
Effect of Enhanced Recovery Protocol on Neck Pain and Disability Post Thyroidectomy

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Abstract:

Thyroidectomy is one of the most common cervical and endocrine surgeries performed today, technological advancements in thyroid surgery, mortality and morbidity rates are low, but some long-term complications occurring after thyroidectomy continue to pose a health and social problem. **Aim:** This study aimed to evaluate the effect of enhanced recovery protocol on neck pain and disability post thyroidectomy. **Design:** A pre- post technique quasi-experimental research design was used. **Setting:** This study was conducted at the department of General Surgery connected with New Surgical Hospital and Outpatient Surgery Clinic at Zagazig University Hospital, Sharquia Governorate, Egypt. **Sample:** A purposive sample of sixty patients undergoing thyroidectomy. **Tools:** Patients' interview questionnaire, Neck Pain Disability index Questionnaire, and Post thyroidectomy complications observational checklist. **Results:** There was a highly statistically significant difference between the patients in the study and control groups about the level of pain & disability at post intervention at p-value <0.001 and with Mean \pm SD (10.9 \pm 4.9 & 22.1 \pm 5.8 respectively). Finally, inverse significant correlation was found between total level among the patients in knowledge, neck pain & disability in study group at post intervention ($r=-0.53$ $p=0.003$). **Conclusion:** Application of enhanced recovery protocol for patients undergoing thyroidectomy had a statistically significant positive effect on alleviating neck pain, functional disability, and postoperative complications. **Recommendation:** Repetition of the present study on greater possibility population is advised to gain generality and larger application of the proposed protocol.

Keywords: Disability, Enhanced Recovery Protocol, Neck Pain & Thyroidectomy.

Introduction:

A thyroidectomy is a surgical operation recommended for those with Graves' disease who have thyroid cancer, toxic multinodular goitre, a very big goitre, poor compliance with antithyroid medication, and aesthetic deformity. The most frequent complications are thyroid storm, hyperparathyroidism, bleeding, and thyroid diseases such neck pain, tension and pressure on the neck, difficulties moving the neck, and recurrent laryngeal nerve injury. After the surgery, other issues like dry throat, swallowing difficulties, coughing, and hoarse voice also appeared. Additionally, a number of factors, including the patient's comorbidities, the surgeon's surgical technique, and inherent disease-related factors, such as the existence of thyroid cancer and toxic goitre, might affect postoperative complications (El Shafaey et al., 2022, Gropper et al 2020, Caulley et al 2017, & Balentine et al 2016).

Over the past three decades, there has been a sharp rise in thyroid surgery. In the United States, thyroidectomies were performed on 118,000 to 166,000 individuals each year. Both male and female patients get thyroidectomy, however female patients have them more frequently (Hashem et al., 2018)

The prevalence of thyroidectomy was also unreachable in Egypt, but there has been a steady rise in the proportion of patients admitted for thyroidectomy compared to patients undergoing general surgery. In 2021, there were (144) cases. (Statistical and Medical Records, at surgical unit at Zagazig University Hospital, 2021).

Evaluating the patient for prospective or actual post-operative complications and being aware of the most frequent difficulties these patients may have are crucial nursing tasks. For the purpose of guaranteeing safe nursing procedures and beneficial patient outcomes, early detection and quick action are essential (El Shafaey et al., 2022). In addition to assessing pain levels and teaching patients neck exercises that must be continued until they can move their head and neck freely, nurses also play a critical role in informing patients about the signs and symptoms of potential complications. They must also provide both written and verbal information about the wound. Care, medication, nourishment, and doctor follow-up appointments. As the simplest and most efficient exercise to relieve pain and muscle weakness and enhance muscular flexibility and functional levels, nurses should advise patients to move their neck and shoulders and extend their neck slowly and fully (Abd-El Mohsen & Ahmed, 2018).

Interdisciplinary therapies known as Enhanced Recovery Protocols (ERAS) are designing to standardize care and lessen the effects of postoperative stress. A brief preoperative fast the night before surgery, early suture and drain removal, early food, and movement from bed the day of surgery are frequently included. Compared to standard treatment, improved recovery protocols provide advantages such as quicker feeding times, faster bowel movements, and fewer surgical complications such neck pain, disability and shorter hospital stay (Kuemmerli et al., 2022). The ERAS protocol's implementation enhances the health of patients who use catheters by allowing for early drain removal, mobilization, and introduction of oral nutrition. Even more so than the exact components of the protocol itself, the standard procedure is crucial to the success of the pathways. The protocol, especially in this type of intricate perioperative pathway, reduces human omissions and commissioning errors (Pandit et al., 2019).

