

Nursing Guidelines on Safety Measures Awareness among Patients with Thyroid Disorders undergoing Radioactive Iodine Therapy

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Abstract

Background: Radioactive iodine therapy (RAIT) is a highly effective therapy for thyroid cancer and is usually general in patients with various thyroid diseases. Safety is considered an essential plan in treating patients suffering from cancer with iodine-131. **Aim of the study:** was to evaluate the effect of nursing guidelines on safety measures awareness among patients with thyroid disorders undergoing Radioactive Iodine Therapy. **Study design:** A quasi-experiment study design was used to achieve aim of the study. **Setting:** The outpatient clinics of the Nuclear Medicine Center for radioactive iodine therapy at Ain Shams University Hospital. Cairo. Egypt. **Sample:** A Purposive sample of 50 patients was participated in the current study. **Tools:** Data were collected using three tools as follows: Tool1: Patient Interview Questionnaire (pre/post and follow up). Tool 2. Swallowing exercise observational checklist (pre/post and follow up), and Tool 3- Complications assessment tool (pre/post and follow up). **Results:** there was significant improvement in patient's knowledge, awareness regarding the safety measures of RAIT, patient's practice of swallowing exercises and significant decreasing in occurrence of short and long term complications after nursing guidelines implementation. **Conclusion:** It was concluded that nursing guidelines have a positive effect in increasing patient's knowledge, patient's awareness of safety measures, swallowing exercises practice, and reducing the incidence of treatment complications. **Recommendation:** Continuous educational guidelines should be constructed and implemented about safety measures to the patients with thyroid diseases and receiving RAIT.

Key word: Nursing guidelines, Safety measures awareness, Radioactive iodine therapy.

Introduction

The thyroid gland is made up of two lobes that are joined by an isthmus and is situated in the midline in the front of the neck. Thyroxine (T4) and triiodothyronine (T3) are the two hormones that are produced by the thyroid gland. The releasing of these hormones is managed by the hypothalamic-pituitary-thyroid axis. It is part of the neuroendocrine system (Allen & Fingeret, 2022).

There are many types of thyroid diseases such as hypothyroidism and hyperthyroidism. The causes of Hypothyroidism includes: Thyroiditis: which is the thyroid gland inflammation, Hashimoto's thyroiditis that is an autoimmune disease in which the body's cells

causes harm to the thyroid and; Iodine deficiency: It is described as thyroid gland not performs its function to produce hormones. Sometimes, the thyroid gland not working correctly from birth (Merck, 2021).

The causes of hyperthyroidism include: Graves' disease (diffuse toxic goiter): This can cause the entire thyroid gland to become overactive and produce too many hormones. Hyperthyroidism can also because by overactive nodules in the thyroid. A single toxic nodule acts autonomously, while a multinodular toxic goiter is a gland with multiple nodules. Thyroiditis: May be painful or not noticeable at all. In this state, the hormones stored there are released. This can take numerous weeks or

months. In case of excess Iodine, the thyroid produces more hormones than necessary. Some agents (amiodarone) and cough syrups contain excess iodine (**American Thyroid Association, 2021**).

Radioactive iodine therapy is an essential treatment for Differentiated Thyroid Cancer (DTC). Radioactive iodine-131 has long been used in the treatment of DTC to remove thyroid remnants or to treat thyroid metastases. Although RAIT is relatively safe, it is not always free of side effects. Even relatively low doses of RAIT for plaque removal have been correlated with clinical potential side effects such as xerostomia, swelling and pain of the salivary glands, sialadenitis, excessive tearing, dry eyes, or taste changes (**Charalambous, 2017**).

Preparation for RAIT consists of discontinuation of hormone substitute remedy and regularly a low-iodine diet (LID). The exact indications are controversial and prescription methods vary depending on institutional practice. Likewise, there is a lack of high-quality evidence on the benefits of LID (and/or the optimal period for avoiding iodine-containing foods and medications), leading to uncertainty among physicians and concern among patients who may fear that taking iodine through LID effect could lead to reduced effectiveness (**Wadsley et al., 2023**).

