

Effect of Educational Guidelines regarding Stretching Exercise on Postoperative Neck Pressure Symptoms, pain, and Quality of Life post Thyroid Surgery

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Abstract

Background: After a variety of surgical procedures, including thoracotomy, mastectomy, and orthopaedic surgery, stretching exercises help with muscle pain reduction, enhance range of motion, flexibility, functioning, and neuromuscular coordination.. **Aim:** To investigate the effect of educational guidelines regarding stretching exercise on postoperative neck pressure symptoms, pain, and quality of life post thyroid surgery. **Subjects and method: Design:** A quasi-experimental research design was used to achieve the aim of this study. **Setting:** The study was conducted in the surgical department at Mansoura University Hospital. **Subjects:** A purposive sample of 60 adult patients admitted to the above-mentioned setting and undergoing thyroidectomy. **Three Tools were used for data collection:** Tool I: Structured Interviewing Questionnaire, Tool II: The Goiter Symptom scale, Tool III: **Neck Pain Disability index Questionnaire**, and Tool IV: The generic QoL was measured by the validated EQ5D-5L questionnaire. **Results:** There were no significant statistical differences between them regarding total knowledge level during pre-operative period. However, it was significantly different disability post Educational guidelines implementation. In the study group experienced more improvements in the Goiter symptom and hyperthyroid symptom scale of the ThyPRO questionnaire than in the control. There was a highly statistically significant difference between the patients in the study and control groups about the level of pain & disability post Educational guidelines implementation. Also, a highly statistically significant difference and improvement among the patients in study group regarding QoL than control group post Educational guidelines implementation. **Conclusion:** Educational guidelines implementation regarding stretching exercise has positive effects on reducing postoperative neck pressure symptoms, pain, and improving quality of life post thyroid surgery. **Recommendation:** Neck stretching exercises should become an integral part of the care provided by nurses in their care and follow-up protocols post thyroidectomy. Replication of the study using a larger probability sample from different geographical areas to attain more generalizable results.

Keywords: Educational guidelines, Postoperative neck pressure symptoms, Pain, Quality of life post thyroid surgery, Stretching exercise

Introduction:

Over the last three decades, the number of thyroid surgeries has tripled; in the US, between 118,000 and 166,000 patients receive a thyroidectomy annually (D'Orazi et al., 2019). The surgical removal of the thyroid gland entirely or in part is known as a thyroidectomy. Three types of thyroid surgery are commonly performed: subtotal thyroidectomy, which leaves bilateral thyroid remnants; total thyroidectomy, which aims to remove all thyroid tissue macroscopic; and thyroid lobectomy, which removes half of the thyroid gland containing the nodule. Despite being

uncommon, problems from complete thyroidectomies do occur (Abualeish et al., 2020).

Thyrotoxicosis, cervical hematomas, haemorrhage, injury to the recurrent or superior laryngeal nerve, hypothyroidism, damage to or unintentional removal of parathyroid glands causing hypoparathyroidism and hypocalcemia, and wound infection are among the potentially fatal conditions (Sulaiman & Al-Saigh, 2020). In addition, because of the fixed position of the neck during and after thyroidectomy surgery, the patients experience postoperative occipital

headaches, neck pain and discomfort, issues with neck and shoulder movement, shoulder stiffness, and limited range of motion in the cervical spine. The aforementioned complaints have the potential to persist long after surgery and have a detrimental impact on the patients' quality of life (**Abd-El Mohsen & Ahmed, 2018**).

According to **Sorensen et al. (2019)**, benevolent nodular goitre can cause a variety of symptoms, such as neck discomfort and difficulty swallowing. Three to six months following surgery, patients having thyroidectomies frequently report an increase in their quality of life. Nevertheless, many patients experience neck and shoulder pain, constriction and pressure sensations, a restricted laryngeal mobility, and choking sensations in the early stages following surgery. **Perigli et al. (2021)** suggest that these characteristics may be the result of skin injuries, damage to the extra-laryngeal muscles or nerves, or a psychological response to neck surgery.

Furthermore, recurrent laryngeal nerve palsy, surgical edoema, damage to the anterior strap muscles, affection of the external branch of the superior laryngeal nerve, injury to the vocal folds from intubation, and altered voice function may also result in swallowing impairment (**Ryu et al., 2020**). Though transient in nature, these symptoms have the potential to lower quality of life in general and in relation to specific diseases. After a variety of surgical procedures, including thoracotomy, mastectomy, and orthopaedic surgery, stretching exercises help with muscle pain reduction, enhance range of motion, flexibility, functioning, and neuromuscular coordination. Patients who benefit from these kinds of procedures are frequently provided with physiotherapeutic care. Additionally, speech-language pathologists treat voice dysfunction patients by teaching them neck stretching exercises (**Yu & Wu, 2021**).

Exercises for stretching the neck, including simple neck movements, are recognized to be the most straightforward and productive types of exercise. Stretching activities alleviate pain and muscle weakness, increase flexibility and neuromuscular coordination, promote good posture, and improve physical activity. In addition to

assessing pain intensity and teaching patients about neck stretching exercises, nurses play a crucial role in educating patients about the warning signs and symptoms of potential complications following a total thyroidectomy. This is especially important for patients who are able to move their head, neck, and shoulders freely and who are in less pain. In addition to verbal and written instructions regarding the procedure and neck stretches, patients should also receive postoperative instructions regarding medication, wound care, diet, activities of daily living, and follow-up (**Jang et al., 2020**).

The nurses' main objectives are to reduce neck edoema and pain. In order to be monitored during the post-operative phase, patients should be informed about neck pain treatment prior to surgery, as well as, if applicable, their families. Patients should be told that their distress stems from the surgical incision produced during a thyroidectomy (**Hashem et al., 2018**). Stretching exercises are simple and easy to perform; they can be started the day following thyroid surgery and help reduce the symptoms of postoperative neck stiffness. In addition to reducing the requirement for analgesics (**Miyauchi et al., 2021**).

