

# Effect of implementing a training program on nurses' competency in caring for geriatric patients with functional thyroid disorders

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## Abstract

**Background:** Functional Thyroid Disorders (FTDs) including hyperthyroidism and hypothyroidism conditions of the thyroid gland can be fatal and pose life-threatening health risks to older adults. The geriatric population tends to be affected with FTDs more than younger populations and manifestations in older persons are subtle due to the ageing process and thus are often ignored making it a challenge to diagnose and treat. In this context, implementing a training program for nurses who care for geriatric patients with FTDs to develop and or enhance their competency is a valuable priority. **Objective:** To evaluate the effect of implementing a training program on nurses' competency in the care of geriatric patients with FTDs at the outpatient clinic. **Setting:** The study was conducted at the outpatient clinics at the one-day services Centre which is an extension of the Main University Hospital (El Amiri Hospital). **Design and Sample:** A quasi-experimental research design was used for the study (one study group and one control group). A convenient sample of sixty nurses was selected and divided equally into the control and the study group. **Tools:** Two main tools were developed and used to evaluate nurses' competency on geriatric FTDs. Tool one: Nurses' socio-demographic and work-related characteristics questionnaire and tool two: Nurses' competency in caring for geriatric patients with functional thyroid disorders questionnaire which has three parts. **Results:** There was a statistically significant increase in total mean scores of nurses' competency levels regarding FTDs in the study group Compared to the control group, immediately post-implementation of the intervention ( $94 \pm 19.348$ ,  $62 \pm 19.66294$ ). **Conclusion:** The current study reveals the effectiveness of applying a training program on nurses' FTDs competency. Nurses' competency levels in caring for geriatric patients with FTDs improved significantly for the study group after implementation of the proposed training intervention program as compared to before implementing the program and then those of the control group. **Recommendations:** In-service training programs on FTDs should be offered on a regular basis to the nurses at the outpatient clinic.

**Keywords:** Functional thyroid disorders, Geriatric patients, Nurses, Nurses' competency, Training program

### ***Introduction***

Thyroid disease, is a common non-communicable disease among older people. (Hanford Thyroid Disease Study Guide - Findings and Interpretations | NCEH | CDC, 2022.). It is the most common endocrine disorder in the developing world, that is underdiagnosed, under-treated, and under-managed. (Fualal & Ehrenkranz, 2016). The thyroid gland's function changes are more noticeable in elderly above 65 years. The manifestations are subtle in geriatric patients thus making it harder to assess, diagnose and manage. According to Older Patients and Thyroid Disease | British Thyroid Foundation, (2019) thyroid disease is primarily a disease of the elderly, and the prevalence and incidence of functional thyroid disorders rise with age.

With ageing process, alteration of the function of the thyroid gland causes progressive physiological fibrosis and atrophy, resulting in a decrease in thyroid volume that is difficult to palpate. The prevalence of auto-antibodies rises with age and may contribute to thyroid gland anatomic changes. The number of neoplastic thyroid lesions increases with age, making the thyroid more nodular. Iodide status in the elderly is lower than in young adults because of salt restrictions in the diet and decreased absorption due to comorbid conditions (Leal & Beito, 2020). Atypical manifestations in older adults such as anorexia, depression, apathy and fatigue, constipation, weight loss or weight gain maybe a reflection of thyroid disease.

Thyroid diseases regardless of age can be classified as: (1) functional thyroid disorders (FTDs) which include hypothyroidism and hyperthyroidism, (2)

inflammatory conditions (thyroiditis), and (3) neoplastic conditions. Hypothyroidism is a common pathological condition characterised by thyroid hormone deficiency (Montmollin et al., 2020). The clinical course of FTDs in older adults differs significantly from that observed in younger individuals, owing to more subtle symptoms frequently attributed to normal ageing. Thyroid dysfunction in the elderly, especially if left untreated, is associated with significant morbidity. (Leal and Beito 2020).

