- *Basic Research*

Effect Of Implementation of Head and Neck Stretching Exercises on Pain Level and Disability Post Thyroidectomy

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Abstract

Introduction: Thyroid diseases are one of the most common health problems all over the world. Thyroidectomy is a common surgical procedure resulting in significant neck pain and disability postoperatively. After thyroidectomy, patients often experience discomfort such as neck pain, shoulder stiffness, shoulder movement difficulty, choking, or a pressing sensation. Head-neck stretching exercises provide neuromuscular coordination and flexibility in patients by reducing pain and muscle weakness. **Aim: to** evaluate the effect of implementing head-neck stretching exercises after thyroidectomy on reducing the postoperative neck pain level and disability. **Design:** A quasi-experimental research design was utilized. **Setting:** This study was conducted at the head and neck surgery unit of the Alexandria Main University Hospital, Alexandria, Egypt. **Subjects:** The subjects comprised 60 patients undergoing thyroidectomy. They were divided into two groups at random and equally: a study group that received neck stretching exercise training in addition to routine hospital care and a control group that received routine hospital care. Three tools were used; Tool I: Patients' socio-demographic and clinical data structured interview schedule. Tool II: Neck pain assessment using the Indiana polyclinic combined pain scale (IPCPS). Tool III: Neck Disability Index Questionnaire (NDI). **Results:** There was a highly statistically significant difference between both groups regarding neck pain and disability one week and four weeks post thyroidectomy. **Conclusion:** Implementing head and neck stretching exercises illustrate a positive result and significant differences among both groups regarding the pain and disability mean scores. **Recommendations**: Neck stretching exercises should become an integral part of the care provided by nurses in their care and follow-up protocols post thyroidectomy.

Keywords: Implementation, Head-neck Stretching Exercises, Thyroidectomy, Pain level, and Disability, Post Thyroidectomy.

Introduction

Thyroid disorders are among the most frequent endocrine problems worldwide. Thyroidectomy is the most common surgical procedure for benign and malignant thyroid disorders that cause compressive symptoms all over the world. Thyroidectomy is a surgical treatment that involves the removal of all or part of the thyroid gland [(1)]. In 2016, over 34,000 thyroid procedures were conducted in Italy, and the number of thyroid illnesses requiring total thyroidectomy is on the rise [(2)]. Every year, 118–166 thousand patients in the United States undergo thyroidectomy for benign or malignant thyroid cancer. In England, around 13thousand thyroid procedures are performed each year [(3)]. In Egypt, the percentage of patients admitted for thyroidectomy has been steadily increasing in comparison to general surgical patients [(4)]. In 2019, 250 people underwent thyroidectomy, according to data from statistical records from the head and neck surgical operating room of the Main Alexandria University Hospital. Thyroid cancer has risen in incidence over the last three decades, as has the prevalence of thyroidectomies and their attendant consequences [(5,6)].

Temporary or chronic calcium insufficiency, recurrent laryngeal nerve injury with voice alterations, hemorrhage, surgical site infection, and the necessity for lifelong thyroid hormone replacement are among the consequences [(7)]. Furthermore, postoperative bleeding with airway constriction is a common thyroidectomy consequence. The patient's quality of life can be affected by the occurrence of probable consequences, which can lead to an increase in health-care costs and the need for a lifelong alternative therapy [(8)]. Thyroid surgery can also result in considerable pain in the neck and shoulders, as well as limited ranges of motion. These restrictions may have an impact on daily tasks as well as social interaction [(4)]. To manage these potential post-operative problems, patients undergoing thyroidectomy typically require adequate and prompt professional nursing interventions [(9)]. Because the nurse is the primary health care provider and spends more time with patients and their families than other professionals, the nurse plays a critical role in the treatment of thyroidectomy patients. Nurses are in a unique position to conduct nursing interventions from the time a patient is admitted until the time he is discharged, and they have the best opportunity to assess potential problems or side effects, discuss medical regimens, and provide education about all aspects of care [(10)].

The primary goals of the nurses are to alleviate neck pain and swelling [(4)]. Pre-surgery, patients and, if applicable, their families should learn about neck pain treatment so that they can be followed in the post-operative period. It is suggested that patients be informed that the surgical incision made during thyroidectomy is the source of their suffering [(11)]. Stretching exercises, which may be started the day after thyroid surgery and are useful in preventing postoperative neck discomfort symptoms, are basic and straightforward to do. Besides the fact that it lowered the need for analgesics [(12)]. Moreover, most patients are

afraid to move their necks and shoulders following neck surgery, and stiffness is one of the reasons for postoperative neck discomfort, nurses should reassure the patient that the surgical wound will not be affected. The nurse should instruct patients to do the exercises in the following order: relax shoulders and neck sufficiently, look down, move face to the right, move face to the left, incline head to the right, incline head to the left, turn shoulders round and round, and finally slowly raise and lower hands. Three times each day (morning, noon, and evening) for one month, the participants were to do three repetitions of each stretching exercise with a 15-second hold at the end of the range and then return to the neutral position. Nurses in the general surgery department must incorporate stretching neck exercises in the care and follow-up protocols of patients who have had a complete thyroidectomy, as well as employ the validated neck pain and disability assessment in patient monitoring [5,13].