Nurses should convince patients that the surgical wound will not be harmed because stiffness is one of the reasons for postoperative neck discomfort and most patients are scared to move their necks and shoulders after neck surgery. The following is the sequence in which the nurse should give the patients' instructions for performing the exercises: turn the shoulders back and forth, look down, move the face to the right, move the face to the left, incline the head to the right, incline the head to the left and finally, slowly raise and lower the hands (**Perigli et al., 2021**).

For a duration of one month, the participants were required to perform three sets of every stretching exercise (morning, lunch, and evening) with a 15-second rest at the end of the range before returning to the neutral position. Nurses working in the general surgery department are required to use the validated neck pain and disability evaluation in patient monitoring and to include stretching neck exercises in the care and follow-up protocols of patients who have undergone a total thyroidectomy (**Iliff et al., 2022**). A nurse should also advise patients to move and stretch

their neck and shoulders slowly and thoroughly, as these exercises can help reduce discomfort and muscular weakness and increase the patients' range of motion and flexibility (Hameed, 2018).

Significance of the study:

From 2014 to 2016, there were discrepancies in the incidence of several thyroid diseases reported in the Arab globe. For example, the prevalence of goitre reported by multiple studies conducted in Egypt ranged from 6.18 to 47.34% (Mohamed, 2019). Patients commonly report discomfort symptoms in their neck, including shoulder stiffness, tension and pain in the neck, neck pain, and problems moving their neck and shoulders. Additionally, patients in the current study were observed to walk robotically and without moving their necks during the early postoperative period, probably to protect their incisions and avoid aggravating their neck pain, as was similarly reported by (Soni, et al. 2019). So, the present study will be conducted to evaluate the effect of Educational Guidelines regarding Stretching Exercise on Postoperative Neck Pressure Symptoms post Thyroid Surgery

Aim of the study:

To investigate the effect of educational guidelines regarding stretching exercise on postoperative neck pressure symptoms, pain, and quality of life post thyroid surgery

Research hypothesis:

- The study group post Thyroid Surgery will exhibit lower Postoperative Neck Pressure Symptoms after implementing the Educational Guidelines regarding Stretching Exercise than control group.

- The study group post Thyroid Surgery will exhibit lower Postoperative Neck pain after implementing the Educational Guidelines regarding Stretching Exercise than control group.

- The study group post Thyroid Surgery will exhibit better Quality of Life after implementing the Educational Guidelines regarding Stretching Exercise than control group.

Subjects and Methods:

Research design:

A quasi-experimental design was used.

Setting:

The study was conducted in the surgical department at Mansoura University Hospital.

Sample:

A purposive sample of 60 adult patients admitted to the above-mentioned setting and undergoing thyroidectomy.

Sample size calculation:

The sample size was estimated using the EPI info tool with the following parameters: - Population size = 70/3 months. Anticipated frequency: 50% Allowable mistake is 5%. - 95% confidence coefficient - 60 patients is the minimum sample size. -

Patients who fulfilled the following requirements were deemed qualified to take part in the study: 1. Age range for both sexes ranging from 18 to 60 years old. 2. Capable of following directions and participating in verbal communication. 3. Scheduled for either a complete or partial thyroidectomy. 4. Devoid of any rheumatoid and orthopedic neck issues The following is the equal and sequential recruitment of participants into the study and control groups: •The study group received instruction in neck-stretching exercises.in addition to the standard hospital care. The control group got the standard hospital care.

Tools for data collection

Tools of the study: To fulfill the aim of the study, three tools were used for data collection.

Tool I: Structured Interviewing Questionnaire that included two parts: It was developed by the researcher in simple Arabic language based on the extensive review of relevant and recent literatures, and it was consisted of two parts as follows:

Part I: Patients 'demographic data:

This section contains details about the general characteristics of the study participants, including age, gender, education level, place of residence, and occupation.

Part II: Patients' Clinical data: This included: a family history of thyroid gland disorders. chronic illness presence, prior hospitalization, and thyroidectomy causes

Part III: -Patient's knowledge regarding thyroid gland, thyroidectomy, and neck stretching exercises: It was modified from Lewis et al. (2016) and Ignatavicius & Workman (2015), and it consisted of seventeen questions divided into two sections: A) Concluding Knowledge regarding Hypothyroidism (9 questions). B. Understanding of the exercises for stretching the neck and how they ended (8 questions). System of scoring: All knowledge factors were weighted in accordance with the items included in each multiple-choice question; a "yes" response received a score of 1, while a "no" or "don't know" response received a score of 0. As to the statistics report, the distribution was as follows: 60% and higher were deemed satisfactory, and less than 60% were deemed unsatisfactory.

Tool II: The Goiter Symptom scale of the thoroughly validated disease-specific Thyroid-Related Patient-Reported Outcome (ThyPRO) questionnaire, It is presently advised for assessing and diagnosing thyroid illness in patients utilized to evaluate head pain. The ThyPRO 39 short form, which of 39 statements, was used to measure neck problems. Eleven measures make up the ThyPRO questionnaire: Hyperthyroid Symptoms, Eye Symptoms, Goiter Symptoms, Tiredness, Cognitive Complaints, Anxiety, Depressivity, Emotional Susceptibility, Impaired Social Life, Impaired Daily Life, and Appearance. A Likert scale was used to score each comment, with 0 representing no symptoms and 4 representing severe symptoms. The ThyPRO Goiter Symptom Scale comprises three questions that are pertinent for both preoperative and postoperative symptoms from goiter and thyroid surgery: "discomfort swallowing," "pressure in the throat," and "sense of fullness in the neck."

Tool III: Neck Pain Disability index Questionnaire "NDI": (post-test) : It was adopted from Abd-El Mohsen & Ahmed, (2018). Its purpose was to give information about how neck pain following surgery has impacted one's capacity to go about daily life. Ten components made up the list: the intensity of the discomfort, personal care lifting, reading, headaches, work, driving, sleeping, and leisure.

During the first week following surgery, it was evaluated.

