guidelines. The use of case-based learning and decision-making simulations has been particularly impactful (Agarwal, 2020).

2.2 Global Perspectives on DTC Management

The most frequently diagnosed form of endocrine cancer, thyroid cancer, is expected to increase in incidence by 1.2% by 2022 (Lyu, 2024).

Globally, the management of DTC has evolved significantly over the past decade. The standard care includes risk-adapted strategies that involve surgery, RAI ablation, and thyroxin hormone supplementations (Avram, 2023). The use of RAI is guided by risk stratification, which aims to maximize therapeutic benefits while minimizing morbidity. This approach is supported by guidelines from major organizations such as the American Thyroid Association and the European Association of Nuclear Medicine

2.3 physicians' Attitude and Knowledge

Studies have shown that physicians' attitude and knowledge significantly impact the management of DTC. For instance, a study conducted in Tanzania highlighted that a substantial proportion of physicians lacked sufficient knowledge about the role of RAI in DTC management. This gap in knowledge was associated with delayed referrals and suboptimal treatment outcomes. Similarly, research in other regions has underscored the need for continuous medical education to ensure clinicians are up-to-date with current guidelines and best practices (SAKAFU, 2016)

2.4 Utilization of Radioactive Iodine

The utilization of RAI in DTC management is a critical component of treatment protocols. I-123 & I-131 used for diagnostic and I-131 for therapy, leveraging the physiological sodium-iodine symporter expression in thyroid tissue. However, the appropriate use of RAI requires a thorough understanding of patient-specific factors, including the risk of tumor recurrence and the presence of radio iodine-refractory disease. Recent advances have also emphasized the importance of individualized treatment plans based on molecular markers and postoperative diagnostic imaging (Avram, 2023).

2.5 Challenges in Low-Resource Settings

In low-resource settings, such as TASH, Addis Ababa, Ethiopia, there are unique challenges that may hinder the optimal management of DTC. Limited access to updated clinical guidelines, insufficient training in nuclear medicine and resource constraints can contribute to gaps in physicians' knowledge and attitude. Targeted training initiatives and legislative changes are needed to address these issues and guarantee that physicians have the know-how to properly handle DTC.

3. Objective of the study

3.1 General Objective

To assess physicians' knowledge and attitude regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia.

3.2 Specific objectives

To determine the level of attitude among physicians about the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI)

To evaluate the knowledge of physicians' regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI).

4. Research Methodologies

4.1 Study Design

A cross-sectional study was conducted to assess physicians' attitude and knowledge regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia

4.2 Study Area and Period

4.2.1 Study Area

The study was conducted at Tikur Anbessa Specialized Hospital; Addis Ababa, Ethiopia is the largest teaching hospital of Addis University Medical School in Ethiopia. The hospital has been providing services to the community for over five decades. It now treats over 500 thousand outpatients and more than 21 thousand inpatients. It serves as a referral hospital for cases seen in other hospitals, ranging from emergency obstetrics, pediatrics, multi-drug-resistant tuberculosis, and HIV/AIDS to advanced cancers.

4.2.2 Study Period

The study period was from December 2024 to February 2025.

4.3 Source and Study Population

4.3.1 Source Population

The source population included all physicians working at Tikur Anbessa Specialized Hospital.

4.3.2 Study Population

All physicians in the Department of Nuclear Medicine, Oncology, General Surgery, and Endocrinology that fulfilled the inclusion criteria upon data collection.

4.4 Sample Size Determination and Sampling Technique

4.4.1 Sample Size Determination

The sample size for this study was calculated using the single population proportion formula and calculated to be 384 and the adjusted sample was 148 since the study population found to be 240. To account for potential non-responses or missing data, a 10% contingency was added rounding up; the final sample size is 163. Thus, the adjusted sample size, including the 10% contingency, is 163

4.4.2 Sampling technique

The study employed Proportional Stratified Sampling as its sampling technique. This method ensured that each department in the study (Oncology, General Surgery, Endocrinology, and Nuclear Medicine) was adequately represented based on its proportion within the total Population of 240 physicians. Initially, the number of physicians in each department is as follows: Oncology (25), General Surgery (193), Endocrinology (12), and Nuclear Medicine (10). The proportion of physicians in each department was obtained by dividing the number of physicians in each department by the total number of physicians (240). After determining these proportions, the total sample size of 163 was distributed to each department in proportion to its size. General Surgery had 125 physicians in the sample, Oncology had 17, Endocrinology had 8, and Nuclear Medicine had 7. Following the allocation, data was collected using simple random sampling within each department to ensure that every physician within the department had an equal chance of being selected for the study.

4.5 Data Collection Instruments and Techniques

Data was collected by using Semi-structured, pre-tested, and self-administered English version questionnaires, which have three components. The first part addressed the socio-demographic information of the respondents while the next two parts contain questions that measured the level of knowledge and attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine. The questionnaire was given to all study participants in the hospital and data was collected by health professionals. To ensure data quality, two Oncology resident physicians were provided a one-day training by the principal investigator on the contents and how to administer a questionnaire, identification of study subjects based on

inclusion/exclusion criteria, how to approach and get informed consent from subjects, ethical issues, and rights of the participants.