Competence is a broad concept that refers to an individual's overall capacity, whereas competency refers to specific abilities. Thus, competency-based training and education is a behaviourist tradition that concentrates on training rather than qualifications, such as what a nurse has been taught rather than what a nurse is able to do. (Gonczi et al., 1993). The self-assessment of competence attributes, which is used in this research, is the most common method for measuring nurses' competence because it allows nurses to consider their practice within their own environments and helps them to improve their practice (Campbell & Mackay, 2001).

Outpatient clinic nurses play an important role in the management of FTDs in elderly patients. Nurses are the first health care providers to meet with patients. They understand the significance of individualised care and how to use it to track the progress of interventions and the patient's overall health.

Increased competency among nurses can enable them to provide high-quality nursing care. Quality nursing care will, in turn, help reduce complications and symptom burden associated with functional thyroid disorders

in older adults. This, in turn, improves patient satisfaction, communication, and relationships with other healthcare professionals. In addition, may reduce costs associated with emergency admissions due to complications, along with costs associated with unnecessary diagnostic procedures and treatments, thus, saving time and resources. (Nurses as Educators: Creating Teaching Moments in Practice | Nursing Times, 2022).

Nursing competencies to care for geriatric patients with functional thyroid disorders includes many other aspects such as screening for cognitive impairment, depression, environmental hazards, functional abilities, and patient education. Patient education about the disease, its effects, and management will bring about awareness of knowledge of hypo and hyperthyroidism among elderly population and improve their general health and well-being thereby decreasing symptom burden (Miaoli et al., 2019).

Furthermore, studies assessing nurses' competence in the care of geriatric patients with thyroid disorders are scarce. Recognizing the multifaceted nature of the problem, the proposed study nursing interventions programme will help to equip nurses with competency on FTDs in geriatrics. This aligns with the international Sustainable Development Goals 2030 (SDGs) and the Egyptian Sustainable Development Strategy, both of which focus on ensuring healthy lives and promoting well-being for all ages through early interventions and preventive care. (Ministry of Planning, Monitoring and Administrative Reform Cairo, 2012).

**Aim of the study:** This study aimed to determine the effect of a training program on nurses' competency in caring for geriatric patients with functional thyroid disorders.

**Research hypothesis:** Nurses caring for geriatric patients with functional thyroid

disorders who receive the proposed training program exhibit a higher level of competency than those who do not.

## **Materials and methods**

### **Materials**

**Design:** A quasi-experimental research design was used for the study (one study group and one control group).

**Setting and subjects:** The research was conducted at the Main Alexandria University Teaching Hospital (Elamiry Hospital), Alexandria, Egypt, which is affiliated with the Faculty of Medicine at Alexandria University. The Facility offers therapeutic and diagnostic services to older adults in Alexandria and the outlying neighbourhoods. All nurses working at the outpatient clinic are women and are 108 in number including 6 nurse specialists who are working as head nurses, 15 diploma nurses, and the rest are technical nurses. Technical nurses are in direct contact with geriatric patients at outpatient clinics. Among the technical nurses, 6 nurses work in the operating rooms. The diploma and technical nurses are rotated at the clinics except for those who are working in the operating rooms. The schedule of the nurses is planned monthly by the nurse director of the centre.

**Subjects:** A convenience sample of sixty (60) technical nurses and nurse specialists met the inclusion criteria. Nurses working in operation rooms, nurse supervisors, those less than one year of work experience were excluded due to their indirect care to geriatric patients. The sample size was estimated using the Epi info programme V 7.0 and the following parameters: population size of 73, a prevalence of the problem 50%, a margin of error 5%, a confidence level 95%, and a sample size of 60 was used. The study subjects were divided equally into two

groups. Each group comprised of thirty (30) staff nurses.

**Group 1:** Control group who followed the outpatient routine care and did not receive the training program.

**Group 2:** Study group who received the proposed study training program intervention.

**Tools:** The following tools were used:

**Tool One: Socio-demographic and work-related characteristics questionnaire:**

This tool was designed to assess the subjects' socio-demographic and work-related characteristics. It included information such as age, marital status, level of education, years of work experience, a preferred group of care, and previous geriatric in-service training.