There is a need to assess and support the effect of head-neck stretching exercises post thyroidectomy on postoperative pain level and disability. So, the present study will be conducted to evaluate the effect of implementing head-neck stretching exercises on postoperative pain level and disability post thyroidectomy.

Aim of the Study

This study was conducted to evaluate the effect of implementation of head and neck stretching exercises on pain level and disability post thyroidectomy.

Research Hypotheses:

H1: Post thyroidectomy patients who receive neck stretching exercises exhibit lower neck pain mean scores than those who do not receive.

H_2: Post thyroidectomy patients who receive neck stretching exercises exhibit lower neck disability mean scores than those who do not receive.

Materials

Research Design: A quasi-experimental research design was used to conduct this study.

Setting: The study was conducted at the head and neck surgery unit of the Alexandria Main University Hospital, Alexandria, Egypt. This unit was on the third floor of the surgical building. It was composed of four rooms, each of which had 10 beds. Thyroidectomy surgery was performed in the operating room and surgical C unit every Monday and Thursday. The postoperative follow-up post discharge was conducted at the head and neck surgery outpatient clinic of the above-mentioned hospital. This clinic was located in the outpatient department and worked two days per week (Wednesday and Thursday) from 8.30 AM to 12:00 PM. This clinic serves patients from the three governorates: Alexandria, Matroh, and El Behira.

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

Sample size calculation: EPI info program was used to estimate the sample size applying the following parameters:

- Population size = 70/3 months.
- Expected frequency = 50%
- Acceptable error = 5%
- Confidence co-efficient = 95%
- Minimum sample size = 60 patients.

- Patients was considered eligible to participate in the study if they meet the following criteria:

1. Age group from 18 up to 60 years old of both sexes.
2. Able to communicate verbally, and able to follow instructions.
3. Planned for thyroidectomy; total or partial surgery.
4. Free from any orthopedic and rheumatic conditions of the neck

The participants were equally and sequentially recruited to the study and control groups as follows:

•**The study group** was subjected to neck stretching exercises training.in addition to the routine hospital care.

•**The control group** was received the routine care offered by the hospital.

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

Tool I: Patients' Socio-demographic and Clinical Data Structured Interview Schedule.

This tool was developed by the researcher, and it was consisted of two parts as follows:

- **Socio-demographic data:**
  This part includes information about the study patients' general characteristics such as age, gender, level of education, area of residence, marital status, occupation, and monthly income.
- **Clinical data:** This was comprised of:
  1. The family history of having thyroid gland diseases.
  2. Patients' past medical history; complaint of chronic diseases, previous hospitalization, and its causes.
  3. Surgical history; previous surgeries and their causes.
  4. Present history; duration of thyroid enlargement, symptoms, laboratory investigations, and prescribed medications.

Tool II: Neck pain assessment sheet using Indiana Polyclinic Combined Pain Scale (IPCPS).

It was adopted from Dimitry Arbuck and Amber Fleming in 2001, to assess neck pain intensity; it includes an eleven-point Likert Scale, with 0 meaning "no pain" and 10 indicating "the worst possible pain imaginable". It included a description of each rating number on the scale that helps patients provide an accurate pain level report [(14)]. It was translated into Arabic by the researcher. Other items of neck pain assessment include frequency, duration, aggravating, and relieving factors [(15)].

Tool III: Neck Disability Index (NDI) questionnaire, adapted by researcher from Vernon and Mior (1991), to assess neck-specific disability and ability to manage daily life. This questionnaire has eight items concerning pain and activities of daily living, including personal care, lifting, reading, headaches, concentration, work status, sleeping, and recreation. Each item includes six sub-items [(16)].

Scoring system:

Each item was scored out of five with the no disability response given a score of zero, giving a total score for the questionnaire out of 40. The result can be expressed as a percentage (score out of 100) by doubling the total score.

- Accordingly, the maximum total possible score for a patient's neck disability was equal to 40 (8 items x 5 = 40) and the minimum total score was equal to zero (8 statements x 0 = 0).
- The score was transformed into a percentage adjusted to start from zero percent to 100 percent.
- The percentage from 0 to 33.3% means low disability, the percentage from 33.3% to 66.3% means moderate (intermediate) disability, and from 66.3% to 100% means high/great disability.

Method

Data Collection:

- An approval from the ethics research committee of the Faculty of Nursing, Alexandria University was obtained.
- An approval from the research affairs committee of the Faculty of Nursing, Alexandria University was obtained.
- An official letter was obtained from the Faculty of Nursing, Alexandria University to the administrative authorities of the selected setting to obtain their permission to carry out the study after explaining the aim of the study.
- Official approval was obtained from administrative authorities of the selected setting to carry out the study.