Scoring system of neck pain and disability index questionnaire:

The NDI consisted of 10 items, each worth up to 5 points out of a total of 50. The lower the score; the less self-assessed disability. The Neck Pain and Disability Index Questionnaire was graded according to the following categories: No Disability (0–4), Mild Disability (5–14), Moderate Disability (15–24), Severe Disability (25–34), and Complete Disability equal to or greater than 35.

Tool IV: The generic QoL was measured by the validated EQ5D-5L questionnaire. It includes five health dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, with levels ranging from 1 to 5 (1 denoting "no problems" and 5 denoting "unable to/extreme problems"). The VAS score for overall health status ranges from 0 to 100. In 2019, the Foundation ER One way to assess QoL between different conditions is to include a general QoL questionnaire (Stolk et al., 2019).

Methods:

Validity of the tools:

Face and content validity of the tools for clarity, comprehensiveness, appropriateness, and relevance by a board of five experts professors, three professors in medical-surgical nursing with more than ten years of experience in the fields were assessed; the board ascertained the face and content validity of the tools. The content validity index (CVI) was 89% for the tool

Reliability of the tools:

Reliability was assessed through Cronbach's alpha reliability test $\alpha = 89\%$ which revealed that the first tool, consisted of relatively homogenous items as indicated by high reliability, $\alpha = 87\%$ which revealed the reliability of the second tool, reliability of the third tool was $\alpha = 914$, and reliability of the fourth tool was $\alpha = 914$. The tools' reliability was estimated by using the Pearson correlation coefficient test to compare variables. The Pearson correlation coefficient for the variables ranged between (P. < 0.5) and (P. < 0.001),

which indicated a highly significant positive correlation between the variables of the subjects.

A pilot study

To assess the clarity and feasibility of the data collection tools, a pilot study was conducted on 10% (6 patients) of the total sample. To produce the final form of the tools and modifications was made.

Ethical considerations:

Before beginning the study, the researchers were met with the directors of the selected setting to explain the study's aim and gain their cooperation. Ethical approval by the institutional review board of the Faculty of Nursing, Mansoura University was obtained. To gain the cooperation of patients, informal consent was gained. Both the study's objective and its anticipated results were stated. The patients were informed of the study's objectives. The study's chosen participants was advised that their participation was completely voluntary and that they might leave the study at any moment, for any reason. Additionally, they were informed that their data would be protected and was utilized for research purposes.

Procedures:

Before starting this study, formal administrative approval was taken from the setting. Official permission was obtained from the managers of the previously selected settings. They was met the patients individually and was explained the aim of the study after introducing herself to the participants. Approximately, 30-40 minutes was taken to complete interview tools using face-to-face interviews.

The actual study was divided into three phases:

Phase I: Preparatory phase:

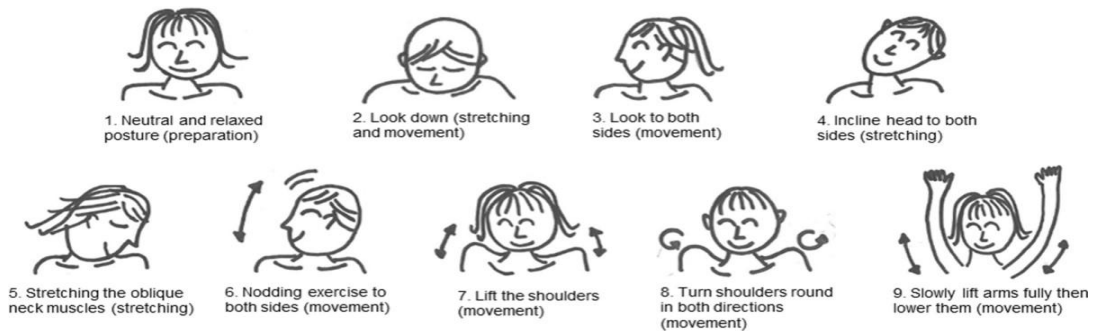
Once the research directors were made aware of the investigation's objectives, formal approval was obtained for data collection. Everyone who took part in the study and was patients granted consent. A survey of the literature on the various aspects of the concerns from the past and the present, both locally and globally, was conducted using books, essays, periodicals, and magazines. Guidelines were prepared in the Arabic language. It was took about two months to develop the study tools from **the beginning of March 2021 to the end of April 2021,**

1. Phase II: Implementation phase:

The actual fieldwork was carried out starting from **the beginning of May 2021 to the end of July 2021 for three months.** The researcher introduces herself to start a conversation and goes over the goals of the study during the first interview.

Hospital records were used to gather the individuals' baseline demographic and health data. ThyPRO39, a shortened version of the ThyPRO with 39 statements, was used to quantify neck complaints.

Under the guidance of a skilled physical trainer, patients in the intervention group began their rehabilitation exercises the morning following surgery. Nine stretching and mobility exercises were carried out, with an emphasis on the muscles surrounding the shoulders and the anterior and posterior neck musculature. It was not advisable to stretch against the direction of the incision. The patient was instructed to complete the exercises three times a day for a total of four weeks during one 10- to 15-minute rehabilitation session. Other than written materials and a film showcasing the rehabilitation program, no other guidance was provided. No information about training exercises was given by nurses or surgeons to the control group.



The main results were quality of life and neck symptoms as measured by the Goiter Symptom scale of the fully validated disease-specific Thyroid-Related Patient-Reported Outcome (ThyPRO) questionnaire. Patients with thyroid illness are currently advised to use this questionnaire for evaluation. Subjective voice dysfunction, pain in the neck and shoulders, and quality of life as measured by the standard EuroQol-5-Domain (EQ-5D-5L) QoL questionnaire were the secondary outcomes. Before surgery, one, four, and three months after surgery, data were collected. Hospital records were used to gather the individuals' baseline demographic and health data. The disease-specific quality of life was assessed using the ThyPRO short form, which was labeled ThyPRO and contained statements. With the use of the Neck Pain and Disability Index questionnaire, discomfort and pain were assessed. The validated EQ5D-5L questionnaire was used to measure the generic quality of life.

Phase III: Evaluation phase:

The physical trainer conducted telephone follow-up consultations with all participants one week, four weeks, and two months post-surgery. During these consultations, general well-being questions were asked. The call also addressed exercise compliance for the intervention group.