**Tool Two: Nurses' competency in caring for geriatric patients with FTDs questionnaire:**

This tool was developed by the researcher based on related literature to evaluate nurses' competency in caring for the geriatric patient with FTDs. It has three (3) parts as follows:

**Part I: Nurses' knowledge of FTDs among geriatric patients:**

This part consists of 12 items with multiple choice questions with five options and only one option per item is the correct answer. Each correct answer was given a score of one and the wrong or I do not know the answer was given a score of zero.

**Scoring System of Knowledge:** the total score ranged from 0-12. Nurses' knowledge level was based on contextualized Benner's stages of competency categorized from excellent (>90%) to fail (<60%). For this study, a score of 9 out of 12 (75%) was considered good. Scoring as follows:

Total scores	Category
≥90%	Excellent
80% to 89%	Very good
70% to 79%	Good
60% to 69%	Fair
<60%	Fail

**Part II: Nurses' attitude towards geriatric patients with FTDs:**

This part assessed the subjects' attitudes toward geriatric patients with FTDs. It consists of 13 items on a Likert scale with three options from 'I do not know what to do (1), I am often uncertain what to do (2) and I am certain I handle it well (3). The minimum score is 13 and the maximum score is 39.

The overall attitudes toward geriatric patients with FTDs scores were classified into three classes: negative attitude (less than 75%), neutral attitude (75% to 85%) and positive attitude (more than 85%). Thus, for this study a score of 33 out of 39 (85%) is positive attitude (competent).

**Part III: Functional thyroid disorders nurses' practices:**

This part included 17 Likert scale items on a scale from 'never=1, sometimes=2, often=3 and always=4', the minimum score is 17 and the maximum score is 68. In addition, it has (4) four qualitative items with a score of one each for the correct answer indicated and a sum 72 maximum score. Thus, a score of 54 out of 72 (75%) was considered competent. This part evaluated different nurses' practices related to the care of geriatric patients with FTDs such as using the geriatric depression scale short form, Mini-Mental State Examination, Medication Adherence Rating Scale, fatigue scale, skin, and foot care, deep breathing exercises, precautionary measures against COVID-19 including wearing, removing gloves and masks correctly, and safe environment.

**Scoring System for Nurses' practices:** The competency level was based on (Benner, 2001), as follows:

Total scores	Category	Level of competency
≥90%	Excellent	Expert
80% to 89%	Very good	Proficient
70% to 79%	Good	Competent
60% to 69%	Fair	Advanced beginner
<60%	Fail	Novice

The sum of the three parts of tool two shows the competency level of the nurses. The higher the score the higher the nurses' competency level. In the present study a score of 75%, (competent) was considered competent. The sum of the three parts of tool two was 123. Thus, a score of 92 of 123 (75%) and above was considered competent.

### Method

**The study included three phases as follows:**

**I- Preparation phase:** It included reviewing related literature and theoretical knowledge of various aspects of the study using books, articles, and internet periodicals and magazines to develop tools and sessions for data collection.

1. Approval for the study was obtained from the Research Ethical Committee (REC), Faculty of Nursing, Alexandria University. Permission to conduct the study from responsible authorities and the head of the study setting at Alexandria University Teaching Hospital (El Amiri) was obtained. The purpose of the study, along with the date and time of data collection, were communicated to the head of the study setting and the nursing administration office at the outpatient clinic.

**2. Tools validity and reliability:**

- The tools were developed in English language and translated into Arabic language. Validity and reliability tests for the tools was done. Content validity was done by a jury of five experts in related fields, including

gerontological nursing, medical-surgical nursing, and nursing education.

- Reliability was determined following a pilot study. Cronbach's Alpha was calculated. The tool to assess knowledge, attitude, and practise had Cronbach's Alpha of 0.819, 0.931, and 0.914, respectively. The total internal consistency was positively correlated.

3. **Pilot study:** A pilot study was conducted on 10 nurses to test the clarity, applicability, feasibility, and relevance of the tools used, as well as to determine the time required for the study tools to be applied. The nurses who participated in the pilot study were not included in the sample. Following the pilot study, the researcher reviewed the tools, and based on the pilot study feedback, some items (6) were removed due to redundancy, and minor corrections such as spelling, numbering, and formatting were made. The final tool includes 55 items.