Regarding to Complications of RAIT there are short and long term complications. Short term complications as swelling, neck tenderness, vomiting and nausea, tenderness and swelling of the salivary glands, dry mouth, and changes taste. Long term consequences as recurrent sialoadenitis associated with mouth pain, xerostomia, and dental caries. As regards swallowing problems (dysphagia) caused by radioactive iodine therapy the nurse should teach the patient how to perform swallowing exercises to avoid weight loss, dehydration and exposure to aspiration pneumonia (**Journal of Nuclear Medicine, 2023**).

Maintaining a specific distance between the

individual receiving the radioactive dosage and others, as well as minimizing their time spent in close proximity to the patient, can help reduce the risks associated with radiation-induced illnesses in diverse populations. These guidelines instruct patients undergoing RAIT to use their own vehicles, bring their own toiletries and bedding, plan to sleep alone in a separate room, purchase disposable dinnerware and utensils, wear gloves when cleaning or handling anything that has come into contact with bodily fluids, set up a separate trash can or bag for trash, and anticipate being absent from work or school for a minimum of seven days (**Society of Nuclear Medicine, 2019**).

Awareness of radiation safety is extremely important for health care workers as staff in several departments such as radiology, surgery and interventional cardiology. And on the other hand is also important for the patients to protect themselves, their families and others from adverse effects of radiation. Also, reduce unnecessary radiation exposure (Khamtuikrua & Suksompong, 2020). Nurses should give the patient adequate instructions following receiving iodine therapy as it remains in the body for a short time. In the initial days following treatment, the body excretes the majority of the radioiodine therapy. The main way that it exits the body is through urine, while very minute amounts can also be found in perspiration, bowel movements, and saliva (**American Thyroid Association, 2023**).

Significance of the study:

Patients with thyroid diseases who are treated with radioactive iodine therapy experience several physical, emotional and social issues that influence their life going. According to "Statistical Report at Ain Shams University Center" the frequency of patients receiving radioactive iodine was almost (80 patients) treated in Nuclear Medicine Center in 2022. Nursing has a role toward patients before, during and after the radioiodine treatment to reduce complications and maintain safety to patient and

others.

The incidence of thyroid cancer has been increased from 4.9 to 14.3 per 100,000 people. An extremely high proportion of females (6.5-21.4=14.9 per 100.000 females) were almost four fold cumulative than that of male (3.1 -6.9=3.8 per 100.000 male). Worldwide, hyperthyroidism occurs in 1.2% of cases, and most cases are caused by Graves' disease. Radioactive iodine has been broadly used to treat hyperthyroidism from 1940s (Kitahara, 2019).

Hence, this research evaluates the effect of nursing guidelines on safety measures awareness among patients with thyroid disorders undergoing radioactive iodine therapy.

Aim of the study:

To evaluate the effect of nursing guidelines on safety measures awareness among patients with thyroid disorders undergoing radioactive iodine therapy. This aim was accomplished through the following:

1. Assessment patient's knowledge regarding the disease of thyroid gland
2. Assessment patients' knowledge regarding RAIT
3. Assessment patient's awareness regarding safety measures of RAIT.
4. Assessment patient's practice regarding swallowing exercises
5. Developing and implementing nursing guidelines based on patients assessment
6. Evaluating the effect of nursing guidelines on patient's knowledge, safety measures awareness, swallowing exercises practice. and treatment complications.

-Operational definition:

Patient awareness: means the patient is aware of safety measures before, during and post treatment of iodine therapy related to food, medications, activities, traveling, pregnancy, lactation, contact with others, and how to get rid of RAIT after treatment without complications.

Research Hypotheses

H.1. Nursing guidelines will improve the patient's knowledge regarding the disease and RAIT

H2: Nursing guidelines will improve the patient's awareness of safety measures regarding RAIT.

H.3. Nursing guidelines will improve the patient's practice regarding swallowing exercises

H.4. Nursing guidelines will reduce the incidence of treatment complications.

Subjects and Methods

A- Design:

This is a single-group quasi-experimental interrupted time series. This design involves data collection from research participants before and after the introduction of the experimental intervention. In addition to the immediate pretest and posttest, delayed posttest or posttests are often involved to assess long-term treatment outcomes (Rogers & Révész, 2020)

B- Setting:

The study was conducted in the outpatient clinics of the Nuclear Medicine Center for radioactive iodine therapy at Ain Shams University Hospital. It is a separate entity consisting of one ground building; head and neck clinic which contains a doctor's office, a patient stretcher and a chair. In addition to reception and waiting area.