4.5.1 Inclusion Criteria

- Physicians who were employed, residents, and fellows at TASH and were involved in the management of thyroid cancer.
- Physicians who were willing to take part in the study.
- Physicians who were available at the time of data collection.

4.5.2 Exclusion Criteria

- Physicians who were on leave during the data collection period or who declined to participate

4.6 Variables of the Study

Independent Variables: physicians' socio-demographic characteristics (age, gender, education level, years of experience, specialty), training received on DTC management.

Dependent Variables: Attitude and knowledge levels regarding DTC management and RAI utilization.

4.7 Operational Definitions

Physicians: Healthcare professionals who are actively involved in the diagnosis, treatment, and management of patients with differentiated thyroid cancer. This includes but is not limited to endocrinologists, oncologists, surgeons, and general practitioners at Black Lion Hospital.

Diagnosis: Techniques and criteria used to identify differentiated thyroid cancer.

Surgical Intervention: Types of surgeries performed, such as thyroidectomy.

Radioactive Iodine Therapy: Application, dosing, and administration of radioactive iodine for treatment.

Follow-Up: Monitoring and managing post-treatment care and surveillance.

Utilization of Radioactive Iodine: The application of radioactive iodine (I-131) as part of the treatment regimen for differentiated thyroid cancer. This includes:

Indications: Conditions or stages of differentiated thyroid cancer that warrant the use of radioactive iodine.

Dosage: Amount and frequency of radioactive iodine administered.

Administration: Methods of delivering radioactive iodine to the patient.

Monitoring: Procedures for tracking the effectiveness and side effects of therapy.

Knowledge: understanding of the basic facts about the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine.

Sufficient knowledge: respondents who scored greater than or equal to the mean of knowledge assessment questions correctly will be considered to have sufficient knowledge.

Insufficient knowledge: respondents who scored less than mean of knowledge assessment questions correctly will be considered to have insufficient knowledge.

Attitude: It represents the perception or belief towards the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine.

Positive Attitude: respondents who score above or equal to mean of the attitude assessment questions correctly will be regarded as having favorable attitude.

Negative Attitude: respondents who score < mean of the attitude assessment questions correctly will be regarded as having unfavorable attitude.

4.8 Data processing and analysis

Immediately After data collection, the data was reviewed for completeness, clarity, and consistency. The collected data was carefully coded, entered, and cleaned using Epi data V.7.2.6 and then exported to, processed and analyzed with computer using SPSS statistical software version 27.

Descriptive statistics was computed to describe each variable. The results have been displayed in the form of tables, figures, and texts using frequencies and summary statistics such as mean, percentage, and standard deviation to summarize the research population in relation to the pertinent variables. The statistical analysis techniques were utilized to demonstrate the relationship between variables in the study population. Bivariate and multivariate analysis was employed using binary logistic regression analysis to analyze the data based on the selected parameters and *P-value* of <0.05 was considered significant at 95% CI. Binomial logistic analysis was also used to compute statistically a significant association between dependent variables.

4.9 Data Quality

Since the questionnaires were developed from scratch by the principal investigator after reviewing different literatures to include all possible variables, pre-testing and pilot study was conducted to ensure the validity of the questionnaire before actual data collecting began, and any necessary changes were made to the questionnaire. The questionnaire was submitted to, reviewed and commented by experts from Nuclear Medicine team at TASH, Addis Ababa, Ethiopia Then, a pilot study was done on 10% of the sample size by the principal investigator at TASH, Addis Ababa, Ethiopia, which gives comparable service. The participants were totally excluded from the main study. Table 1 shows the reliability and validity of the pilot study.

Table 1 : Reliability and Validity of the pilot survey

Constructs/Measurement Variables	Number of Items	Cronbach's alpha	Inter-Item correlations	Result remarks
Knowledge about DTC and RAI utilization	12	0.812	0.133	Good
Attitude about DTC and RAI utilization	10	0.782	0.324	Good

Cronbach's coefficient alpha value of 0.7 and above is indicators of good reliability of instrument and inter-item correlation values from 0.15 to 0.50 are good indicators of the instrument's validity.

4.10 Ethical Considerations

Ethical clearance was obtained from Addis Ababa University College of Health Sciences, Department of Internal Medicine, Nuclear Medicine Unit Ethical Clearance Committee, and official letter was written to Tikur Anbessa Specialized Hospital, Department of General Surgery, Oncology, Nuclear Medicine and Endocrinology to obtain approval, and the purpose of the study was adequately described. After providing full information about the study's goal and process, each study subject was asked to obtain informed consent. They were also informed that all information received from them would be kept confidential and utilized only for research purposes, using codes rather than personal identification.

5. Results

5.1 Socio-demographic characteristics of respondents

A sum of 163 physicians working in the departments of general surgery, Endocrinology, Oncology, and Nuclear Medicine at TASH were included to this study. Semi-structured questionnaires were distributed to these 163 participants and 137 of them responded to the questionnaire, making the response rate of 84%. Regarding the sex of respondents, 72 (52.6%) were females, and female to male ratio was 1.2:1. More than half, 86 (62.8%) of the respondents were in the age group less than 31 years, and the mean (±SD) age of the respondents was 31.26 (±3.51). The minimum and maximum ages of respondents were 26 and 45 years respectively while the median age was 30. Most participants, 75 (54.7%) were year three and above residents. The majority of respondents, 84 (61.3%) were found to have <3 years of total work experience. The majority of respondents, 113 (82.5%) were from the General Surgery department. The majority of respondents, 104 (75.9%) took training on the management of DTC.