**II- Implementation phase:**

1. Preparation of the study setting was done by the researcher to ensure a quiet, non-disturbing with adequate lighting, and well-arranged and comfortable place to deliver the proposed sessions to the study subjects.
2. The nurses who fulfilled the inclusion criteria were included after an explanation of the aim of the study in order to collect data.
3. The researcher started by introducing themselves and giving an overview of the program and its purpose.
4. Tools one and two were used to assess socio-demographic and work-related characteristics and nurses' competency for caring for geriatric patients with functional thyroid disorders for both control and study groups (pre-test).
5. The time to fill in the tools ranged from 20-40 minutes.

6. The nurses attended the sessions in small groups, each group consisted of up to a maximum of 7 nurses.
7. At the start of the training program, the subjects were given a notebook and a pen to take notes of important points.
8. The training program was delivered in Arabic Language and included three (3) sessions as follows:
  - **The first session:** included an overview of the thyroid gland, its function, normal age-related changes, pharmacological and non-pharmacological management of FTDs including diet and role of hormones. Also, the nursing role at the outpatient clinics.
  - **The second session:** included training about the use of valid tools to screen for the different manifestations that accompany the FTDs among geriatric patients namely training the nurses about screening for depression among geriatric patients using different tools such as patient health questionnaire-2 and geriatric depression scale short form, the use of Mini-Cog., Mini-Mental State Examination to screen for cognitive impairment among geriatric patients, and training on the use of the Fatigue Scale. As well as, the use of the Medication Adherence Rating Scale to screen Medication non-adherence among geriatric patients. Arabic version of all these tools (4) was provided to the participants who were encouraged to use them among their geriatric patients and report their experience in using these tools. The study subjects were allowed to choose and practice on the specific tool they found easy to adapt with where more than one tool was taught for one manifestation such as for depression and cognition.
  - **The third session:** This session included teaching nurses about skin and foot care, deep breathing exercises, and maintaining a safe environment for geriatric patients, precautionary measures against COVID-19 including wearing and removing gloves and masks correctly as geriatric patients especially those with functional thyroid disorders are more liable to be infected with COVID-19 and other communicable diseases.
9. The training program was carried out three times per week for five weeks during official working days, each session lasted for a maximum of 45 minutes.
10. The sessions were conducted during the morning and afternoon shifts.
11. Based on the learning content, audio-visual materials such as PowerPoint and videos were used during each session. Demonstration and re-demonstration of various practices, such as how to use valid tools in assessing geriatric patients' effects associated with FTDs, were also used as teaching methods.
12. In light of the learning content of each session, the researcher created an action plan calendar with goals. The action plan specified what, how much, when, and how many days per week the study subject would carry out the required practices. The action plan was given to the subjects at the end of the first session, and the researcher stressed the importance of using it while practicing what they had learned and providing feedback.
13. Along with all sessions, the researcher together with the study subjects reviewed the action plan calendar to assess the study subject's commitment to the plan. In each following session, the researcher and the study subjects assessed the pre-set goals through goal tracking form giving the score for the study subject's achievement. This was found to be tedious for the subjects as they expressed

time constraints in the actual performance of the practices in day-to-day care.

14. At the beginning of the second and third sessions, the researcher revise the important points that have been discussed.
15. At the end of each session, the researcher summarized the key points presented and provided participants with time to ask and answer questions. Study subjects were also expected to answer questions regarding the concluded session.
16. At the end of each session, brochures were given which had important points for that session,
17. The researcher created an illustrated educational booklet guide titled "**Nursing Interventions for Geriatric Patients with FTDs**," in the Arabic language which was distributed to all the participants of the study (control and study groups) at the end of data collection.
18. Data collection commenced on 20<sup>th</sup> March 2022 and ended on June 21<sup>st</sup>, 2022.

### **III: Evaluation phase:**

The assessment of the nurses' competency for both groups; the study group and control group was done before the training interventions for the study group using tools one and two. Immediate post-test was done for both groups using tool two only after the implementation of the training interventions for the study group. Follow-up after intervention for the study group was done after four weeks post implementation of the intervention using tool two.