C- Subjects:

A Purposive non probability/non randomized sample of 50 patients with thyroid disorders and undergoing radioactive iodine therapy. Data collection took six months from the beginning of August 2023 to January 2024, for patients who fulfilling the determined criteria.

Inclusion criteria:

- Adult from both sexes
- Aged from 20yrs to more than 50 years

- Patients with thyroid disorder and treated with radioactive iodine therapy at the beginning of treatment or taking only one session of treatment.
- Agree to participate in the study.

Exclusion criteria:

- Patients taking other anti-cancer drugs.
- Patients taking radioactive iodine for other cause rather than thyroid disorders.

D- Tools of data collection:

(I): Patient interview questionnaire: It was developed by the researchers based on current literatures such as **Rogers and Révész (2020)**, **(Naderi et al., 2021)**, **Gomes, (2022)**, and **(American Thyroid Association, 2023)** it included five parts; **Part1:** demographic characteristics of the patients as (age, gender, work, educational level, marital status, residence, family member No, patient's income and family history. **Part2:** clinical data of the patients such as duration of disease, medical diagnosis, BMI, previous history of cancer, smoking and comorbidities disease. **Part 3:** Patient's knowledge regarding the diseases of thyroid gland. **Part 4:** patient's knowledge regarding RAIT. **Part 5:** Patient's awareness about safety measures regarding RAIT (pre/post, follow up). This tool is used to assess the level of patient's knowledge regarding diseases of thyroid gland, radioactive iodine therapy, and patient's awareness of safety measures regarding RAIT. This questionnaire contains 40 yes or no questions (Five questions) regarding knowledge about thyroid gland including definition, functions, anatomy, the hormones that secreted by the gland and the diseases which effect on the thyroid gland. (Five questions) regarding RAIT including definition, indications, contraindications, risks and complications, (30 questions) regarding safety measures awareness before/ during and after RAIT (10 questions) about safety measures before RAIT, (5

questions) about safety measures during RAIT and (15 questions) about safety measures after RAIT. It was used before and immediately after the implementation of the safety measures awareness (immediate post-test) and after six months (follow up) by using the same tools.

Scoring system:

For awareness assessment zero grades was given for the incorrect answer and one for the correct one. Obtaining less than (70%) was considered unsatisfactory level of awareness, and patients who have more than or equal (70%) were considered having satisfactory level of awareness

Tool (II): Swallowing Exercises Observational Checklist (pre/post/ follow up): It is designed by researchers based on literature review **(Logemann, 2016)** to assess the different swallowing improvement steps such as Masako exercise (Three steps), Mendelsohn exercise (Three steps) and Shaker exercise (Five steps).

Scoring system:

One grade is scored for done correctly step and Zero grades was given for not done step and those who scored <70% were considered unsatisfactory practice, and those who have more than or equal (70%) were considered having satisfactory practice.

Tool (III): Complications assessment tool (pre/post/ follow up): It was developed by the researcher based on literature review such as **(Cliff et al., 2020)** to assess the complications according to all body systems before and after the radioactive iodine therapy and follow up phase. One grade for presence of complications and zero grades for not presence of complications (N.B: signs and symptoms were ranked according to their priority of occurrence to indicate presence of the complications).

Educational guidelines booklet

It was designed by the researchers, written in simple Arabic language supported by the images, the booklet was based on the results of assessment of the patients, as well as reviewing relevant literature such as (Charalambous, 2017), Ministry of Health (2022)and American Thyroid Association (2023). The booklet was given for each patient; and it composed of four parts as follow: **Part (1):** anatomy of the thyroid gland, its functions, diagnostic tests, thyroid hormones, and different types of thyroid disorders **Part (2):** RAI treatment, definition, indications, contraindications, technique, side effects and complications, and preparation for taking RAI treatment. **Part (3):** safety measures before, during and post treatment of iodine therapy related to food, medications, activities, traveling, pregnancy, lactation, contact with others, and how to get rid of RAI after treatment. **Part (4):** swallowing exercises.