- Tool (I) was developed by the researcher after a thorough review of the relevant recent literature.
- The developed tool was submitted to a jury of two experts in the field of head and neck surgery, faculty of medicine, and three experts in the field of medical surgical nursing, to assess its content validity. Comments and suggestions were reviewed, and necessary modifications were made.
- Tool II was adopted by the researcher.
- Tool III was adapted by the researcher.
- Tools were translated into the simple Arabic language.
- The reliability of the developed tool (tool I) and the translated Arabic form of tool II and tool III was tested by using Cronbach's Alpha test. Reliability coefficient values were 0.75, 0.85, and 0.89, respectively.
- The educational neck stretching exercise pamphlet was developed by the researcher in simple Arabic language based on a thorough review of the relevant recent literature to support the given instructions. This pamphlet contained colored pictures with simple illustrations of head/neck stretching shoulder exercises.
- This pamphlet was submitted to two experts in the field of head and neck surgery, faculty of medicine, and three experts in the field of medical surgical nursing, for testing its content validity, clarity, and comprehensiveness. Then, the necessary modifications were done, accordingly.
- A pilot study was conducted on 6 patients to test the clarity, the feasibility of the tools, and necessary modifications were done accordingly. The subjects of the pilot study were excluded from the study.
- The study subjects were divided randomly into two equal groups; the control and study group (30 for each group).
- The control group was exposed to routine care only.
- The study group received head/neck stretching exercises training.
- **The study was carried out in four phases:**

1. **Assessment phase:** (for both study and control group).

- Initial assessment was carried out pre-operatively using tool I to collect the needed personal and clinical data.
- Phone contact was maintained between the researcher and patients to schedule follow-up visits at the outpatient clinic.
- Patients were asked to attend follow-up after one week and four weeks postoperatively.
- To avoid theoretical contamination, data from the control group were collected before those from the study group.

2. **Planning phase:**
   - An illustrative educational neck stretching exercise pamphlet in a simple Arabic language with simple pictures was also developed by the researcher.
3. **Implementation phase:**

- **Concerning the study group**:
  - Individualized training and teaching of the studied patients about neck exercises were conducted over one session lasting about 30 minutes.
  - This session was repeated two times during the pre-operative period, and on the zero day of operation for reinforcement.
  - The session included a demonstration and a re-demonstration of neck stretching exercises.
  - The researcher demonstrated every exercise in front of the patient and asked patient to re- demonstrate this exercise until it was performed correctly.
  - The exercise training was done as follows: the patient was instructed about the motions, frequency, duration, and principles of exercises; neck exercises should be gentle, easy, and slowly, starting with passive then active with assistance and then active exercises.
  - The motions of neck exercises include flexion, extension, and rotation of the neck.
  - Exercise performed 3 times per day (morning, afternoon, and late afternoon) for 10 minutes for 3 weeks.
  - The patients were asked to do the following sequence: relax shoulders and neck sufficiently, look down, move face to the right, move face to the left, incline head to the right, incline head to the left, turn shoulders round and round, and finally slowly raise hands fully, then lower them. The participants were to perform three repetitions of each stretching exercise with a 15-second sustain at the end of the range and then turn back to the neutral position.
  - A neck stretching exercise pamphlet was given to every patient in the study group at the beginning of the session.
  - Patients were encouraged to perform neck stretching exercises that had been learned preoperatively, following the principles of exercises from the 1st post-thyroidectomy day.

Side neck stretch

- Sit or stand and point your right arm downward.
- Place your left hand on the top of your head
- Gently pull down your head to the left, to stretch the muscles on the right side of your neck (see Figure 3).

Figure 3. Side neck stretch

- Hold for 30 seconds then release.
- Repeat 5 times.
- Repeat on the other side of your neck.

Shoulder shrugs

I. Shrug your shoulders up toward your ears (see Figure 4).

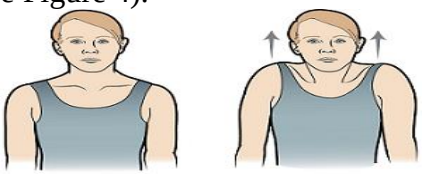

Figure 4. Shoulder shrugs

II. Drop them down.
III. Repeat 10 times.

Arm circles

- Sit or stand with your arms at your side, with your palms facing forward and your thumbs pointing to the ceiling.
- Lift your arms up and circle them backwards (see Figure 5).

Head-neck Stretching Exercises post Thyroidectomy

Turning neck stretch

- Gently turn your head so you're looking up to the right.
- Place your right hand on your left cheek and jaw. Apply mild pressure to give yourself a deeper stretch. (See Figure 1).

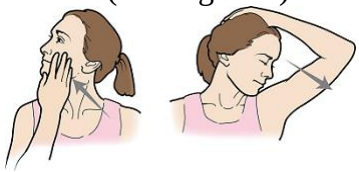

Figure 1. Turning neck stretch

- Turn your head back to look down and to your left.
- Place your left hand on top of your head and gently apply pressure. (see Figure 1).
- Repeat these 10 times. Then repeat this movement in the other direction 10 times.

Chin tuck

- Sit or stand with your back and head leaning against the wall for good posture.
- Tuck your chin in and try to flatten the back of your neck against the wall (see Figure 2).