### **Ethical considerations: -**

After explaining the purpose of the study, informed written consent was obtained from each study subject included in this study. The participants were informed that their participation in the study was voluntary and that they could refuse to participate or

withdraw from the study at any time. The study participants' privacy, along with the confidentiality of the collected data, were ensured.

### **Statistical analysis of the data:**

Cronbach's alpha correlation coefficient was utilized to measure the study's tools for internal reliability. Data were coded by the researcher and statistically analyzed via IBM SPSS software package version 25.0. Frequency and descriptive analysis were done to visualize and describe the data. The mean, standard deviation, range, frequency, and percentages were used to describe the quantitative data. The number and percent were utilized to describe the qualitative data. Test for normal distribution of data was done using histogram, Q-Q plot, and scatterplot. Comparison between two groups means and more than two groups was done using t-tests. The chi-square test ( $\chi^2$ ) was used to test whether the two groups were similar based on their socio-demographic and work-related characteristics.

### **Results**

**Table 1** shows that the age of the study and control group ranged from >20 to <60 years, with a mean of  $49.9 \pm 6.87$  and  $45.5 \pm 10.91$  respectively. 57% of the study group and 37% of the control group reported having work experience of 25 years to less than 35 years. Only 23.3 % of the study group compared to 33.3% of the control group had attended previous training in relation to older adults. Among those who attended the training, 57% of the study group and 60.0% of the control group had done so in the previous 6 months.

**Table 2** shows that the percentage of competent nurses in the study group increased significantly from novice (<60%,  $61 \pm 19.514$ ) during pre-intervention to competent (76%,  $94 \pm 19.348$ ) immediately post-intervention and remained significantly higher at competent level during follow-up period compared to the percentage of

competence for nurses in the control group which remained lower (<65%) prior to and after the interventions. Furthermore, the total mean scores of the nurses in the study group were higher immediately after program implementation than before it ( $61 \pm 19.514$  to  $94 \pm 19.348$ ),  $P < 0.001$ . However, there was a decrease during follow-up phase when compared to immediately following program implementation ( $90 \pm 17.57$ ),  $P < 0.348$ .

**Discussion**

FTDs are more common in older adults than in younger populations. Geriatric patients with thyroid diseases must take long-term anti-thyroid drugs and go to the outpatient clinic for regular check-ups. Therefore, nurses should be competent in providing care for geriatric patients with FTDs.

Regarding the studied nurses' competency levels on geriatric FTDs, the present study revealed a higher statistically significant improvement in the study group compared to the control group. Additionally, current results revealed that the mean competency level remained higher during follow-up compared to pretest. This improvement could be attributed to nurses' exposure to the FTDs competency program, in which also they were provided with an Arabic educational booklet and encouraged to practice what they learned using goal tracking and action plan. This is in consistence with El-Hay et al., (2018; and Zidan et al., (2018.) who reported a highly statistically significant increase in nurses' knowledge following the implementation of a designed education training program on clinical outcomes for stroke patients. Moreover, Naga et al., (2021) demonstrated the effectiveness of the competency-based

programme on nursing staff's knowledge on stroke.

Decline in the mean scores which was observed during follow-up compared to immediate posttest for the study group may be attributed to decline in exposure to the training intervention over time. This calls for periodic and continuous in-service education and motivation on geriatric FTDs competency. This finding is similar to Abd-Alla et al., (2016.) who reported in their study on the effect of educational program on nurses' performance caring for patients, that there was a significant decrease in knowledge levels among the studied nurses after two months post implementation of educational program. Furthermore, Naga et al., (2021) in their study on the effect of competency-based program on nurses' knowledge, attitude and skill reported that nurses' levels of skills and knowledge decreased during follow-up compared to immediately after the intervention.

**Conclusion:**

According to the findings of this study, implementing a geriatric FTDs training program resulted in a statistically significant improvement in nurses' competency among the study subjects when compared to those in the control group. As a result, these findings support the study hypothesis. Due to scarcity of geriatric FTDs competency in the literature, this study provides and attempt to address this issue and is a basis for further similar studies.

**Recommendations:**

In line with the study findings, it is recommended that in-service FTDs training programs be offered regularly for the nursing staff working at the outpatient clinic.