Revision of nursing guidelines was performed by seven experts. Four professors of Medical Surgical Nursing as well as one professor of oncology medicine, and two professor of Physics Radiation Oncology in Ain Shams University for content validity. Some changes were made based on the advice of a panel of experts, and after that, the final version was created.

Validity and reliability

Validity: evaluating the recommended tools' face and content authenticity by means of a jury composed of seven experts After reviewing the instrument for clarity, comprehensiveness, understanding, and ease of administration, four professors of medical surgical nursing, one professor of oncology medicine, and two professors of physics and radiation oncology at Ain Shams University concluded that no modifications were necessary.

Reliability: Alpha Cronbach test was used to determine the internal consistency the tools. Patient knowledge assessment tool was reliable

at (0.897), swallowing observational tool was reliable at (0.87) and Complications assessment tool was reliable at (0.85).

Preparatory phase:

Administrative design: The necessary official approvals were gained from officials of the Oncology Center of Ain Shams University Hospital. Request letters were issued to administrators from the Faculty of Nursing at Ain Shams University explaining the purpose of the work and its expected results.

Ethical considerations:

Written consent was obtained from each patient after being informed of the nature, purpose and benefits of the study. Patients were also informed that participation was completely voluntary and they could withdraw at any time without giving reasons. Data confidentiality and anonymity were ensured by stating that personal information would be kept private after association with researchers and by comforting patients that data would be recycled only for the purpose of the research. Furthermore, the intervention used in the current study is safe and does not cause any harm to the participants.

Pilot Study:

A pilot study was performed after obtaining permissions and before data collection on 10% of targeted cases (Five patients) from the same setting of the main study. Some modifications were done, so, there were excluded from the main sample to evaluate clarity, feasibility, and applicability of the tools, and estimate the time required for collecting the data to detect any significant barrier that might meet the researchers and restrict collection of data.

Field work

I- Assessment phase

Firstly the researchers introduce themselves to the patients, explaining the purpose of the study simply and the consent

was taken from patients who agreed to participate. The research was carried out in six months from the beginning of August 2023 to January 2024. Data were collected by the researchers two days per week (Tuesday and Thursday) at morning shift in the previous mentioned setting. Assessment was done through filling the interview questionnaire tool and assesses their awareness of safety measures regarding RAIT, swallowing exercises and complications of treatment using the previously mentioned tools.

The nursing guidelines were prepared based on the determined patients' needs using the related literatures. It included knowledge about thyroid gland, its anatomy, its functions, thyroid hormones, types of thyroid disorders. In addition to RAIT information which include definition, indications, contraindications, side effects and complications, how to apply. Also, safety measures pre, during and post treatment of iodine regarding food, medications, follow up, contact with others, travelling, pregnancy, lactation, and how to get rid of iodine.

The teaching media was prepared by including; booklet, posters and pictures for theory and video tapes for practice. Its content validity was tested through expert's opinions

II. Implementation phase

The study subjects were categorized into small categories; each one consisted of 4–5 patients per each training session. The handout was distributed to all patients included in the program in the first day of starting implementation of safety measures guidelines. The researchers demonstrated the components of the guidelines to the patient through sessions. Each session takes 30–40 minutes; the total sessions were 5 sessions for each patient's group. It included knowledge about thyroid gland and RAIT as definition, indications, contraindications, risks and side effects, and safety awareness measures regarding treatment pre, during, and post treatment such as food,

medications, follow up, travelling, contact with others, pregnancy and lactation.

The sessions included lectures and discussion to answer all the patients' related questions. The researchers demonstrated the swallowing exercises as an intervention to improve swallowing difficulties. The researchers' patient's relationship was maintained through telephone for any questions, and for patient follow up.

Evaluation phase:

This phase started after the implementation of the intervention post six months, the researchers evaluate the effect of nursing guidelines on safety measures awareness, swallowing exercises practice and complications among patients with thyroid disorders undergoing radioactive Iodine Therapy by using the same tools and comparing the results.