Significance of the study:

The prevalence of thyroid disorders is very high worldwide. Although thyroidectomy operations have a nearly 0% death rate, significant postoperative problems can occur, with the majority of patients complaining of neck pain or other physical disability. The usual length of stay for thyroidectomy patients in clinics is one to two days, and planning for patient discharge and education regarding at-home care is not done well. Lack of post-discharge patient education causes patients to be confused about potential problems they might encounter in everyday life and leaves them without any remedies. Prior research has demonstrated that patients should be made aware of potential post-discharge problems, given the proper precautions, and given effective follow-up during the preoperative period (Atasayar & Demir, 2019). Therefore, it is hoped that this study would assist this particular set of patients in improving their knowledge and practice in an effort to reduce the likelihood of this complications.

Aim of the study

The aim of this study was to evaluate the effect of enhanced recovery protocol on neck pain and disability post thyroidectomy.

Through the aforementioned precise objectives:

1. Assess the patients' level of thyroidectomy knowledge
2. Assess the level of neck pain and disability post thyroidectomy.
3. 3-Assess presence or absence of post-thyroidectomy complications.

Design and implement an enhanced recovery protocol for patients undergoing thyroidectomy.

Hypotheses

To accomplish the purpose of this study, the subsequent research propositions were devised:

H1: Following the application of the enhanced recovery protocol, the patients in the study group will have higher mean knowledge scores than the patients in the control group

H 2: Post thyroidectomy patients in the study group exposed to enhanced recovery protocol have less neck pain and disability than control group.

H 3: The study group will experience fewer post-operative complications from thyroidectomy than the control group.

Operational definitions:

Enhanced recovery protocol (ERP):

ERP is a multi-step approach that requires strict adherence to the protocol by a multidisciplinary team as well as good patient compliance. In this study, the implementation of the postoperative components of the ERP includes assessment of postoperative neck pain, disability measured by Tool II, deep breathing, coughing, and neck stretching exercises, ice cup absorption in the early postoperative period, postoperative wound care instructions, medications, nutrition, positioning, techniques of application of drinking water for the first time, and safe swallowing, voice care and pre discharge instructions included warning signs requiring medical care, follow up visit, and postoperative activities as returning to work, driving a car, reading, and engaging in regular exercise are important care elements in the postoperative phase.

Materials and Methods:

Research Design:

The study was conducted using a quasi-experimental research methodology (study and control). Because it employs a non-random approach to divide participants into groups, quasi-experimental design is a helpful tool in circumstances where true studies cannot be conducted for moral or practical considerations (Thomas, 2020).

Setting:

The current study was carried out at the General Surgery Department linked with the New Surgical Hospital and the Outpatient Surgery Clinic at the Zagazig University Hospital in the Sharquia Governorate of Egypt. The General Surgery Department located on the 5th floor consisted of 8 rooms, each room had 3 beds. The Outpatient Surgery Clinic located on the 3rd floor included two rooms one for surgical examination and the other room for post-operative care as wound care. The selected settings provided services to surgical patients in the form of preoperative, postoperative care and post-thyroidectomy follow-up.

Subject

From the Department of General Surgery, Outpatient Surgery Clinic, Zagazig University Hospital, a Purposive Sample of 60 patients undergoing thyroidectomy was drawn, divided into two equal groups with 30 patients each. A sample size and power calculation application was used to determine the sample's 95% power. With a 95% confidence level, the projected sample size in the aforementioned setting is 60 of the 72 cases (Thompson, 2012). The sample size was determined using the following formula:

$$n = \left[\frac{N \times p(1-p)}{N-1 \times (d^2 \div z^2)} + p(1-p) \right]$$

Adults over the age of 18, thyroidectomy patients of both sexes, who are able to give written informed consent and are prepared to participate in the study are the inclusion criteria. Patients with orthopedic or rheumatic illnesses of the neck (such as cervical osteomalacia), as well as those who acted uncooperatively or refused to take part in the study, are excluded from study. The control group received standard hospital treatment while the study group's patients received ERP.

Tools of data collection:

Tool I: Patients' interview questionnaire: This was created by the researcher using a review of the literature and the advice of a content validity expert. It was utilised by all patients in the study and control groups before and after the deployment of ERP, and it has been translated into Arabic to prevent misunderstandings. The following three parts made up the primary portion of the questionnaire:

Part I: Demographic characteristics: It included five items with personal demographic characteristics of the patients such as age, gender, marital status, level of education, and occupation.