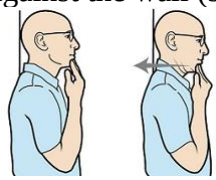

Figure 2. Chin tuck

- Return to the starting position.
- Repeat 10 times.

front of your shoulders. Keep your back straight and your neck and shoulders relaxed.

- Hold for 30 seconds.
- Return to the starting position.
- Repeat 5 times.

Jaw lowering

- Sit or stand by a mirror so that you can see your face.
- Place the tip of your tongue behind your top teeth.
- Slowly lower your bottom jaw to open your mouth, while keeping your tongue in contact with the roof of your mouth (see Figure 8). Use the mirror to make sure that you're opening your mouth evenly, and not moving your jaw from side to side.

Figure 8. Jaw lowering

- Close your mouth.
- Repeat 10 times.

Diaphragmatic breathing

- Lie on your back or sit in a supportive chair.
- Place one or both of your hands over your abdomen (belly, see Figure 9).

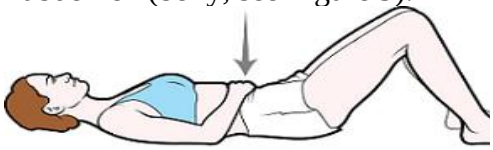

Figure 9. Diaphragmatic breathing

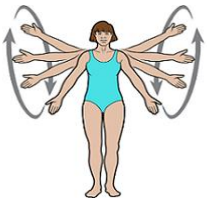

Figure 5. Arm circles

- Return to the starting position.
- Repeat 10 times.

Arm and shoulder retraction

- Sit or stand with your arms in front of you and your thumbs up.
- Move your arms out to the sides, while squeezing your shoulder blades together (see Figure 6).

Figure 6. Arm and shoulder retraction

- Return to the starting position.
- Repeat 10 times.

Pectoral stretch using doorway

- Stand in a doorway.
- Place your hands and forearms at shoulder level on the sides of the doorway (see Figure 7).

Figure 7. Pectoral stretch using doorway

- Gently step forward until you feel a gentle stretch across your chest and in

- Breathe in slowly and deeply through your nose. Your abdomen should rise but your upper chest should remain still and relaxed.
- Breathe out slowly through your mouth. As you breathe out, slowly and gently pull your abdomen towards your spine.
- Repeat 10 times.
  - **Regarding the study group**:
    - Patients received routine hospital care from admission until discharge.
    - They were only informed about the date of follow-up after surgery and did not receive any educational interventions.
    - The educational content was delivered through PowerPoint, demonstrations, and re-demonstration. Each patient in the study group was supported by a simple neck stretching exercise pamphlet that contained the correct technique of head/neck stretching exercise as an illustrative guide for more clarification.

4. **Evaluation phase:**
   - The researchers evaluate every patient in the study and control group four times using tools II & III as the following:

1. First assessment: during the zero day to assess neck pain.
2. Second assessment: after one week to re-assess neck pain and assess neck disability.
3. Third assessment: after four weeks of operation to re-assess neck pain and assess neck disability.
4. Comparisons between the control and study groups were carried out using appropriate statistical analysis to evaluate the effect of neck stretching exercises on pain and functional disability among patients post thyroidectomy.
5. Data collection was carried out over seven months from February to August 2020

Statistical analysis:

- Reliability test: reliability was measured by using Cronbach's alpha test which was = 0.75 for the developed tool (tool I), and 0.85, 0.93 for the translated Arabic form of tool II and tool III indicating reliable tools.
- After data collection, they were coded and transferred into a specially designed format to be suitable for computer feeding. Following data entry, a checking and verification process was carried out to avoid errors during data entry.
- The raw data were coded and entered into SPSS system files (SPSS package version 25). [17]. Analysis and interpretation of data were conducted.

The following statistical measures were used:

- Descriptive statistics as frequency, distribution, mean, and standard deviation were used to describe different characteristics.
- Univariate analyses, including t-test and paired t-test were used to test the significance of results of quantitative variables and to compare the means between the study and control groups on the same continuous, dependent variable.
- The one-way analysis of variance (ANOVA) is used to determine whether there are any statistically significant differences between the means of two or more independent groups (F Test).
- The Friedman test a non-parametric test alternative to the one-way ANOVA with repeated measures. It was used to test the differences between groups when the dependent variable being measured is ordinal. It was used to test the significance of results of quantitative variables of abnormal distribution.
- Chi-Square test, Monte Carlo test, and Fisher's exact test were used to test the significance of results of qualitative variables.
- The level of significance selected for this study was a p value equal to or less than 0.05.

Ethical Considerations:

6. Written informed consent was obtained from each patient pre-data collection, after providing an appropriate explanation of the study purposes.
7. Privacy of the study participants was asserted.
8. Confidentiality of the collected data for each patient was assured.
9. The study participants were assured that their participation is voluntary, and they have the right to withdraw from the study at any time.

Results:

Table (1): Percentage Distribution of both the Study and Control Group according to their Socio-demographic Characteristics.