Statistical Design:

The data was organized and entered using the researchers' personal computer. Statistical Package for the Social Sciences 20 program (SPSS) 20 used in the study. Data were gained using descriptive statistics in the form of percentages and frequencies. T-test was exploited as an inferential statistic was used to investigate the effect of guidelines on awareness of safety measures, awareness, swallowing exercise practice and complications among patients with Thyroid Disorders undergoing Radioactive Iodine Therapy within three times: pre intervention (1st time), post (2nd time) intervention and follow up (3rd time) scores. The correlations between qualitative data were processed by chi-square test. Also Mean \pm SD also, was used. Significance was considered at p-value \leq 0.05, where $<$ 0.001 was considered highly significant.

Results

Table (1): Displays the mean age of the patients under the study were 36.7 ± 14.6 . As regards their gender 76% of the patients were females, 60% of them were working. Concerning qualifications, 48% of the studied patients read and write and 70% of them were married and living in urban area, 64% of their family members were 1-3 persons. Also, 100% of the patients had not enough income.

Figure (1): Clarifies that, 40% of the patients under the study had family history of thyroid diseases and treatment of radioactive iodine therapy from (1st degree).

Table (2): showed that, 60% of the studied patients their duration of disease was < 6 months, 68% of them their medical diagnosis was hyperthyroidism, and 60% of the studied patients were underweight, Also, 80% of the patients were had no previous history of cancer, in addition to that, 60% of the studied patients were non-smokers, Also, regarding to co-morbidities diseases 40% of the studied patients were had diabetes.

Table (3): Indicates significant improvement in patients' knowledge about safety measures awareness of radioactive iodine therapy regarding post and follow-up tests (mean = 40.3 ± 1.6 & 44.7 ± 1.1 respectively) compared to pre – test (26.1 ± 4.2), with t – test = 22.5 and 16.9 pre and post/ follow up respectively) .

Table (4): Reveals significant improvement in level of patients' practice regarding swallowing exercises post and follow - up tests (mean = 40.7 ± 1.6 & 45.1 ± 1.6 respectively) compared to pre – test (26.7 ± 3.9). Also shows a significant positive

relation between patient's awareness of safety measures and swallowing exercises practice post nursing guidelines implementation at ($p=0.000$).

Table (5): showed that statistically significant difference between the effect of pre and post nursing guidelines implementation regarding occurrence of short and long term complications as revealed in post and follow - up tests (mean = 39.4 ± 1.0 & 24.3 ± 2.7 respectively) compared to pre – test (45.0 ± 1.6), with t – test = 36.8 and 21.5 respectively).

Table (6): Shows a significant positive correlation between total level of patient's knowledge about safety measures awareness and level of swallowing exercises practice post nursing guidelines implementation at ($p=0.000$).

Table (7): showed a significant positive correlation between total level of patient's knowledge about safety measures awareness and short / long term complications post nursing guidelines implementation at ($p=0.000$).

Table (1): Frequency and Percentage Distribution of the Demographic Characteristics of the Patients under Study (n=50).

Items	Studied Patients (n=50)	
	No	%
Age		
• 20 ≤ 35	5	10%
• 35 ≤ 50	30	60%
• +50	15	30%
Mean ± SD	36.7± 14.6	
Gender		
• Female	38	76%
• Male	12	24%
Work		
• Yes	30	60%
• No	20	40%
Educational level		
• Don't read or write	5	10%
• Read and write	24	48%
• Intermediate	16	32%
• High education	5	10%
Marital status		
• Married	35	70%
• Unmarried	15	30%
Residence		70%
• Urban	35	30%
• Rural	15	
Family member No.		
• 1- 3persons	32	64%
• + 3 persons	18	36%
Income		
• Enough for cost treatment	0	0
• Not enough for cost treatment	50	100%