Table 2 : Socio-demographics characteristics of respondents TASH, Addis Ababa, Ethiopia, 2025(N=137)

Characteristics	Category	Frequency	Percentage (%)
Age (years)	<31	86	62.8
	≥31	51	37.2
Gender	Male	65	47.4
	Female	72	52.6
Educational level	Year one residency	9	6.6
	Year two residency	53	38.7
	Year three and above	75	54.7
Work experience	<3 Years	84	61.3
	≥3 Years	53	38.7
Departments	General Surgery	113	82.5
	Oncology	13	9.5
	Nuclear Medicine	5	3.6
	Endocrinology	6	4.4
Training	Yes	104	75.9
	No	33	24.1

5.2 Respondents' knowledge towards the management of differentiated thyroid cancer and the utilization of radioactive iodine among physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia

Participants were given 12 knowledge-based questions to evaluate their knowledge towards the management of differentiated thyroid cancer and the utilization of radioactive iodine, and they were categorized into two groups based on their score (good knowledge and poor knowledge). The total cumulative knowledge level was established out of 12, and the mean level of knowledge was determined to be 7.75. Hence, mean and above (i.e., ≥ 8) is considered 'sufficient knowledge', while the rest was considered 'insufficient knowledge'. The Findings of this study revealed that the majority of respondents who participated in this study had an insufficient knowledge score, 71 (51.9%).

Table 3: Frequency distribution of respondents' knowledge score towards Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine among physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia, 2025 (N= 137)

Questions (Items)	Sufficient	Insufficient
What is the most common type of thyroid cancer?	109(79.6%)	28(20.4%)
Which of the following is a common treatment option for differentiated thyroid cancer?	87(63.5%)	50(36.5%)
What is the primary benefit of using radioactive iodine (RAI) for thyroid cancer treatment	62(45.7%)	75(54.7%)
Which of the following is a contraindication for RAI therapy?	77(56.2%)	60(43.8%)
What is the recommended dose of RAI for a typical patient with DTC?	70(51.1%)	67(48.9%)

Which of the following is not a benefit of RAI therapy in DTC?	76(55.5%)	61(44.5%)
Which of the following imaging modalities is most commonly used for initial staging and follow-up of DTC?	115(83.9%)	22(16.1%)
What is the primary treatment approach for a patient with papillary thyroid cancer (PTC)?	128(93.4%)	9(6.6%)
What is the most commonly used staging system for DTC?	116(84.7%)	21(15.3%)
How do you manage a patient with DTC and elevated Tg levels but no detectable disease on imaging	56(40.9%)	81(59.1%)
What is the most common side effect of RAI therapy in DTC patients?	59(43.1%)	78(56.9%)
What steps do you take to minimize radiation exposure to patients and healthcare workers during RAI therapy administration	80(58.4%)	57(41.4%)

Overall score	Sufficient =	≥8/12 or (≥65%)	66(48.2%)
	Insufficient =	<8/12 or (<65%)	71 (51.8%)

5.3 Respondents' attitude towards the management of differentiated thyroid cancer and the utilization of radioactive iodine among physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia

Regarding respondents' attitude (mean = 39.46, SD = 5.33, range = 20-50). The level of attitude of respondents towards the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine was dichotomized as positive with an attitude score of more than or equal to the mean and negative with an attitude score of less than the mean. Most of the respondents 75 (54.7%) have a positive attitude towards management of differentiated thyroid cancer and the utilization of radioactive iodine.

Table 4: Frequency distribution of respondents' Attitude score towards the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine among physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, 2025 (N= 137).

Questions (Items)	Positive	Negative
How confident do you feel in managing patients with differentiated thyroid cancer (DTC)?	137(100%)	
How comfortable do you feel in using radioactive iodine (RAI) therapy for DTC patients?	99(58.5%)	38(41.550
How concerned are you about the potential risks and side effects associated with RAI therapy?	122(89.1%)	15(10.9%)
How often do you discuss the potential risks and side effects of RAI therapy with your DTC patients?	67(48.9%)	70(50.1%)
How important is it for you to involve DTC patients in the decision-making process regarding their care?	135(98.5%)	2(1.5%)
How often do you assess DTC patients' quality of life and overall well-being during the treatment process?	134(97.8%)	3(2.2%)
How do you prioritize DTC patients' needs and preferences in the treatment plan?	134(97.8%)	3(2.2%)
How would you rate your confidence level in ordering RAI therapy for a patient with DTC?	88(64.3%)	49(35.7%)

How do you perceive the quality of care provided to patients with DTC in your department?	136(99.97%)	1(0.07%)
Do you think RAI therapy should be widely available for all patients with DTC?	137(100%)	

Overall score	Positive =	≥ 40/50 or (≥80%)	75 (54.7%)
	Negative =	< 40/50 or (<80%)	62 (45.3%)

Table 5: knowledge and Attitude level of the respondents towards the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine among physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, 2025 (N= 137).