Administrative Design:

An official letter from the dean of the faculty of nursing was sent to the director of the selected area of the study. The director of each clinic was contacted and informed to obtain permission to include the nurses and the women in the present research.

Statistical analysis

Various properties were described using descriptive statistics, such as frequency, distribution, mean, and standard deviation. - To assess the significance of quantitative variable results and compare the means of the study and control groups on the same continuous dependent variable, univariate analyses, such as the t-test and paired t-test, were employed. It was applied to evaluate the relevance of abnormally distributed quantitative variable data. - The significance of the results of the qualitative variables was tested using the Fisher's exact test, the Monte Carlo test, and the Chi-Square test. - For this investigation, a p value of equal to or less than 0.05 was chosen as the significant threshold.

Results:

Table (1) shows that there was no significant difference between patients in the study and control groups regarding demographic data ($P > 0.05$). Regarding patients' age, the results revealed that the highest percentage of patients in both study and control groups (36.7% and 50%, respectively) were between 20<30 years of age. The mean ages for the study and control groups were 39.45 ± 7.33 and 40.22 ± 7.34 years, respectively. In relation to patients' gender of patients in both study and control groups (80%, 73.3%, respectively) were females, while more than two-thirds of patients in both study and control groups (70%, 63.3%, respectively) were females. In relation to the educational level, the highest percentage of patients in both study and control groups (46.7% and 33.33%, respectively) had basic education. As regards occupation, the highest percentages of patients in both the study and control groups (80% and 83.3%, respectively) were not working. In relation to the area of

residence, the highest percentages of patients in the study and control groups (66.7% and 70%, respectively) were from urban areas.

Table (2) shows that there was no significant difference between patients in the study and the control groups regarding their clinical data ($P > 0.05$). The results revealed that patients in the study group and the control groups (70% and 66.7%, respectively) were previously hospitalized. Additionally, the (33.3%) of patients in both the control and study groups had no a positive family history of hyperthyroidism and (63.3% and 50% respectively) had no other chronic diseases. Regarding **causes of total thyroidectomy**, (36.7% and 33.3 %, respectively) of patients in both the control and study groups done **total thyroidectomy** due to thyroid gland Cancer.

Figure (1): Showed that both studied (study and control) groups had unsatisfactory level of total knowledge at preoperative period, while the study group had higher satisfactory level of total knowledge at (1st week postoperative, 4th week postoperative and two months post- surgery) periods than the control group. Also, Showed that comparison between both studied (study and control) groups regarding their knowledge level during (Pre-surgery, 1st week postoperative, 4th week postoperative and two months post- surgery) periods and clarified that significantly improvement during (post-operative 1st week & 4th week), where the majority (90%) of study group had satisfactory level of total knowledge, while the minority (15% & 17%, respectively) of control group had satisfactory level of total knowledge.

Table (3) demonstrates that, in the pre/post -educational guidelines, there were highly statistically significant variations in the patients score knowledge regarding hypothyroidism and stretching exercise (P -value: 0.001).

Table (4): Revealed that there was highly statistically significant difference between both study and control groups regarding their neck disability level in 1st week postoperative period, in 4th week postoperative period, and two months post- surgery).

Table (5): Revealed that there was highly statistically significant difference between both studied groups regarding their neck pain level in 1st week postoperative period, while there were statistically significant differences between groups regarding their neck pain level in 4th week postoperative period

Table (6): Revealed that there was highly statistically significant difference, improvements, and reduction in all goiter symptoms between both studied groups regarding their ThyPRO scores in 1st week postoperative period, 4th week postoperative , and two months postoperative.

In all 13 ThyPRO scores, there was no statistically significant difference between the control and study groups at baseline. Two months after thyroidectomy, there was a significant reduction (i.e., improvement) in seven of the scales in both groups: Goiter-, Hyperthyroid- and Eye Symptoms, Anxiety, Hypothyroid Symptoms (control), Emotional Susceptibility (control), Tiredness (study), Cognitive Complaints (study), and Negative Influence on QoL. Four weeks following surgery, significant improvements were already evident in all of the aforementioned scales (**Tables 7 and 8**). At follow-up, there was no discernible change between the study group and the control group on any of the 13 ThyPRO scores. In terms of impact magnitude, both the control group and the study group experienced moderate to significant improvement on two scales (Hyperthyroid Symptoms and Goiter) two months following surgery (**Tables 7 and 8**). At one, four, and two months following surgery, no discernible changes were found in either item as compared to baseline.

Table (9) demonstrates that there were significant differences and improvement regarding Generic QoL scores between in study group and control group during (pre surgery, one week, and four weeks, and two months after surgery of educational guidelines.

Table (1): Demographic data distribution among patients in both study and control group

Demographic data	Study group(n=30)		Control group(n=30)		Test of significance	
	No.	%	No.	%	Test	P value
Age (in years)						
20 -	11	36.7	15	50.0	X ² :2.643	0.607(n.s)
30 -	10	33.3	6	20.0		
40 -	5	16.4	5	16.7		
50 – 60	4	13.3	4	6.7		
Mean ± SD	39.45±7.33		40.22±7.34			
Gender						
Male	6	20.0	8	26.7	X ² : 0.059	0.169
Female	24	80.0	22	73.3		
Level of education						
Illiterate	0	0.0	10	33.3	X ² ::0.539	0.427
Read and write	3	10.0	4	13.4		
Basic education	14	46.7	10	33.3		
Secondary education	6	20.0	0	0.0		
University education	7	23.3	6	20.0		
Occupation						
Not working	24	80.0	25	83.3	X ² ::6.032	0.319
Working	6	20.0	5	16.7		
Residence						
Urban	20	66.7	21	70.0	X ² : 0.878	0.123
Rural	10	33.3	9	30.0		

X²: Chi-square test

P: p-value of test of significance

Table (2): Patients' Clinical Data Distribution in both the Study and Control Groups