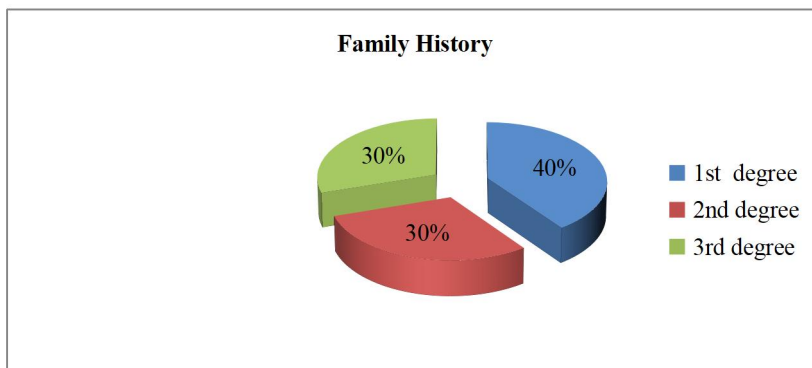
**Figure (1): Percentage Distribution of Family History about Thyroid Disorders of the Patients under Study (n= 50)**

Table (2): Frequency and Percentage Distribution of the Medical Health History and Clinical Data of the patients under Study (n= 50).

Items	Studied Patients (n=50)	
	No	%
Duration of disease		
• < 6 months	20	40%
• 6 months	30	60%
Medical diagnosis		
• Thyroid cancer	16	32%
• Hyperthyroidism	34	68%
Body mass index (BMI)		
• Normal (18.5-24.9kg/m2)	5	10%
• Underweight	30	60%
• Class I obesity (30-34.9 kg/m2)	10	20%
• Class II obesity (35-39.9 kg/m2)	5	10%
Previous history of cancer		
• Yes	10	20%
• No	40	80%
Smoking		
• Smoker	20	40%
• Non smoker	30	60%
Comorbidities diseases		
• Hypertension	15	30%
• Diabetes	20	40%
• Cardiovascular diseases	15	30%

Table (3): Level of Patients Knowledge about Safety Measures Awareness Pre/post and Follow up of Implementation Guidelines under study (n=50).

Items	Studied patients		
	Pre	Post	Follow- up
• knowledge about thyroid gland	15 (50%)	44 (88.0)	40 (80%)
• Knowledge about RAIT	10(20%)	28(56)	30 (60%)
• Safety measures before radioactive iodine therapy	15 (30%)	35 (70%)	39 (78%)
• Safety measures after radioactive iodine therapy	10 (20%)	28 (56 %)	30(60%)
$\bar{X} \pm SD$	26.1±4.2	40.3 ± 1.6	44.7 ± 1.1
T1 (pre & post-tests)	22.5*		
T2 (post & follow- up tests)	16.9*		

Table (4): Level of Swallowing Exercises Practice pre/post and follow up Implementation of Guidelines (n=50)

Items	Studied patients (n=50)						
	Pre	Post	Follow-up	Pre &post		Pre &follow-up	
				X2	P-value	X2	P-value
Masako exercise	22 (44%)	40 (80%)	46 (92%)	24.37	<0.001**	28.85	<0.001**
Mendelsohn exercise	32 (64%)	42 (84%)	47 (94%)	22.47	<0.001**	27.89	<0.001**
Shaker exercise.	24 (48%)	43 (86%)	45 (90%)	22.24	<0.001**	23.90	<0.001**
$\bar{X} \pm SD$	26.7 ± 3.9						

**P<0.001 highly significant

Table (5): Frequency and Percentage Distribution of the Complications Pre/post and Follow up of Implementation Guidelines under Study (n=50)

Items	Studied patients (n=50)		
	Pre	Post	Follow-up
Short term complications			
• GIT	45 (90%)	40(80%)	20(40%)
• Mouth/Saliva	43 (86%)	39 (78%)	29(58%)
• Neck	46 (92%)	40(80%)	23(46 %)
• Blood	47 (94%)	40(80%)	24 (48%)
• Chest /lung	43 (86%)	38(76%)	24(48%)
Long term complications			
• Teeth	46 (92%)	39 (78%)	26(52%)
• Eyes	47 (94%)	40(80%)	24 (48%)
• Chest /lung	45 (90%)	41 (82%)	27(54%)
• Genital			
• Bone marrow	43(86%)	38(76%)	22(44%)
$\bar{X} \pm SD$	45.0 ± 1.6	39 .4 ± 1.0	24.3 ± 2.7
T1 (pre & post-tests)	36. 8*		
T2 (post & follow- up tests)	21.5*		

Table (6): Correlation between Total Level of Knowledge about Safety Measures Awareness and Swallowing Exercises under Study (n=50).