Socio-demographic characteristics	Study group (n=40))		Control group (n=40)		Test of significance	
	No.	%	No.	%	Test	P value
Age (in years)						
20 -	1	3.3	1	3.3	X^2 :27.843	0.484
30 -	8	26.7	4	13.3		
40 -	16	53.3	16	53.3		
50 - 60	5	16.7	9	30		
Min-Max Mean ± SD	20-60 33.05 ± 10.891		20-58 33.23 ± 10.307			
Gender						
Male	9	30.0	11	36.7	X^2: 0.050	0.173
Female	21	70.0	19	63.3		
Marital status						
Single	13	43.4	11	36.7	FET: 0.714	0.446
Married	15	50	17	56.7		
Divorced	1	3.3	1	3.3		
Widow	1	3.3	1	3.3		
Level of education						
Illiterate	8	26.66	8	26.66	FET: 0.527	0.414
Read and write	11	36.66	10	33.33		
Basic education	8	26.66	8	26.66		
Secondary education	2	6.66	2	6.66		
University education	1	3.33	2	6.66		
Occupation						
Not working	1	3.3	1	3.3	FET: 5.022	0.314
Free work	3	10.0	1	3.3		
Manual work	4	13.3	7	23.3		
Cleric work	3	10.0	5	16.7		
Retired	1	3.3	1	3.3		
Housewife	18	60.0	15	50.0		
Monthly income from patient's point of view						
Not enough	29	96.7	26	86.7	FET: 1.920	0.152
Enough	1	3.3	4	13.3		
Area of residence						
Urban	21	70	18	60	X^2: 0.879	0.121
Rural	9	30	12	40		

n = number of studied patients *X^2: Chi-square test*
FET: Fisher exact test *P: p-value of test of significance*

Table (1) shows that there was no significant difference between patients in the study and control groups regarding socio-demographic characteristics ($P > 0.05$). Regarding patients' age, the results revealed that the highest percentage of patients in both study and control groups (53.3% and 53.3%, respectively) were between 40<50 years of age, while the lower percentage of patients in both study and control groups (3.3% and 3.3%, respectively) were between $20 \leq 30$ years of age. The mean ages for the study and control groups were 33.05 ± 10.891, 33.23 ± 10.307 years, respectively. In relation to patients' gender, about one-third of patients in both study and control groups (30%, 36.7%, respectively) were males, while about two-thirds of patients in both study and control groups (70%, 63.3%, respectively) were females. As regards marital status, the highest percentage of patients in both the study and control groups (50 % and 56.7%, respectively), were married. The lowest percentages, (1% and 1%, respectively) of both the study and control group were divorced and widowed.

In relation to the educational level, the highest percentage of patients in both study and control groups (36.66% and 33.33%, respectively) could read and write. The lowest percentage in both the study and control groups (3.33% and 6.66%, respectively) had a university education. As regards occupation, the highest percentages of patients in both the study and control groups (50% and 60%, respectively) were housewives. However, the lower percentages of both study and control groups (1% and 1%) were not working or retired. In relation to the area of residence, the highest percentages of patients in the study and control groups (70% and 60%, respectively) were from urban areas.

Regarding monthly income, the vast majority of patients in the study and control groups (96.7% and 86.7%, respectively) did not have enough monthly income from the patient's point of view.

Table (2): Percentage Distribution of both the Study and Control Group according to their Clinical Data.

Clinical characteristics	Study group (n=30))		Control group (n=30)		Test of significance	
	No.	%	No.	%	Test	P value
Age of onset of the thyroid enlargement (years)						
<1 month	0	0.0	0	0.0	X^2: 4.454	0.348
1< 3 months	0	0.0	0	0.0		
3<6 months	6	20.0	10	33.3		
6<12 months	9	30.0	9	30.0		
More than one year	15	50.0	11	36.7		
Diagnosis						
Multinodular goiter	17	56.7	13	43.3	X^2: 6.220	0.718
Follicular neoplasm	1	3.3	3	10.0		
Papillary thyroid carcinoma	11	36.7	11	36.7		
Graves' disease	1	3.3	3	10.0		
Family history of hyperthyroidism						
Yes	15	50.0	19	63.3	X^2 :1.003	0.121
No	15	50.0	11	36.7		
Presence of chronic diseases						
Having no chronic diseases	11	36.7	13	43.3	FET: 2.417	0.095
Diabetes mellitus (DM)	7	23.3	8	26.7		
Heart disease	2	6.6	1	3.3		
Hypertension (HTN)	4	13.3	3	10		
Liver disease	0	0.0	0	0.0		
Renal disease	0	0.0	0	0.0		
HTN& DM	3	10.0	2	6.7		
HTN& Heart disease	3	10.0	3	10.0		
Experienced symptoms						
Swelling of the neck	30	100.00	30	100.00	FET: 2.541	0.311
Hoarseness	21	70.00	17	56.7		
Difficulty of swallowing	15	50.0	15	50.0		
Difficulty of breathing	10	33.3	15	50.0		
Nervousness and irritability	11	36.7	18	60.0		
Increasing appetite	7	23.3	15	50.0		
Headache	14	46.7	14	46.7		
Palpitation	21	70.0	16	53.3		

FET: Fisher exact test *P: p-value of test of significance*

Table (2) shows that there was no significant difference between patients in the study and the control groups regarding their clinical characteristics (P > 0.05). The results revealed that the highest percentage of patients in the study group and the control groups (50% and 36.7%, respectively) had thyroid enlargement for more than one year. Regarding the diagnosis, the highest percentage of patients in both the study and control groups (56.7% and 43.3%, respectively) was diagnosed with multinodular goiter. Additionally, the highest percentage of patients in both the control and study groups (50% and 63.3%, respectively) had a positive family history of hyperthyroidism. Moreover, the highest percentage of patients in both the study and control groups had generalized seizures (36.7 and 43.3%, respectively) and had no other chronic diseases. In relation to the experienced symptoms, all patients in both control and study groups had neck swelling. In addition, the highest percentage of patients in both the study and control groups (70% and 56.7%, respectively) had hoarseness.