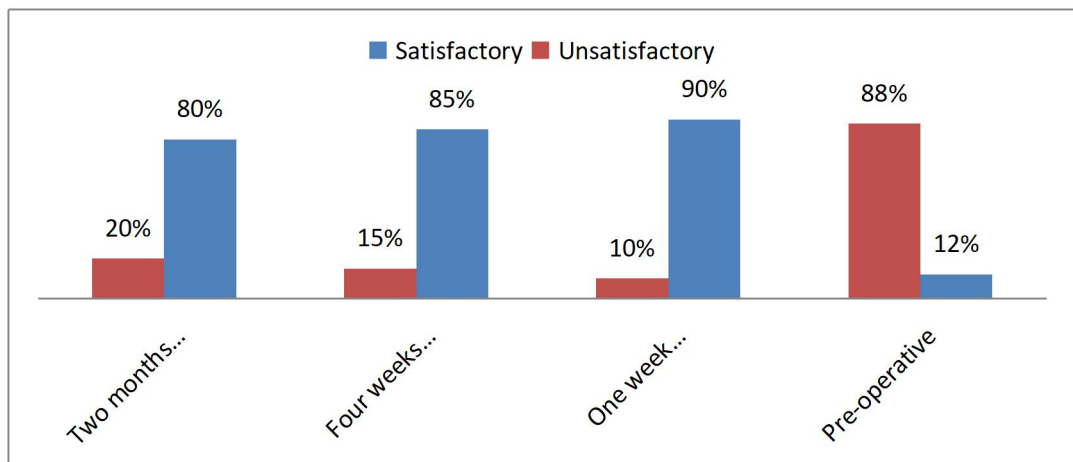
Clinical data	Study group(n=30)		Control group(n=30)		Test of significance	
	No.	%	No.	%	Test	P value
Family history of having thyroid gland diseases						
Yes	10	33.3	10	33.3	0.000	1.000 (n.s)
No	20	66.7	20	66.7		
Previous hospitalization						
Yes	21	70.0	20	66.7	X ² :1.007	0.128
No	9	30.0	10	33.3		
Presence of chronic diseases						
Yes	11	36.7	15	50.0	X ² 2.419	0.098
No	19	63.3	15	50.0		
Causes of total thyroidectomy						
Hyperthyroidism	5	16.7	6	20.0	0.148	0.989 (n.s)
Benign tumors of the thyroid gland	8	26.7	8	26.7		
Cancer of the thyroid gland	11	36.7	10	33.3		
Chronic goiter	3	10.0	3	10.0		
Nodular goiter	3	10.0	3	10.0		

P: p-value of test of significance

Table (3): Mean Scores differences in Knowledge regarding Hypothyroidism and stretching exercise among both study and control groups.

Items	Control group	Study group	t-test	P-value
Definition of Hypothyroidism				
one week	2.6 ± 0.8	4.8 ± 0.6	18.44	0.001**
four weeks	2.5 ± 0.6	4.9 ± 0.7		
two months after surgery	2.8 ± 0.7	5.7 ± 0.4		
Causes of Hypothyroidism				
one week	3.5 ± 2.3	9.4 ± 1.1	19.55	0.001**
four weeks	3.7 ± 2.4	9.6 ± 1.2		
two months after surgery	3.5 ± 2.3	9.3 ± 1.4		
Risk factors of Hypothyroidism				
one week	3.2 ± 1.9	6.8 ± 0.7	17.77	0.001**
four weeks	3.4 ± 1.7	7.1 ± 0.4		
two months after surgery	3.2 ± 1.9	6.9 ± 0.6		
Signs and symptoms of Hypothyroidism				
one week	2.3 ± 0.8	4.7 ± 0.3	16.22	0.001**
four weeks	2.7 ± 0.6	5.8 ± 0.4		
two months after surgery	3.1 ± 0.2	5.8 ± 0.2		
prevention of Hypothyroidism				
one week	3.2 ± 2.2	9.5 ± 1.2	19.33	0.001**
four weeks	3.6 ± 2.4	9.7 ± 1.4		
two months after surgery	3.3 ± 2.5	9.4 ± 1.3		
Treatment of Hypothyroidism				
one week	3.2 ± 1.7	6.7 ± 0.3	15.48	0.001**
four weeks	3.24 ± 1.27	6.6 ± 0.2		
two months after surgery	3.01 ± 1.5	6.4 ± 0.3		
First aid and measures that should be given to the child complications				
one week	2.7 ± 0.8	4.7 ± 0.7	16.99	0.001**
four weeks	3.9 ± 0.5	5.9 ± 0.8		
two months after surgery	3.7 ± 0.6	5.4 ± 0.5		
Total knowledge scores	8.7 ± 3.7	19.7 ± 1.5	23.55	0.001**

(**) highly statistical significance at $p < 0.001$



(**): Highly statistically significant at p -value < 0.001

Figure (1):- total knowledge levels of both study and control groups during (Pre-surgery, one week postoperative, 4th week postoperative, and two months post- surgery).

Table (4):- Comparison between both study and control groups regarding their neck disability level during (Post-surgery 1st week postoperative, 4th week postoperative, and two months post- surgery).

Neck disability level	Post-Operative one week		Post-Operative one weeks	
	Study group (n=30)		Control group (n=30)	
	No.	%	No.	%
No Pain and Disability	16	53.3	3	10.0
Mild Disability	8	26.7	3	10.0
Moderate Disability	6	20.0	14	46.7
Severe Disability	0	0.0	10	33.3
Complete Disability	0	0.0	0	0.0
P -value	24.367	<0.001**		
Post-Operative four weeks				
No Disability	8	26.7	4	13.3
Mild Disability	1	73.3	5	16.7
Moderate Disability	0	0.0	21	70.0
Severe Disability	0	0.0	0	0.0
Complete Disability	0	0.0	0	0.0
P -value	7.844	0.019*		
Post-Operative two months				
No Disability	29	96.7	21	70.0
Mild Disability	1	3.3	5	16.7
Moderate Disability	0	0.0	4	13.3
Severe Disability	0	0.0	0	0.0
Complete Disability	0	0.0	0	0.0
P -value	7.842	0.018*		

(**): Highly statistically significant at p-value <0.001, (*): statistically significant at p-value <0.05

Table (5):- Comparison between both study and control groups regarding their neck pain during (Post-surgery one week postoperative, four week postoperative, and two months post- surgery).