Knowledge and attitude level of respondents			Scores			
			Minimum	Maximum	Mean	SD
Knowledge	Sufficient	66 (48.5%)	1	12	7.75	3.01
	Insufficient	71 (51.5%)				
Attitude	Positive	75(54.7%)	20	50	39.46	5.33
	Negative	62 (45.3%)				

The knowledge and attitude assessment revealed that only 66 (48.5%) of respondents answered above the mean of knowledge assessment questions correctly, while 71 (51.5%) scored an insufficient differentiated thyroid cancer and utilization of radioactive iodine. Table 6 summarizes the mean, standard deviation, minimum, and maximum scores for knowledge and attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine among clinicians at Black Lion Hospital.

Figure 1: shows the respondents level of knowledge and attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine

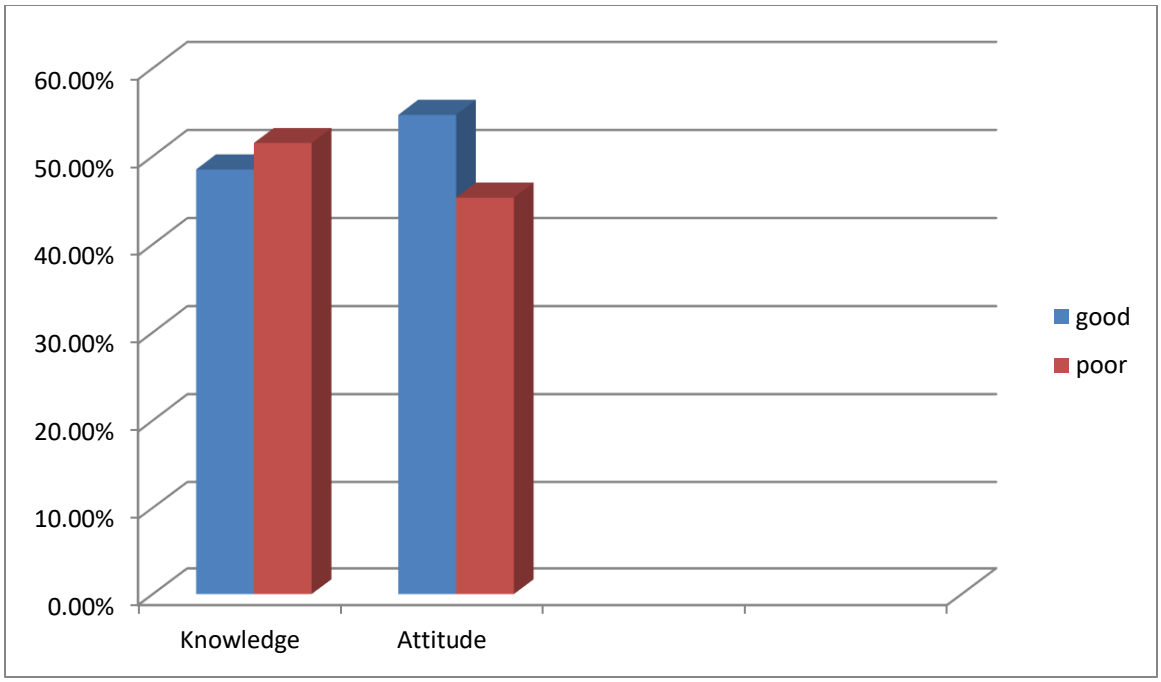

Figure 1: Level of knowledge and attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine among clinicians at Black Lion Hospital.2025

5.4 Association between respondents' knowledge and attitude towards the management of differentiated thyroid cancer and radioactive iodine utilization

5.4.1 Regression analysis of respondents' knowledge towards the management of differentiated thyroid cancer radioactive iodine utilization

Bivariate and multivariate logistic regression analysis was used to identify factors that are associated with respondents' knowledge towards the management of differentiated thyroid cancer and utilization of radioactive iodine. On binary logistic regression analysis, socio-demographic variables (age, work experience, training, General Surgery, Oncology departments) of respondents were significantly associated with knowledge towards the DTC management and RAI utilization at p-value <0.05 with 95% C.I. Sex, Education level, Nuclear Medicine, and Endocrinology departments were the variables that found to be not statistically associated with knowledge of the respondents(P-value>0.05).

The data in table 6 showed that the knowledge of the respondents has significant association with Age [COR=0.193; 95% CI (0.09-0.412], work experience [COR=4.386; 95% CI (2.094-9.184] DTC&RAI Training [COR=0.205; 95% CI (0.082-0.515) General surgery [COR =7.283; 95% CI (2.336-22.708) And Oncology [COR=0.247; 95% CI ((0.065-0.941)].

Respondents whose age less than thirty-one years were found to be 80.7% less likely to be knowledgeable than those aged thirty-one and above [COR=0.193; 95% CI ((0.09-0.412)].