Items	r p-value	Total level of knowledge about safety measures awareness		
		Pre	Post	Follow-Up
Masako exercise	r	0.765	0.890	0.954
	p- value	0.000**	0.000**	0.000**
Mendelsohn exercise	r	0.789	0.850	0.967
	p- value	0.000**	0.000**	0.000**
Shaker exercise.	r	0.810	0.833	0.888
	p- value	0.000**	0.000**	0.000**

**P<0.001 highly significant

Table (7): Correlation between Total Level of knowledge about Safety Measures Awareness and Complications among the Patients under the Study (n=50).

Items	r p-value	Total level of knowledge about safety measures awareness		
		Pre	Post	Follow-up
Short term complications	r	0.779	0.813	0.889
	p- value	0.000**	0.000**	0.000**
Long term complications	r	754	0.890	0.914
	p- value	0.000**	0.000**	0.000**

**P<0.001 highly significant

Discussion

Radioiodine Therapy (RAIT) involves killing of thyroid cells and shrinking of thyroid gland by radioactive iodine. It is used to treat some thyroid gland disorders, as overactive thyroid (Hyperthyroidism) and some types of thyroid cancer (**American Thyroid Association, 2023**).

While the radioiodine therapy with I-131 is safe and has fewer chances of complications, involving early and late complications. Early ones such as, sialadenitis /xerostomia, radiation thyroiditis, gastrointestinal symptoms, suppression of bone marrow, nasolacrimal duct obstruction, dry eye, and gonadal damage. Late complications such as secondary cancers, pulmonary fibrosis, permanent bone marrow suppression, and also genetic impacts (**Esfahani et al., 2014**).

The patient should follow the following precautions to reduce the risks of RAI treatment, and sleep alone for the first few days (3 - 4). Avoid contact, especially with children and pregnant women. Kissing or sexual contact should be avoided for three to four days after treatment. Wash items immediately after use. Do not share washcloths or towels. After using the toilet, flush it twice and rinse the sink and bathtub (**AbdEl-all, 2019**).

The findings of this study revealed that, the mean age of the patients were 36.7 ± 14.6 years and as regards to gender three quarters of them were females, this may be due to females more liable to hormonal changes. These results are supported with study done by **AbdEl-all, (2019)** who demonstrated that, the majority of the patients in his study “Effect of Implementing Safety Recommendation on Outcomes of Patients Receiving Radioiodine Therapy” were females and their ages was ranged from 20-35 years. This is evidence the risk of thyroid disorders for women is about 10 times higher than for men. The current study revealed that, more than one half of subjects were working and

this may be due to thyroid disease occurs in middle age. This finding was agreed with **Mohamed, (2016)**, who reported in his study “Effect of nursing teaching protocol on life style modification of male patients with ischemic heart disease” that more than three quarters of the patients (study and control) were employees.

Concerning qualifications of the present study almost one half of the patients read and write and this results was inconsistent with **Abdelsamea and Abdelmohsen, (2019)** who found in his study (Effect of Nursing Instructions on Life Style of Patients Receiving Radioactive Iodine Therapy for Thyroid Disorders) that the majority of patients were illiterate in both groups, and consistent with **Hammoodi & Khudur, (2015)**, who reported in the study “Life Style for Adult Patients with Hyperthyroidism at Baghdad Teaching Hospital” that the majority of hyperthyroidism patients were secondary educated.

Regarding residence, Almost two thirds of the present studied patients were married and living in urban area and this result is consistent with **Mahrous, Gendy and Abd-Elaziz, (2021)** who reported in the study “Bio psychosocial Needs among Patients Receiving Radioactive Iodine Therapy for Thyroid Disorders: Suggested Guidelines” that more than half of the participants lived in urban region but this result is contradicted with **Roskosz et al. (2019)**, who found in his study “Early Evaluation of treatment effectiveness using ^{131}I iodine radiotherapy in patients with Differentiated Thyroid Cancer” that the majority of the participants came from rural regions. The present research displayed that, more than two thirds of them their family members were had 1-3 persons and all of the patients were had not enough income.