Part II: Patient's Medical and surgical data: This included four questions about the patient's medical and surgical history, such as comorbid disease, Body Mass Index "BMI", indications for surgery, and type of surgery. **It was adapted from Mohammed et al., (2022), Abd-El Mohsen & Ahmed, (2018), Sultan et al., (2014), & Abboud et al., (2012),**

Part III: Patients' knowledge assessment questionnaire: (pre-post-test): To assess the patient's level of knowledge. It was adapted from (El Shafaey et al., (2022), & Alqahtani et al., (2020): It was given to all patients in the study and control groups and completed by the researchers. Twenty-one multiple choice questions (MCQs) on thyroid gland anatomy, thyroidectomy definition, thyroid surgery indications, potential risks, how much thyroid is

removed, type of anaesthesia used, length of hospital stay, preparations for surgery, precautions to reduce the risk of wound infection, care of the neck wound, and proper posture after surgery, proper sleeping position after surgery, surgery, time to restore physical activity willpower and exercises, benefits of stretching exercises after surgery, adequate and safe time to lift heavy objects after surgery, when is showering allowed after surgery, indications to take calcium after surgery, how long the patient needs thyroid hormone replacement therapy, permitted food after surgery, and forbidden food after thyroidectomy.

Scoring system: Response scores were assigned as follows: The scores assigned to each item ranged from 0 to 1 point, as follows; one grade for each correct option, zero grade for each incorrect option or an unknown answer. Total scores ranged from 0 to 58, patients were categorized as; Satisfactory at limit $\geq 60\%$, Unsatisfactory $< 60\%$ according to statistical analysis.

Tool II: Neck Pain Disability index Questionnaire "NDI": (post-test)

It was adopted from Abd-El Mohsen & Ahmed, (2018). It was designed to provide information on how neck pain after surgery has affected ability to manage daily living. It consisted of ten elements: pain severity, personal care lifting, reading, headaches, concentration, work, driving, sleeping, and recreation. It was assessed in the first post-operative week.

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 III: Post Thyroidectomy Complications Observational Checklist (post-test):

An observational checklist was established to assess complications that happened following thyroidectomy. It was differentiated into early and late complications. Airway blockage, voice changes, bleeding, stridor, hypocalcaemia, laryngeal nerve injury, seroma, tracheal injury, thoracic duct injury, wound infection, and thyroid crisis are examples of early complications. Late complications included keloid scarring, thyroid insufficiency, lifelong hypoparathyroidism recurrence, and vocal cord paralysis (VCP). **It was adapted from (El-Gammal, et al, (2020), Atasayar & Demir, 2019, Hashem et al., (2018), & Desoky et al., (2009).**

Scoring system

For all elements of the Complication, each item was observed, categorised, and scored as either present (one) or absent (zero). For patients in both groups (study & control), these complications were evaluated three times: before discharge, one week after discharge, and again four weeks following discharge.

Content validity and Reliability: Suggested tools for using face and content validity. Face validity aimed to inspect items to determine if the tools measured what they were intended to measure. Content validity was performed to determine whether the content of the tools covered the aim of the study. The tools were reviewed by five experts in each specialty and academic position, including one professor and three assistant professors of medical-surgical nursing from Zagazig University College of Nursing and 1 professor surgical staff from Zagazig University College of Medicine, who checked the content of the tool for precision, applicability, completeness, understandability, and simplicity of use. Based on their feedback, minor changes were made, and the final version was developed.

The internal consistency technique was used to evaluate the tools' reliability. The Neck Pain Disability Index Questionnaire was found to have a reliability coefficient of Cronbach's alpha of 0.74. Prior to the start of data collection, testing for content validity and reliability was conducted. According to the statistics expert, the other tools (questionnaires on knowledge and complications) were not evaluated because they were weighted and weren't thought of as a testable Likert scale.

Ethical Considerations

Prior to the first interview, verbal consent was obtained from each subject after being informed of the nature, purpose, and benefits of the study. Patients were also informed that participation was voluntary, and they had the right to withdraw at any time without giving a reason. The confidentiality of the information received was guaranteed by the encryption of all data. Researchers assured patients that the data would be used for research purposes only. The control group received the same ERP at the end of the study.

Pilot study:

A pilot study was conducted with 10% of the total study subjects (6 patients) to test the clarity and practicality of the tools and to estimate the time required to complete each form. Based on the results of the pilot study, the necessary modifications were made. The subjects were then excluded from the main study sample.

Field work:

A letter was delivered by the Dean of the Faculty of Nursing to the Head of the Department of General

Surgery, requesting the required agreement to carry out the current study. Once permission to continue the study was obtained, the researcher began data collection. Initially, the patients in the study and control groups were interviewed by the researcher to initiate a line of communication. Written patient consent for voluntary participation was obtained after explanation of the purpose and nature of the study. Data collection was carried out over a period of 6 months, from February 2022 to the end of July 2022. Each patient was interviewed individually during the study period (3 days) in the preoperative and postoperative period in 2 shifts at morning and afternoon shift).