Respondents in oncology were 75.3% less likely to have sufficient knowledge as compared to other departments [COR=0.247; 95% CI (0.065-0.941]. After bivariate analysis, age, work experience, training, surgery, and oncology department variables were entered for further multivariate analysis. Respondents who did not take training were 2 times less likely to have

sufficient knowledge as compared to those who took training [AOR=2.960; 95% CI (1.093-8.017)]. Respondents in general surgery were 25% less likely to have sufficient knowledge as compared to other departments [AOR=0.75; 95% CI (0.08-0.672). Table 6: Association between independent variables with physicians' knowledge towards DTC management & RAI utilization in TASH, A.A, Ethiopia, 2025 (N =137)

Variables	Categories	Level of knowledge		COR (95%CI) P -value	AOR (95%CI) P-value
		Sufficient N (%)	Insufficient N (%)		
Sex	Male	33(50.8)	32(49.2)		
	Female	33(45.8)	39 (54.2)	0.821(0.419-1.606) 0.564	
Age	<31 Years	29(33.7)	57(66.3)	0.193(0.09-0.412) 0.01	2.223(0.828-5.966) 0.113
	≥31 Years	37(72.5)	14(27.5)		
Education level	Year one residency	3(33.3)	6(66.7)	0.516(0.124-2.153) 0.364	
	Year two residency	22(41.5)	31(58.5)	1.550(0.774-3.103) 0.216	
	Year three and above residents	41(54.7)	34(45.3)		
Work experience	<3 Years	29(34.5)	55(65.5)	4.386(2.094-9.184) 0.01	0.425(0.164-1.102) 0.078
	≥3 Years	37(69.8)	16(30.2)		
DTC&RAI Training	yes	59(56.7)	45(43.7)		
	No	7(21.2)	26(78.8)	0.205(0.082-0.515) 0.01	2.960(1.093-8.017) 0.033
Departments	General Surgery	46(40.7)	67(59.3)	7.283 (2.336-22.708) 0.001	0.75(0.08-0.672) 0.021
	Endocrine	5(83.3)	1(16.7)	0.174(0.020-1.533) 0.115	
	Oncology	10(76.9)	3(23.1)	0.247(0.065-0.941) 0.041	0.220(0.016-2.942) 0.252
	Nuclear medicine	5(100)			

5.4.2 Regression analysis of respondents' Attitude towards the management of differentiated thyroid cancer radioactive iodine utilization.

Bivariate and multivariate logistic regression analyses were used to identify factors that are associated with respondents' attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine. On binary logistic regression analysis, socio-demographic variables only work experience of respondents were significantly associated with Attitude towards the role of DTC management and RAI utilization at p-value <0.05 with 95% C.I. sex, age, department, training on DTC&RAI utilization, education level, were the variables that found to be not statistically associated with attitudes of the respondents. Participants with <3 years of work experience were found to be 44 % less likely to have a positive attitude than those with three and above years of work experience with [COR=0.56; 95% CI (1.17-4.85)].

On multivariate analysis, all independent variables were found not to be statistically associated with attitudes of the respondents.

The attitude of the respondents has a significant association with work experience [COR=0.56; 95% CI (1.17-4.85)].

Table 7: Association between independent variables with physicians' Attitude towards DTC management & RAI utilization in TASH, A.A, Ethiopia, 2025 (N =137)

Variables	Categories	Level of Attitude		COR (95%CI) P -value	AOR (95%CI) P-value
		positive N (%)	Negative N (%)		
Sex	Male	36(54.4)	29(44.6)		
	Female	34(47.2)	38(52.8)	0.72(0.37-1.41) 0.34	
Age	<31 Years	47(70.1)	20(29.9)	0.54(0.26-1.08) 0.082	
	≥31 Years	39(55.7)	31(44.3)		
Education level	Year one residency	4(44.4)	5(55.6)	0.54(0.140-2.269 0.42	
	Year two residency	22(41.5)	31(58.5)	0.506(0.245-1.021) 0.57	
	Year three and above residents	44(58.7)	31(41.3)		
Work experience	<3 Years	36(42.9)	48(57.1)	0.56(1.17-4.85) 0.016	
	≥3 Years	34(64.2)	19(35.8)		
DTC&RAI Training	yes	58(55.8)	46(44.2)		
	No	12(36.4)	21(63.6)	1.26(0.2-1.02 0.055	
Department	General Surgery	56(49.6)	57(50.4)	0.71(0.32-1.61) 0.436	
	Endocrine	5(83.3)	1(16.7)	0.197(0.22-1.73) 0.143	
	Oncology	4(30.8)	9(69.2)	2.56(0.749-8.755) 0.117	
	Nuclear medicine	5(100)	0(0)		

5.4.3 Association between the dependent variables

Binomial logistic regression analysis was conducted on the two dependent variables (knowledge and attitude). For this purpose, attitude of respondents towards DTC management &RAI utilization was analyzed against knowledge variables. The odds of those participants with sufficient knowledge to have positive attitude towards DTC management &RAI utilization was found to be roughly two times more than those participants with insufficient knowledge [COR=2.1; 95%CI (1.06-4.16)].

Table 8: Association between dependent variables of respondents among physicians at TASH, Addis Ababa, Ethiopia, 2025 (N =137)

Variables	Categories	Attitude		COR (95%CI) P-Value
		Positive N (%)	Negative N (%)	
Knowledge	Sufficient	40(60.6)	26(39.4)	2.1(1.06-4.16) 0.033
	Insufficient	41(57.7)	30(42.3)	

6. Discussion

As to the knowledge of the researcher, this study is the first to assess the knowledge and attitude of physicians towards the management of differentiated thyroid cancer, and the utilization of radioactive iodine in Tikur Anbessa Specialized Hospital (TASH).