Neck pain level	Post-Operative one week			
	Study group(n=30)		Control(n=30)	
	No.	%	No.	%
No Pain	15	50.0	2	6.7
Mild Pain	10	33.3	3	10.0
Moderate Pain	5	16.7	14	46.7
Severe Pain	0	0.0	11	36.7
P -value	28.974		<0.001**	
Post-Operative four weeks				
No Pain	25	80.0	25	83.3
Mild Pain	5	20.0	5	16.7
Moderate Pain	0	0.0	0	0.0
Severe Pain	0	0.0	0	0.0
P -value		5.455		0.020*
Post-Operative two months				
No Pain	30	100.0	23	76.6
Mild Pain	0	0.0	7	23.4
Moderate Pain	0	0.0	0	0.0
Severe Pain	0	0.0	0	0.0
P -value	19.67		<0.001**	

(**): Highly statistically significant at p-value <0.001, (*): statistically significant at p-value <0.05

Table (6):- Comparison between both study and control groups regarding their Thyroid-Related Patient-Reported Outcome (ThyPRO) during (Post-surgery one week postoperative, four week postoperative, and two months post- surgery).

ThyPRO	Post-surgery one week	Four week postoperative	Two months post-surgery	p value
Goiter	2.2±1.3	0.4±0.7	0.3±0.6	<0.001
Hyperthyroid symptoms	2.3±1.3	0.2±0.5	0.1±0.4	<0.001
Eye symptoms	2.3±1.1	0.6±0.8	0.5±0.7	<0.001
Hypothyroid symptoms	1.0±1.3	0.3±0.8	0.2±0.7	<0.001
Tiredness	0.8±1.2	0.2±0.5	0.2±0.4	<0.001
Cognitive complaints	2.3±1.3	0.7±0.9	0.6±0.8	<0.001
Anxiety	1.8±1.4	0.7±0.8	0.5±0.6	<0.001
Depressivity	1.8±1.2	0.3±0.6	0.2±0.5	<0.001
Emotional Susceptibility	1.2±1.2	0.2±0.5	0.2±0.3	<0.001
Impaired social Life	0.8±1.2	0.1±0.4	0.1±0.3	<0.001
Impaired daily Life	1.0±1.3	0.5±0.8	0.4±0.7	0.003
Appearance	1.8±1.4	0.7±0.8	0.6±0.6	<0.001

Table (7): Correlation between ThyPRO and QoL scores between in control group during (pre surgery, one week, and four weeks, and two months after surgery)

ThyPRO items in control group	Baseline median (range)	one week median (range) p-value ^a	4 weeks median (range) p-value ^a	2 months median (range) p-value ^a	Effect size ^b
Goitersymptoms	42 (0–100)	33 (0–100) 0.92	21 (0–75) 0.00*	17 (0–75) 0.00*	1.10
Hyperthyroid symptoms	19 (0–75)	6 (0–69) 0.00*	6 (0–63) 0.00*	6 (0–75) 0.00*	0.73
Eye symptoms	8 (0–100)	0 (0–92) 0.00*	0 (0–67) 0.00*	8 (0–75) 0.00*	0.32
Hypothyroid symptoms	13 (0–88)	6 (0–69) 0.00*	6 (0–75) 0.004	6 (0–81) 0.003*	0.24
Tiredness	33 (0–75)	42 (0–67) 0.10	33 (8–83) 0.12	33 (8–58) 0.25	0.15
Cognitive complaints	8 (0–83)	17 (0–75) 0.544	8 (0–67) 0.006	8 (0–75) 0.05	0.19
Anxiety	17 (0–75)	8 (0–58) 0.00*	0 (0–50) 0.00*	8 (0–67) 0.00*	0.47
Depressivity	25 (0–67)	25 (0–50) 0.01	25 (0–50) 0.02	25 (0–67) 0.72	– 0.05
Emotional Susceptibility	33 (0–67)	33 (8–75) 0.002*	33 (0–67) 0.00*	33 (17–58) 0.001*	0.44
Impaired social Life	0 (0–50)	0 (0–42) 0.67	0 (0–25) 0.02	0 (0–42) 0.52	0.08
Impaired daily Life	0 (0–58)	17 (0–75) 0.006	8 (0–42) 0.76	0 (0–75) 0.65	0.07
Appearance	8 (0–50)	17 (0–83) 0.003*	8 (0–42) 0.76	8 (0–50) 0.42	0.13
Negative influence on QoL	25 (0–100)	25 (0–100) 0.44	0 (0–75) 0.001*	0 (0–75) 0.00*	0.46

Table (8): Correlation between ThyPRO and QoL scores between in study group during (pre surgery, one week, and four weeks, and two months after surgery)

Study group	Baseline median (range)	1 week median (range) <i>p</i> -value ^a	4 weeks median (range) <i>p</i> -value ^a	2 months median (range) <i>p</i> -value ^a	Effect size ^b
Goiter symptoms	42 (0–100)	33 (0–92) 0.39	17 (0–100) 0.00*	8 (0–75) 0.00*	1.02
Hyperthyroid Symptoms	19 (0–69)	13 (0–56) 0.00*	6 (0–31) 0.00*	6 (0–50) 0.00*	0.59
Eye symptoms	17 (0–100)	8 (0–58) 0.00*	8 (0–83) 0.00*	8 (0–67) 0.001*	0.33
ypothyroid symptoms	13 (0–100)	13 (0–63) 0.007	6 (0–56) 0.00*	9 (0–75) 0.03	0.21
Tiredness	38 (0–75)	33 (8–67) 0.04	33 (17–67) 0.00*	33 (17–75) 0.001*	0.39
Cognitive Complaints	17 (0–100)	8 (0–83) 0.002*	0 (0–75) 0.00*	4 (0–83) 0.00*	0.32
Anxiety	17 (0–75)	8 (0–75) 0.02	4 (0–75) 0.008	8 (0–67) 0.001*	0.33
Depressivity	25 (0–67)	25 (0–50) 0.002*	25 (0–67) 0.21	25 (0–58) 0.027	0.27
Emotional susceptibility	33 (0–67)	33 (8–75) 0.00*	25 (0–58) 0.04	25 (8–58) 0.07	0.24
Impaired social Life	0 (0–50)	0 (0–42) 0.83	0 (0–42) 0.19	0 (0–58) 0.04	0.25
Impaired daily Life	13 (0–92)	17 (0–75) 0.60	8 (0–75) 0.08	8 (0–75) 0.02	0.28
Appearance	8 (0–92)	17 (0–83) 0.67	8 (0–92) 0.15	8 (0–100) 0.01	0.36
Negative influence on QoL	25 (0–100)	25 (0–100) 0.06	13 (0–100) 0.00*	0 (0–100) 0.00*	0.48