**Table (1): Distribution of studied nurses according to their socio-demographic and work-related characteristics.**

		<b>Percentage (%)</b>	
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Socio-demographic and work-related characteristics.		Study (N=30)	Control (N=30)	Study	Control	Significance (p)
Age (years)	20-	1	4	3.3	13.3	X <sup>2</sup> =5.075 P<0.181
	30-	5	3	16.7	10	
	40-	12	12	40	40	
	50-60	12	11	40	36.7	
<b>Mean ± SD</b>		<b>49.9±6.87</b>	<b>45.5±10.91</b>			
Marital status	Married	28	24	93.3	80	X <sup>2</sup> =3.308 P<0.729
	Single	0	2	0	6.7	
	Divorce	1	1	3.3	3.3	
	Widow	1	3	3.3	10	
Level of education	Technical specialist	29	29	96.6	96.6	X <sup>2</sup> =2.005 P<0.729
		1	1	3.3	3.3	
Years of work experience	<5	2	4	6.66	13.3	X <sup>2</sup> =5.069 P<0.296
	5-	3	4	10	13.3	
	15-	6	10	20	33.3	
	25-	17	11	56.66	36.7	
	35-45	2	1	6.66	3.3	
Attended previous training about older adults	Yes	7	10	23.3	33.3	X <sup>2</sup> =0.894 P<0.344
	No	23	20	76.7	66.7	
How long since the last geriatric training		<b>N= 7</b>	<b>N= 10</b>			
	<6months	4	6	57.1	60	X <sup>2</sup> =7.416 P<0.101
	>6months	3	4	42.9	40	
Cared for older adults	Yes	2	4	6.7	13.3	X <sup>2</sup> =8.20 P<0.424
	No	28	26	93.3	86.7	
A preferred group of care	Children	8	8	26.7	26.7	X <sup>2</sup> =7.393 P<0.56
	Adults	5	2	16.6	6.7	
	Older adult	11	5	36.7	16.6	
	Any group	6	15	20	50	

Significance p<0.05 Monte Carlo significance (2-sided), X<sup>2</sup>=chi square

**Table (2): Frequency Distribution of the Studied Nurses according to their Overall competency Levels regarding FTDs during the Pre, Post, and Follow-up Phases (n=60)**

Nurses 'competency Levels	Pre-test				Immediate Post-test				Follow-up (study) N=30	
	Control N=30		Study N=30		Control N=30		Study N=30			
	No.	%	No.	%	No.	%	No.	%	No.	%
Expert (excellent) $\geq 90\%$	1	3.3	1	3.3	2	6.7	6	20	1	3.3
Proficient (very good) 80-89%	0	0	0	0	2	6.7	9	30	10	33.3
Competent (good) 70-79%	9	30	8	26.6	12	40	14	46.6	15	50
Advanced beginner (fair) 60-69%	9	30	4	13.3	12	40	1	3.3	4	13.3
Novice (fail) $<60\%$	11	36.7	17	56.6	2	6.7	0	0	0	0
<b>Sig. betw. periods</b>	pre and post: $p < 0.001$ , pre and follow: $p < 0.001$ , post and follow: $p < 0.338$									
<b>Mean<math>\pm</math>SD</b>	62 $\pm$ 19.66294		61 $\pm$ 19.51433		81 $\pm$ 23.14495		94 $\pm$ 19.348		90 $\pm$ 17.5772	
Total score=0-123										
<b>P<sup>1</sup>:t=0.428, p&lt;0.670, P<sup>2</sup>:t=1.731, p&lt;0.04, P<sup>3</sup>:t=8.815, p&lt;0.001,</b>										
<b>Min-Max score</b>	<b>Control group:</b> Pretest:30-112 Posttest: 38-113				<b>Study group:</b> Pretest: 30-108 Posttest: 40-117				<b>Follow-up</b> 47-117	

- P<sup>1</sup>=Pre-test (study and control)
- P<sup>2</sup>=Immediate Posttest (study and control)
- P<sup>3</sup>=Pre-test and immediate post-test (control and study)
- \* **Significance  $p < 0.05$**

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