The findings of this study revealed that, the majority of the respondents have insufficient knowledge 71 (51.9%). Despite this, most of the participants in our study demonstrated a positive attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine 75 (54.7%). Similar studies conducted in Tanzania also showed that physicians had insufficient knowledge despite having a positive attitude towards the management of differentiated thyroid cancer and the utilization of radioactive iodine (SAKAFU, 2016).Lack of a well-established nuclear medicine service in our set up and lack of health professional training may be a possible explanation for the poor level of knowledge among the participants. However, they maintain a positive attitude, likely due to their confidence in established treatment protocols, and reliance on clinical guidelines. They also recognize the importance of these treatments, even if they are not fully up-to-date with the latest advancements with similar result in a study finding (Haymart, 2009).

In this study, the association between attitude and knowledge of the respondents and sex, age, educational level, work experience, training and departments were assessed [Table 6, 7]. Knowledge of the participants has a statistically significant association with age, work experience, Training, General Surgery, and Oncology departments ($P<0.05$)

Respondents whose age less than thirty-one years were found to be 80.7% less likely to be knowledgeable than those age thirty-one and above with [COR=0.193; 95% CI ((0.09-0.412)].

The lower knowledge level in individuals under thirty-one is likely due to a combination of less experience, fewer educational opportunities, and less access to networks or contexts where knowledge could be acquired (Salthouse, 2009).

Respondents in oncology department were 75.3% less likely to have sufficient knowledge as compared to other departments [COR=0.247; 95% CI (0.065-0.941].

Respondents who did not take training were 2 times less likely to have sufficient knowledge as compared to those who took training [AOR=2.960; 95% CI (1.093-8.017)].

The significant difference in knowledge levels between those who took training and those who did not can be attributed to the structured learning environment, the reinforcement of knowledge through hands-on practice, access to expert guidance, and the overall impact of training on confidence, skill development, and motivation (Salas, 2012).

Respondents in General surgery were 25% less likely to have sufficient knowledge as compared to other departments [AOR=0.75; 95% CI (0.08-0.672].

Despite this, our study showed that the level of respondents' knowledge was not associated with sex, education level, nuclear Medicine, and endocrinology departments (P>0.05).

The lack of association between these variables suggests that other factors, such as job-specific experience, training, and exposure to relevant information, may have a stronger influence on knowledge than these demographic or departmental factors. This result could also reflect the homogeneity of the study sample in terms of experience or training, or it could indicate that knowledge in this context is independent of these variables (Gegenfurtner, 2017).

The finding of this study also revealed that the attitude level of respondents towards the management of differentiated thyroid cancer and utilization of radioactive iodine has significant association with work experience of respondents (P<0.05). Participants with work experience of less than three years were found to be 44% less likely to have positive attitude as compared to those respondents with work experience of less than three years and above with [COR=0.56; 95% CI (1.17-4.85)]. Whereas, sex, age, educational level, departments, and training did not show association with attitude of respondents (P>0.05).

In this study, associations between dependent variables were also assessed. And those participants with sufficient knowledge were found to be roughly two times more likely to have positive attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine than those with insufficient knowledge [COR=2.1; 95%CI (1.06-4.16)].

The association between sufficient knowledge and a positive attitude toward the management of differentiated thyroid cancer and the utilization of radioactive iodine therapy can be attributed to

the influence of knowledge on clinical decision-making and attitude formation. As individuals gain a deeper understanding of the condition and the efficacy of radioactive iodine, they are more likely to adopt positive attitudes toward its management. This reflects the broader principle that knowledge empowers healthcare professionals to make confident, evidence-based decisions, fostering positive attitudes toward treatment modalities (Ajzen, 1991).

7. Strengths and Limitations of the study

7.1 Strength of the study

According to the investigators' understanding, this has been an initial study to assess the level of knowledge and attitude of physicians towards the management of differentiated thyroid cancer and utilization of radioactive iodine in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. The result offers valuable details to all stakeholders broadly as well as to the relevant bodies in particular. It provides a new avenue for further investigation. A questionnaire that was semi- structured was implemented in the investigation, which was designed by the researcher after reviewing different literatures to include all possible variables and then to figure out the reliability and validity of the instrument, a pilot study was carried out. Further, respondents' primary data was gathered for this study.

As a means to assure data quality, the investigator chose healthcare providers to collect data as well as trained and oriented them to the research's objectives. Additionally, a daily review of completed questionnaires was conducted to guarantee the validity of the data. Additionally, the study properly addresses the research objectives, which is the primary goal of the investigation.

7.2 Limitation of the study

The data was not collected from every physician and is represented by random systematic sampling. The results may differ if all physicians were interviewed.

Furthermore, the self-reporting aspect of the data collection is a constraint, since some participants may have under- or over-reported their views. There was also a shortage of analogous studies conducted around the world for comparison.

8. Conclusion and Recommendation

8.1 Conclusion

According to the findings of this study, the majority of physicians who participated had insufficient knowledge towards the management of differentiated thyroid cancer and utilization of radioactive iodine. Nevertheless, they have maintained good attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine. It was discovered that knowledge and attitude had statistically significant association.

In this investigation, the knowledge level of the respondents has significant association with age, work experience, training and departments. However, sex and level of education did not have significant association with respondents' knowledge.

The attitude level of the participants had significant relation with work experience; In contrast, sex, educational level, work experience, training and departments did not have significant association with attitude towards the management of differentiated thyroid cancer and utilization of radioactive iodine.