Table (9): Generic QoL scores between in study group during (pre surgery, one week, and four weeks, and two months after surgery)

	Mobility (%)	Self-care (%)	Usual activities (%)	Pain/discomfort (%)	Anxiety/depression (%)
No problem					
one week	13(43.3)	16 (53.3)	14(46.6)	12 (40.0)	10 (33.3)
four weeks	14(46.6)	18 (60.0)	15 (50.0)	10 (33.3)	9 (30.0)
two months after surgery	23 (76.6)	25 (83.3)	22 (73.3)	8 (26.6)	7 (23.3)
Some problem					
one week	15 (50.0)	11 (36.6)	16 (53.3)	9 (30.0)	9 (30.0)
four weeks	17(56.6)	13(43.3)	18 (60.0)	7 (23.3)	6 (20.0)
two months after surgery	18 (60.0)	23 (76.6)	25 (83.3)	5 (16.6)	5 (16.6)
Extreme problem					
one week	5 (16.6)	11 (36.6)	4 (13.3)	5 (16.6)	6 (20.0)
four weeks	6 (20.0)	12 (40.0)	3(10.0)	4 (13.3)	3(10.0)
two months after surgery	7 (23.3)	13(43.3)	2(6.6)	3(10.0)	2(6.6)
P -value	0.517*	0.424*	0.464*	0.566*	0.528*

Discussion:

Thyroid gland diseases are extremely important since they present a challenge for surgical or medicinal treatment. When treating thyroid disorders, a total thyroidectomy is thought to be the standard surgical treatment. According to Padur et al. (2016), goiter, hypothyroidism, hyperthyroidism, thyroiditis, and neoplasms are the main disorders of the thyroid gland. One of the most popular surgical procedures is a thyroidectomy, which is used to treat a variety of thyroid disorders, including ambiguous thyroid nodules, symptomatic goiter, hyperthyroidism, and thyroid cancer (Nakamura et al., 2019).

Surgery indication, surgical scope, and surgeon competence and experience all have a significant impact on the rate of complications. Though reported complications from thyroid surgery are uncommon, when they do occur, the repercussions can sometimes be fatal in comparison to other common surgical procedures (Memon et al., 2020). The anatomical location of the thyroid gland influences neck stiffness following thyroidectomy. The daily activities of the patients may therefore be impacted by this. Therefore, the purpose of this study was to

ascertain how educational guidelines about stretching exercise affected the neck pressure symptoms, discomfort, and overall quality of life following thyroid surgery following surgery.

Concerning the age distribution of the two groups under investigation, Abo Shehata et al., (2020) study, "Effect of neck range of motion exercises on neck disability and pain among patients undergoing thyroidectomy," supported these findings by demonstrating that there were no statistically significant differences between the two groups, indicating that both groups were homogeneous with regard to their characteristics. The study's mean age for the study and control groups was 39.45 ± 7.33 and 40.22 ± 7.34 years, respectively, and nearly three quarters of the participants were female, these findings were supported by Abo Shehata et al., (2020) whose study entitled "Effect of neck range of motion exercises on neck disability and pain among patients undergoing Thyroidectomy" showed that the mean age of their both studied groups was 39.82 ± 10.99 & 38.93 ± 10.88 and about two-thirds of studied subjects were female for study and control groups respectively.

In terms of occupation, housewives

made up the largest percentage of patients in both the research and control groups. Abd-El Mohsen and Ahmed (2018), who noted that more than half of the patients in both groups were housewives, corroborate this finding. These findings contradicted the claim made by Abo Shehata et al. (2020) that over half of the groups under study were employed.

More than two thirds of them lived in rural areas when it came to their places of abode. The results contradicted the study made by Abo Shehata et al. (2020) that over half of the examined groups lived in cities.

In terms of education, more than one-third of the patients in the study group and the control group, respectively, had just a basic education. This study did not include any data from Nickel et al., (2019), whose study "Health-Related Quality of Life after Diagnosis and Treatment of Differentiated Thyroid Cancer and Association with Type of Surgical Treatment" found that the majority of patients had completed post-secondary education. Furthermore, these findings were at odds with Temiz et al., (2016) "Determination of Patient Learning Needs after Thyroidectomy" study, which found that patients with a high school education level had higher mean scores.

The results of Hasham et al. (2018), who discovered that half of the patients in the control group and more than two-thirds of the research group were illiterate, are not comparable to these findings. The study sample's general knowledge is generally low, according to the researchers' perspective, which emphasizes the importance of this kind of teaching on the applicability of neck exercise after thyroidectomy.

The results of the current study were consistent with those of Abbas et al., (2019), whose study entitled "Challenges for huge goiter surgery" included three patients who had previously undergone surgery but twenty-four patients who had not. The intervention group comprised half of the group and the control group comprised more than three-fifths of the group without prior surgery.

In terms of clinical data, the current

investigation showed that the majority of patients in the study and control groups did not have any additional chronic diseases. Abd-El Mohsen and Ahmed (2018) discovered that around one-third of the patients in the study group had hypertension, and fewer than one-third had diabetes. According to Turkmen's (2020) study, "The Effect of Head-Neck Stretching Exercises after Thyroidectomy on Postoperative Pain Level and Wound Healing-Randomized Controlled Trial," two thirds of the two study groups had no chronic illness and nearly half had chronic diseases; however, this study disagreed, finding that the majority of the control group had hypertension and the majority of the experimental group had heart failure.