As regards medical health history and clinical data, this work revealed that, more than one half of the patients their duration of disease was less than 6 months, also, two thirds of the patients their medical diagnosis was hyperthyroidism, in addition to that, this research revealed that more than one half of the patients were had no previous history of cancer.

Regarding to smoking, more than three quarters of the patients were non-smokers this results is agreed with **(Abdelsamea and Abdelmohsen, 2019)** who reported that, all of the patients in his study were non- smokers. Regarding to comorbidities diseases this study displayed that almost one half of the studied patients were had diabetes and this result was supported by **(American Thyroid Association, 2023)** who mentioned that the diseases of thyroid dysfunction have a potent relation among different chronic diseases as diabetes and kidney disease, while this result was disagreed with **(Abdelsamea and Abdelmohsen, 2019)** who demonstrated that the majority of the sample in his study were had no history of chronic diseases.

In relation to family history, this research displayed that, nearly one third of the patients were had family history thyroid diseases and treatment of radioactive iodine therapy and this result was disagreed with **(Abdelsamea and Abdelmohsen, 2019)** who reported in his study that the majority of patients in both categories hadn't family history for thyroid diseases but in the same line with **Hammoodi & Khudur (2015)**, who reported family history of hyperthyroidism among the highest percent of the patients.

The current study showed that, there was significant progression in patient's knowledge regarding the disease, RAIT, and safety awareness measures of radioactive iodine therapy post implementation of nursing guidelines than pre- implementation of guidelines in which considerable

differences between pre and post nursing guidelines implementation about awareness of safety measures observed and this was agreed with **AbdEl-all, (2019)** who proved considerable variance between before and after implementing safety awareness measures.

Also, the current study observed significant differences between post guidelines about awareness of safety measures and follow up and this is might due to the patients in the follow-up forget the information and need continuous education at interval periods.

The findings of this work displayed considerable progression regarding knowledge about swallowing exercises Masako exercise, Mendelsohn exercise and Shaker exercise post nursing guidelines implementation about awareness of safety measures, in which there was significant differences between pre / post nursing guidelines implementation about awareness of safety measures and follow up observed. and this result is agreed with **(Mohamed and Hassanine, 2019)** who proved significant variations among study group comparing to the controls regarding the swallowing disturbance after shaker exercise interventions for patients radioactive iodine treatment.

Our study showed positive correlation between total level of swallowing exercises practices pre and post guidelines implementation and this might be referred to effective educational nursing guidelines which increased the patient's practice of swallowing exercises and refers also, to patient motivation to acquire the practice to overcome the swallowing problems.

Our study displayed significant improvement in decreasing the occurrence of

short and long term complications of radioactive iodine therapy post nursing guidelines implementation in which there was a potential variation between pre / post nursing guidelines implementation about awareness of safety measures and follow up. and this is might due to when the patient's awareness improved after educational guidelines implementation the patient complications are decreased, and this results is agreed with (Thompson, 2001) who reported that radiation safety precautions provided by nursing staff was the key to promote patient outcomes following 131I therapy by reducing radiation hazard to patient family and environment.

Conclusion

There was a significant improvement in patient's knowledge of the disease and RAIT. Also significant improvement in patient's awareness about safety measures regarding radioiodine therapy. There was a significant progression regarding patient practice of swallowing exercises after implementation of the nursing guidelines. There was also a significant improvement in reducing short- and long-term complications of radioactive iodine treatment after implementation of nursing guidelines.

Recommendations

Based on the finding of the present study, the researchers recommended the following:

1. Continuous educational programs should be constructed to increase the level of patient's knowledge regarding awareness of safety measures about radioactive iodine therapy which can be provided in the clinics using simple booklets and brochures
2. Swallowing exercises training programs should be constructed for patients with thyroid disorders and receiving RAIT to help the patients to overcome of swallowing complications.
3. Patient's education is a very important element in improving patient knowledge so;

- it must be emphasized before administration of radioactive iodine treatment and persisted after receiving it.
4. Conducting similar studies on a larger nonprobability representative sample to achieve more generalizable findings.
 5. Further researches are needed to fully understand the associations between patients' knowledge and effect of patient education.

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