Table (3): Comparison between Patients of Both the Study and Control Group Pre/post-Implementation of the Head-neck Stretching Exercises according to their Neck Pain Assessment.

Neck pain assessment	Study			Control			Test of significance				
	Zero day	After one week	After four weeks	Zero day	After one week	After four weeks	Friedman test		t-test		
	Mean± SD	Mean± SD	Mean± SD	Mean± SD	Mean± SD	Mean± SD	p_1	p_2	p_3	p_4	p_5
Frequency of pain											
	4.13±0.90	2.13±0.34	1.20±0.40	4.43±0.50	3.83±0.37	2.43±0.68	0.000*	0.000*	0.116	0.000*	0.000*
Duration of pain											
	4.40±0.67	2.07±0.78	1.27±0.45	4.47±0.50	2.07±0.78	2.10±0.45	0.000*	0.000*	0.648	0.000*	0.000*
Aggravating factors											
	4.03±0.61	2.13±0.50	1.30±0.46	4.20±0.55	2.53±0.63	2.70±0.53	0.000*	0.000*	0.262	0.009*	0.000*
Relieving factors											
	3.97±0.18	1.97±0.18	1.63±0.49	3.82±0.50	2.57±0.56	2.30±0.79	0.000*	0.000*	0.182	0.000*	0.000*
Associated symptoms											
	4.50±2.30	3.13±1.40	2.07±0.36	4.30±2.20	3.83±0.26	3.37±0.76	0.000*	0.000	0.732	0.009*	0.000*
Severity of pain											
	7.87±0.81	4.27±0.90	2.47±0.50	7.62±0.68	4.67±0.66	2.97±0.80	0.000*	0.000*	0.185	0.054*	0.005*
Mean % Scale Final Score (degree =100)**											
	82.57±7.13	50.67±6.75	28.38±2.299	81.62±5.51	64.57±2.28	45.33±4.90	0.000*	0.000*	0.566	0.000*	0.000*

p_1: Stands for p-value for Friedman test for comparison between zero day with 1 week post the operation in the study group

p_2: Stands for p-value for Friedman test for comparison between zero days with 4 weeks post the operation in the study group
p_3: p-value for Student t-test for comparing between study and control at zero day of operation
p_4: p-value for Student t-test for comparing between study and control 1 week post the operation
p_5: p-value for Student t-test for comparing between study and control 4 weeks post the operation
*: Statistically significant at $p \leq 0.05$
**: Mean percentage of total scale score classified as the following
The percentage is from 0 to 33.3% means mild pain.
The percentage is from 33.3% to 66.3% means moderate pain.
The percentage is from 66.3% to 100% severe pain.

Table (3) illustrates that there were no statistically significant differences between the study and control groups before the implementation of the neck stretching exercises (P= 0.0.56). While highly statistically significant differences were detected between both groups after one week and four weeks post neck stretching exercises (P<0.001). Moreover, the mean percent subscale score of neck pain assessment at zero day for the study and control groups were82.57±7.13, and 81.62±5.51 respectively, indicating severe pain. However, the mean percent subscale score decreased after one week post neck stretching exercises for the study group (54.59±5.72), indicating moderate pain. A marked decline was detected in the mean percent subscale score of the neck pain assessment in the study group after four weeks postoperatively indicating mild pain. Regarding the control group, the mean percent subscale score decreased after 1and four weeks postoperatively (64.57±2.28, 45.33±4.90 respectively), indicating moderate pain.

Table (4): Comparison Between Patients of Both the Study and Control Group Pre and Post Implementation of The Head-Neck Stretching Exercises According to Their Neck Disability Assessment.