In a similar vein, the study by Attaallah et al. (2019), titled "Is hemithyroidectomy a reasonable course of treatment for benign nodular goitre? Four people had only had thyroid surgery performed in the past, but the majority of the patients in the study had no family history of the condition, according to "A Multicentre Retrospective Single Group Study."

Regarding to the reasons behind total thyroidectomies, thyroid cancer accounted for approximately one-third of thyroidectomies in both trial groups. This study aligned with that of Ayhan et al. (2019), whose research, "The Effectiveness of Neck Stretching Exercises Following Total Thyroidectomy on Reducing Neck Pain and Disability: A Randomized Controlled Trial," reported that the majority of the two groups under investigation had been diagnosed with papillary thyroid carcinoma, which led to a total thyroidectomy. This study was also consistent with that of Bhattacharyya and Fried (2019), whose study, "Assessment of the morbidity and complications of total thyroidectomy," reported that almost half of patients had thyroid cancer as their primary reason for surgery.

This finding validates the study hypothesis, which postulated that after applying the instructions, the study group would have a better degree of knowledge than the control group. According to the researchers, this demonstrates the beneficial outcomes of implementing the instructions. These results are consistent with a study by Hassan et al. (2019)

titled "Impact of a Designed Educational Program on Thyroidectomy Patients' Discharge Compliance Instructions," which found a statistically significant difference in discharged knowledge between the pre- and post-tests.

Regarding neck disability, the current study found that there was a highly statistically significant difference in neck disability levels in the first week following surgery, the fourth week following surgery, and two months following surgery between the study and control groups. According to the researchers, this demonstrates that the rules were successfully implemented. This may be because, following a thyroidectomy, neck disability naturally improves in around one month.

The study supported Abd-El Mohsen & Ahmed's (2018) findings, which indicated that following a week of instruction in neck stretching exercises, over half of the study group had no disability, roughly one-third complained of mild disability, only 13% complained of moderate disability, and none complained of severe or total disability. Additionally, after one week of exercise intervention, patients showed a reduction in neck pain and impairment, according to Bhavani's (2019) study, "Evaluating the Effects of Neck Exercise on Post Thyroidectomy Patients—A Pilot Study."

According to Abd-El Mohsen and Ahmed (2018), the study group experienced a significant reduction in neck pain and related disability one week after thyroidectomy, compared to the control group. This was confirmed by the study's findings regarding the Neck Pain and Disability Index questionnaire. Furthermore, Abd Elazeem, et al. (2020) discovered statistically significant differences in the study and control groups' overall discomfort score levels throughout the first, second, and third weeks.

The results of the current study showed that, in terms of neck pain level, there were statistically significant differences between the groups in the first week postoperative period, and in the fourth week postoperative period, there were highly significant differences between the two studied groups. This could be

because, following a thyroidectomy, neck pain usually goes away on its own in a month. The fact that neck pain following a thyroidectomy typically goes away on its own within a month may be connected to this. These results were consistent with those of Ayhan et al. (2019), who reported that after one week and one month, patients in the stretching exercise group reported much less pain and disability than those in the control group. Additionally, the study supported Abo Shehata et al. (2020) in demonstrating that, at one and four weeks following surgery for thyroidectomy, there was a statistically significant difference in neck pain and disability between the study and control groups.

Additionally, Turkmen (2020), who approved that there was a statistically significant difference between the mean scores of neck pain and disability in the experimental and control groups one week and one month following surgery, also agreed with the current study. Kim (2018) provides evidence for this outcome, observing that a home-based exercise regimen improves quality of life and boosts immune function in thyroid hormone replacement patients who have had thyroidectomies by lowering anxiety and fatigue.

According to the ThyPRO instrument, the study verified that thyroid surgery significantly enhances the quality of life particular to the thyroid. The improvement became apparent in the first two weeks following surgery and continued until the two-month mark, when it was last assessed. These results are consistent with previous QoL research (Mishra et al., 2019; Sorensen et al., 2020).

Stretching exercises have also been studied in the past using different outcome measures (Takamura et al., 2020; Ayhan et al., 2019; - Jang et al., 2020). After thyroid surgery, Takamura et al. (2020) observed less pain and discomfort in the neck after a year. Abdelmohsen et al. [2021] saw comparable outcomes in goiter patients as early as two weeks following surgery. On the other hand, Jang et al. [2020] discovered no evidence of a noteworthy impact from early neck stretching exercises following thyroid surgery. Takamura

et al. (2020) did not employ any validated instruments in any of their experiments. Ayhan et al. [2019] observed that patients who got neck stretching exercises one week postoperatively had a significantly lower "Neck Pain and Disability Score" compared to a control group. This was determined using a validated questionnaire called the Neck Pain and Disability Scale.

The results of the current study showed that, there were significant differences and improvement regarding Generic QoL scores between in study group and control group during (pre surgery, one week, and four weeks, and two months after surgery of educational guidelines. From the researchers' point of view, it reflected the success of educational guidelines regarding QoL of the studied patients post stretching exercises intervention.

Conclusion:

Based on the finding of the current study it can be concluded that implementing Educational guidelines implementation regarding stretching exercise has positive effects on reducing postoperative neck pressure symptoms, pain, and improving quality of life post thyroid surgery.

Recommendations:

The following recommendations were made in light of the study's findings:

- Neck stretching exercises should become an integral part of the care provided by nurses in their care and follow-up protocols post thyroidectomy.

- Improving the quality of care given to patients in the out-patient clinics through continuous follow up for patient's neck disability and pain using validated tools in monitoring patient's condition.

- A colored illustrated booklet that is updated periodically including all neck stretching exercises instructions should be available and distributed to all patients undergoing thyroidectomy.

- Replication of the study using a larger probability sample from different geographical areas to attain more generalizable results

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