8.2 Recommendation

The findings of the research ultimately result in the following recommendations for departments, administrative bodies, and researchers at Addis Ababa University in order to raise knowledge about the treatment of differentiated thyroid cancer, the applications of radioactive iodine, the creation of treatment plans, and the expansion of clinical services within the setup.

8.2.1 Recommendations to AAU, College of Health Science

The administrative bodies of AAU's College of Health Sciences and TASH should facilitate training for health care professionals.

8.2.2 Recommendations to Department of the Internal Medicine, Nuclear medicine Unit

The department should host conferences, workshops, joint sessions, seminars, and lectures to increase medical professionals' understanding of the use of radioactive iodine in the treatment of differentiated thyroid cancer. Establishing therapeutic nuclear medicine services within the facility is also advised.

8.2.3 Recommendations to the Department of General Surgery, Oncology, and Endocrinology

Physicians should be aware of the precise indications for using radioactive iodine to treat differentiated thyroid carcinoma. To enhance treatment results, the departments should also include the use of radioactive iodine in their treatment guidelines for differentiated thyroid cancer.

8.2.4 Recommendations to researcher

Further reevaluations on this study area are advised.

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10. Annex

Annex 1 Participant information sheet (English version)

AAU College of Health Science

Department of Internal Medicine, Nuclear Medicine Unit

Participant information sheet

Background

Dear respondent my name is_____ I am here as a data collector for a study being conducted in Black Lion Hospital. These data will be collected to assess Physicians knowledge and attitude regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Black Lion Hospital, Addis Ababa, Ethiopia

Objective

The main objective of this study is to assess Physicians knowledge and attitude regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Black Lion Hospital, Addis Ababa, Ethiopia

Methodology

A hospital based cross sectional study will be conducted to assess physicians' knowledge and attitude regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Black Lion Hospital, Addis Ababa, Ethiopia Those physicians who are currently working at TASH, Department of Nuclear Medicine, Oncology, General Surgery and Endocrinology will be included in this study.

Risks and benefits

The study has no risk to your health or profession; Rather based on the finding of this study different recommendations will be given to the responsible bodies that directly or indirectly helps for the better practice of your profession.

Confidentiality

Your name will not be written in this form so that you will not be identified. We promise to keep all of the information you provide to us secret.

Right to refuse or withdrawal

Your participation is entirely optional, and you have the choice to stop answering any questions that make you uncomfortable at any moment. This will not affect your career at this hospital now and any time in the future.

Outcome of this study

The expected result will generate information on knowledge and attitude of physicians of Nuclear Medicine, Oncology, General Surgery and Endocrinology Department. Based on evidence-based result responsible bodies generate policies, preparing awareness creation training, mobilize the necessary resource materials to fill the gaps identified by the study and improve the clinical practice on Differentiated Thyroid cancer management.

Contact person

If you have questions regarding the study or if you wish to know the result after its completion, it is our pleasure to give you our contact address. Please contact the principal investigator.

Dr. Bekalu Awoke

Tel no. +251921279046

Email: bekalawoke6@gmail.com

Are you willing to participate in this study?

If yes please proceed to consent form. Thank you!

Annex 2: Participant consent form (English Version)

Consent form

Participant code No: _____

I have been informed that Dr. Bekalu Awoke, resident physician in Nuclear Medicine in AAU, TASH, is conducting research to assess physicians' knowledge and attitude regarding the management of differentiated thyroid cancer (DTC) and the utilization of radioactive iodine (RAI) at Black Lion Hospital, Addis Ababa, Ethiopia. I have been asked to take part in this study and I am aware that the study has no risk except taking 15-20minutes to complete the questionnaire.

I have also been told that the information I have given will be kept confidential and there will be no way of linking my responses to the results of the study findings.

I am informed that my participation is voluntary, and it is my right to refuse participation or withdraw from participating in this study at any time. I had adequate time to consider my decision before signing this informed consent. Therefore, I give my informed consent to take part in this study with full understanding of the situations.

Signature of respondent_____Date_____

Signature of data collector who receive consent_____Date_____

Thank you for your willingness to participate!

Annex 3: Semi-structured English version Questionnaire

Addis Ababa University, College of Health Sciences

Department of Internal Medicine, Nuclear Medicine Unit

Questionnaire for Assessment of Knowledge and Attitude towards the Management of Differentiated Thyroid Cancer and the Utilization of Radioactive Iodine among physicians in Tikur Anbessa Specialized Hospital in Addis Ababa, Ethiopia

.