Neck pain Assessment	Study		Control		Test of significance	
	After 1 week	After 4 weeks	After 1 week	After 4 weeks	t-test	
	Mean± SD	Mean± SD	Mean± SD	Mean± SD	p1	p2
1.Personal care	4.23±0.898	2.79±0.94	1.50±0.51	1.41±0.82	0.000*	0.000*
2. Lifting	4.33±0.479	3.59±1.21	2.00±0.00	2.50±1.09	0.000*	0.012*
3.Reading	3.20±0.714	3.07±0.94	4.47±1.06	2.0±0.73	0.001*	0.003*
4. Headache	2.80±0.407	1.70±0.702	3.87±0.730	2.93±0.868	0.000*	0.000*
5.concentration	3.80±1.44	2.55±1.21	4.23±1.19	1.24±0.69	0.000*	0.000*
6.Work	2.60±0.675	2.55±1.12	4.10±0.99	2.03±0.49	0.004*	0.011*
7. Sleeping	2.60±1.03	2.62±1.63	3.50±0.900	1.38±1.01	0.001*	0.001*
8. Recreation	4.40±0.724	3.43±0.568	3.03±0.669	2.50±0.572	0.000*	0.000*
Mean % Scale Final Score** (degree =100)	67.68±11.17	43.4259±11.87	71.50±9.06	51.33±10.43	0.000*	0.000*

P_1: p-value for Student t-test for comparing between study and control one week post the neck stretching exercises
P_2: p-value for Student t-test for comparing between study and control four weeks post the neck stretching exercises
*: Statistically significant at $p \leq 0.05$
**: Mean percentage of total scale score classified as the following
The percentage from 0 to 33.3% means low disability.
The percentage from 33.3% to 66.3% means moderate (intermediate) disability.
The percentage from 66.3% to 100% means high/ great disability.

Table (4) indicates that there were highly statistically significant differences were detected between both groups after one week and four weeks post neck stretching exercises (P<0.001). Moreover, the mean percent subscale score after one week post neck stretching exercises for the study group (67.68±11.77), indicated high/great disability. A decline was detected in the mean percent subscale score of the neck disability assessment in the study group after four weeks postoperatively (43.4259±11.87), indicated moderate (intermediate) disability. Regarding the control group, the mean percent subscale score after one week post neck stretching exercises (71.50±9.06), indicated high/great disability. A decline was detected in the mean percent subscale score of the neck disability assessment in the control group after four weeks postoperatively (51.33±10.43), indicating moderate (intermediate) disability.

Discussion

Thyroidectomy is one of the most common surgical treatments, and it is used to treat both benign and malignant thyroid conditions such as hyperthyroidism, symptomatic goiter, ambiguous thyroid nodules, and thyroid cancer [(18)]**.** The thyroid gland's anatomical position contributes to post-thyroidectomy neck stiffness. As a result, this could affect patients' daily activities. As a result, the aim of this study to see how head-neck stretching exercises after thyroidectomy affected post-operative pain and disability. Regarding patients' **age**, the present results revealed the mean ages for the study and control groups were 33.05 ± 10.891, 33.23 ± 10.307 years, respectively. This result disagreed with El-Khateeb. Ali, Makhlouf. & Rizk, (2015) [(19)] who stated that the average age of patients receiving thyroidectomy was 37.53 10.48. Ranging between 40 and 50 years old. Concerning gender, married women made up around two-thirds of patients in both the study and control groups (70 percent and 63.3 percent, respectively). This result was confirmed by Abd Elazeem. Abdel-Karim, & Aly, (2020) [(20)] who confirmed that the majority of the patients tested were married females.

This finding is consistent with the National Women's Health Resource Center Team's (2018) findings that women have a higher number of cases than men, with a ratio of 1:1.6. Thyroid disorders affect one out of every eight women at some point during their lives. Thyroid dysfunction affects up to 10% of women in the first year after giving birth

[21]. In relation to educational level, the study and control groups had the highest percentage of patients who could read and write (36.66 percent and 33.33 percent, respectively). This contrasts with the findings of Hasham et al. (2018) who found that more than two-thirds of patients in the study group and half of those in the control group were illiterate. According to the researchers' point of view, the general knowledge of the study sample is generally low, which highlights the significance of such education regarding the relevance of neck exercise following thyroidectomy [4].

As regards occupation, the highest percentages of patients in both the study and control groups were housewives. This result is supported by **Abd-El Mohsen and Ahmed (2018) [5] w**ho mentioned that more than half of the patients in both groups were housewives. Regarding the diagnosis, the highest percentage of patients in both the study and control groups were diagnosed with multinodular goiter. This result was in line with Yüksel et al. (2020) [22], who reported THAT MULTINODULAR goiter was a diagnosis in more than half of their patients. According to the current study, in both the study and control groups, the highest percentage of patients had no other chronic conditions. This contrasts with **Abd-El Mohsen and Ahmed (2018) [5], who** found that around one-third of patients in the study group had diabetes and less than one-third had hypertension, whereas 26.7 percent of patients in the control group had diabetes and 6.7 percent had hypertension.

The highest percentage of patients in both the study and control groups had hoarseness. All patients in both control and study groups had swelling in the neck. This result is in line with Fouad**, Shereif, Hassanein, and El-Baea** (2020) [23], who mentioned that more than half (52.4%) of them reported having a health complaint. Concerning neck pain level, the current study found that there was a highly statistically significant difference between the two studied groups in terms of their neck pain level in the first and fourth week post-operative period. This could be related to the fact that after a thyroidectomy, neck pain usually goes away on its own after a month. This result is supported by KimET AL**.** (2018) [24], who found that a home-based fitness program helps reduce fatigue and anxiety, enhancing the quality of life and increasing immunological function in thyroid hormone replacement patients following thyroidectomy. This finding confirmed the study hypothesis (1), which stated that Post thyroidectomy patients who receive neck stretching exercises exhibit lower neck pain mean scores than those who do not receive.

Concerning neck disability, the current study found that there was a highly statistically significant difference between the two studied groups in terms of their neck disability in the first- and fourth-week postoperative period. In the same line, **Abd-El Mohsen and Ahmed (2018) [5], who** confirmed that, regarding the neck pain and disability index questionnaire, the findings of their study revealed that, when compared to the control group, neck pain and

related disability were significantly reduced in the study group when followed one week after thyroidectomy. Also, Akira **Miyauchi, Yasuhiro Ito, and Akihiro Miya** (2021) [(12)], who found that the total symptom scores in the stretching group were significantly lower than those in the control group at all time points after the surgery. In addition, **Abd Elazeem, et al (2020**) [(20)], who found statistically significant variations in total discomfort score levels between the study and control groups in the first, second, and third weeks. This finding confirmed the study hypothesis (2), which stated that post thyroidectomy patients who receive neck stretching exercises exhibit lower neck disability mean scores than those who do not receive.

Conclusion

Based on the finding of the current study it can be concluded that implementing head and neck stretching exercises illustrate a positive result and significant difference among both groups regarding to pain and disability means scores.

Recommendations

- Head-neck stretching exercises are recommended for every institution where thyroid surgery is frequently performed, not only to help with curing thyroid disease but to improve the patients' quality of life.
- Nurses should attend in-service education and awareness national and international training programs/or workshops.
- A colored illustrated booklet that is updated periodically including all head-neck stretching exercises instructions should be available and distributed to all patients undergoing thyroidectomy.
- Replication of the study needed to be conducted for a larger number of probability samples, as well as a long period of study time to confirm the results of the current study.

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الملخص العربي

تأثير تنفيذ تمارين اطالة الرأس والرقبة على مستوى الألم والإعاقة بعد استئصال الغدة الدرقية

المقدمة: تعد أمراض الغدة الدرقية واحدة من أكثر المشاكل الصحية شيوعًا في جميع أنحاء العالم. استئصال الغدة الدرقية هو إجراء جراحي شائع ينتج عنه آلام شديدة وإعاقة في الرقبة بعد الجراحة. بعد استئصال الغدة الدرقية ، غالبًا ما يعاني المرضى من عدم الراحة مثل آلام الرقبة أو تصلب الكتف أو صعوبة في حركة الكتف أو الاختناق أو الإحساس بالضغط. توفر تمارين اطالة الرأس والعنق التنسيق العصبي العضلي والمرونة لدى المرضى من خلال تقليل الألم وتقوية العضلات.

الهدف من الدراسة: هدفت الدراسة الحالية الي تقييم أثر تنفيذ تمارين إطالة الرأس والرقبة على تقليل مستوى آلام الرقبة والإعاقة بعد استئصال الغدة الدرقية. **فرضية البحث:** إفترضت الدراسة الحالية أن:
فرضية 1: متوسط درجة ألم الرقبه لدي مرضى ما بعد استئصال الغدة الدرقية الذين يتلقون تمارين إطالة الرقبة أقل من أولئك الذين لا يتلقونها.

فرضية 2: متوسط درجة إعاقة الرقبه لدي مرضى ما بعد استئصال الغدة الدرقية الذين يتلقون تمارين إطالة الرقبة أقل من أولئك الذين لا يتلقونها. **تصميم البحث:** تم استخدام تصميم بحثي شبه تجريبي. **مكان البحث:** أجريت هذه الدراسة في وحدة جراحة الرأس والرقبة بمستشفى جامعة الإسكندرية الرئيسي ، الإسكندرية. **عينة البحث:** شملت 60 مريض ومريضه يخضعون لاستئصال الغدة الدرقية. تم تقسيمهم إلى مجموعتين بشكل عشوائي وبالتساوي: مجموعة الدراسة التي تلقت تمارين إطالة الرقبة بالإضافة إلى الرعاية الروتينية في المستشفى ومجموعة المراقبة التي تلقت الرعاية الروتينية في المستشفى. الأدوات: تم جمع البيانات باستخدام ثلاث أدوات ؛ (1) استبيان للبيانات الاجتماعية والديموغرافية والسريرية للمرضى. (2) تقييم آلام الرقبة باستخدام مقياس الألم المشترك (IPCPS). (3) استبيان مؤشر إعاقة العنق (NDI).

النتائج: كان هناك فرق ذو دلالة إحصائية عالية بين المجموعتين فيما يتعلق بألم الرقبة والعجز بعد أسبوع وأربعة أسابيع بعد استئصال الغدة الدرقية. **الخلاصة:** علي ضوء هذه النتائج نستخلص أن تنفيذ تمارين إطالة الرأس والرقبة يعطي نتيجة إيجابية وفروق ذات دلالة إحصائية بين المجموعتين فيما يتعلق بمتوسط درجات الألم والعجز.

التوصيات: يجب أن تصبح تمارين إطالة الرقبة جزءًا لا يتجزأ من الرعاية التي تقدمها الممرضات وبروتوكولات المتابعة بعد استئصال الغدة الدرقية.