Date of interview___/____/_____

Questionnaire identification number_____

Interviewer name_____signature

Checked by Supervisor. signature_____Date___/____/____

SECTION I- Background characteristics (socio-demographic)

No	Questions	Response categories	Skip to
Q101	What is your age?	Answer_____Years	
Q102	What is your gender?	1. Male 2. Female	
Q103	What is your year of study?	----------	
Q104	What is your Highest Level of Education	A) Undergraduate degree B) Postgraduate degree C) Fellowship/Board Certification Other: ____	
Q105	Years of Professional Experience	A) Less than 1 year B) 1-5 years C)6-10 years D)11-15 years	
Q106	Current Job Title/Position:	A) Resident Physician B) General Practitioner C)Specialist _____ D)Consultant	
Q107	Department of Affiliation	A) Nuclear Medicine B) General Surgery C)Endocrinology D) Oncology	
Q108	Have you received specific training in managing thyroid cancers?	A) Yes B) No	

SECTION II- Questions to assess knowledge about management of differentiated thyroid cancer and utilization of Radioactive Iodine

No	Questions	Response	Skip to
Q201	What is the most common type of thyroid cancer?	a)Papillary b)Follicular c)Medullary d) Anaplastic	

Q202	Which of the following is a common treatment option for differentiated thyroid cancer?	a) Surgery alone b) Radioactive iodine (RAI) alone c) Combination of surgery and RAI d) Chemotherapy alone	
Q203	What is the primary benefit of using radioactive iodine (RAI) for thyroid cancer treatment	a) It is a non-invasive treatment option b) It is highly effective in destroying thyroid cancer cells c) It is relatively inexpensive compared to surgery d) It is not associated with any side effects	
Q204	Which of the following is a contraindication for RAI therapy?	a) Pregnancy b) Breastfeeding c) Previous radiation exposure d) All of the above e) None of the above	
Q205	What is the recommended dose of RAI for a typical patient with DTC?	a) 30-100 mCi b) 100-200 mCi c) 200-300 mCi d) 300-400 mCi	
Q206	Which of the following is not a benefit of RAI therapy in DTC?	a) Improved survival rate b) Reduced recurrence rate c) Less surgical complications d) Reduced need for follow-up	
Q207	Which of the following imaging modalities is most commonly used for initial staging and follow-up of DTC?	a) Ultrasound b) CT scan c) MRI d) PET scan	
Q208	What is the primary treatment approach for a patient with papillary thyroid cancer (PTC)?	a) Surgical resection b) RAI therapy c) External beam radiation therapy (EBRT) d) Chemotherapy	
Q209	What is the most commonly used staging system for DTC?	a) TNM b) AJCC c)ETA	
Q210	How do you manage a patient with DTC and elevated Tg levels but no detectable disease on imaging	a) Repeat RAI therapy b) EBRT c) Chemotherapy d) Surgery	

Q211	What is the most common side effect of RAI therapy in DTC patients?	a) Nausea and vomiting b) Fatigue c) Thyroid storm d) Second primary malignancy	
Q212	What steps do you take to minimize radiation exposure to patients and healthcare workers during RAI therapy administration	a) Follow institutional protocols b) Use shielding and protective gear c) Minimize time spent in the presence of the patient d) Other (please specify)	

SECTION III- Questions to assess attitude assess knowledge about management of differentiated thyroid cancer and utilization of Radioactive Iodine.

No	Questions	Response	Skip to
Q301	How confident do you feel in managing patients with differentiated thyroid cancer (DTC)?	a) Very confident b) Somewhat confident c) Neutral d) Somewhat unconfident e) Not confident at all	
Q302	How comfortable do you feel in using radioactive iodine (RAI) therapy for DTC patients?	a) Very comfortable b) Somewhat comfortable c) Neutral d) Somewhat uncomfortable e) Not comfortable at all	
Q303	How concerned are you about the potential risks and side effects associated with RAI therapy?	a) Very concerned b) Somewhat concerned c) Neutral d) Somewhat unconcerned e) Not concerned at all	
Q304	How often do you discuss the potential risks and side effects of RAI therapy with your DTC patients?	a) Always b) Frequently c) Occasionally d) Rarely e) Never	
Q305	How important is it for you to involve DTC patients in the decision-making process regarding their care?	a) Very important b) Somewhat important c) Neutral d) Somewhat unimportant e) Not important at all	
Q306	How often do you assess DTC patients' quality of life and overall	a) Always b) Frequently	

	well-being during the treatment process?	c) Occasionally d) Rarely e) Never	
Q307	How do you prioritize DTC patients' needs and preferences in the treatment plan?	a) Always prioritize patient needs b) Frequently prioritize patient needs c) Occasionally prioritize patient needs d) Rarely prioritize patient needs e) Never prioritize patient needs	
Q308	How would you rate your confidence level in ordering RAI therapy for a patient with DTC?	a) Very confident b) Somewhat confident c) Neutral d) Somewhat unconfident e) Not confident at all	
Q309	How do you perceive the quality of care provided to patients with DTC in your department?	a) Excellent b) Good c) Fair d) Poor e) Very poor	
Q310	Do you think RAI therapy should be widely available for all patients with DTC?	a) Strongly agree b) Somewhat agree c) Neutral d) Somewhat disagree e) Strongly disagree	

Q311	What do you think is the major barrier to providing RAI therapy in your department?	a) Lack of trained personnel b) Limited resources c) Limited availability of RAI d) Patient-related factors (e.g., fear of radiation) e) Other (please specify	

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in Addis Ababa University or any other universities. I also declare that all sources of materials used for the thesis have been duly acknowledged.

Name of the candidate: Bekalu Awoke (MD, Year III NMR)

Signature: _____

Place: Addis Ababa University, Addis Ababa, Ethiopia

Date of Submission: _____

The thesis has been submitted for examination with my approval as University Advisors:

Name	Signature	Date
1. Dr Bethlehem Worku	_____	_____
2. Masresha Ahmed	_____	_____