The study was conducted through the following**Four phases:****Phase I: Preparatory phase:**

Review of relevant literature (medical and nursing textbooks, journals, internet resources on thyroidectomy surgery, postoperative care to deliver data and ERP.

Phase II: Assessment phase:

To evaluate patients who met the inclusion criteria for this study, researchers used Tool (I), Parts 1 & 2 to conduct an initial assessment of all study participants in the control and study groups. Pre-tests using Tool (I), Part 3 were used to assess the knowledge of the patients. The first tool was gathered at outpatient clinics. Interviews were used to finish the tools. The evaluation of patients' knowledge was conducted twice: first prior to the implementation of the protocol in the preoperative phase and once again following the protocol in the postoperative phase. Once post-operatively, Tool 2 was picked up in the General Surgery department. Tool 3 was collected three times following surgery: once at the general surgery department prior to discharge, once after the first week, and once after the fourth week at outpatient clinics. In order to complete data collection about follow up in the first and fourth weeks following discharge at outpatient clinics, the patients' telephone numbers were first gathered for calling them to schedule the additional visits. The researcher finished and filled out the study tools.

Phase III: Planning

The ERP's design was developed to increase patient knowledge, articulate less neck pain, lessen neck discomfort and dysfunction, and reduce surgical complications based on an assessment of the patient's learning needs as well as the patient's aim, priority, and expected outcome criteria. At this phase, the protocol included six days of progressive teaching sessions (two days preoperative and four days postoperative).

Group discussions, demonstrations, and re-demonstrations were all part of the teaching method.

Additional teaching tools included instructional videos on neck stretches exercises, PowerPoint presentations, and a full-color booklet created by the researcher in Arabic and distributed to patients as a guide and resource to help them understand all aspects of thyroidectomy. The patient's knowledge of thyroid function, a brief description of thyroid disease, post-thyroidectomy complications, breathing exercises, neck exercises, proper body positioning, pre- and post-operative patient care, and patient instructions prior to discharge and follow-up were all included in the full-color booklet.

Phase IV. : Implementation

Group (I): Control group

The control group followed the routine hospital care prescribed by the surgical team and consisted of routine preoperative care, routine postoperative care, and routine pharmacological treatment.

Group (II): Study group

The study group received the ERP in the Outpatient Surgery Clinic pre-operative. Protocol content included routine pre-operative care, routine post-operative care with special emphasis on post-operative exercise (breathing exercises, neck stretching exercises). Preoperative care included educating the patient about breathing and neck exercises (definition, benefits, exercise guidelines, and precautions), possible complications, and reassuring the patient about the surgical incision. Post-operative instructions on wound care, proper use of body position, medications, nutrition, postoperative radioactive iodine for thyroid cancer patients, personal hygiene, driving, warning signs requiring medical attention and follow-up visits, and pre-discharge general instructions based on the patient's needs assessment.

The ERP was applied to the study group in 7 sessions (3 theoretical sessions, 4 practical sessions); Each session lasted 20 to 30 minutes. The protocol was written and presented in Arabic. At the beginning of the first session, an orientation on the protocol and its purpose was presented. Each session began with a summary of what had been taught in the previous session and the objectives of the new one, taking into account the use of simple language adapted to the level of the patients. Motivation and reinforcement were used during training sessions to enhance learning. The booklets were distributed to the studied patients at the end of the sessions. The theoretical part was presented in group discussions using educational videos, booklets, and power point. The practical part was presented in the form of demonstration and demonstration repetition.

The content of the sessions covered theoretical and practical part as the following:

The first two sessions: It begins at outpatient clinic (preoperative admission). It included two theoretical sessions. One session contained a simple anatomical overview of the thyroid gland and information about thyroidectomy surgery such as definition, reasons, kinds, and complications. **The second session** contained information about postoperative positioning (semi-Fowler position with neutral alignment and neck support), early postoperative walking, surgical inspection dressing for bleeding, especially in the neck, wound care, drainage diet planning (soft diet), medications, and follow-up appointments.

The Third and fourth session: It included two practical sessions. It began on the 1st day after admission (preoperative) and included techniques of applying deep breathing, coughing, and neck stretching exercises. After this session, the patient was able to carry out deep breathing, coughing and neck exercises independently. It focused on the following points: definition and benefits of the exercises, instructions, and precautions for performing the exercises, techniques for applying the exercises. At this phase, all patients in the study group were taught neck exercises prior to surgery. The researcher demonstrated deep breathing, coughing, and neck stretching exercises, and the patients repeated it several times until they performed the technique effectively and correctly. All training sessions were observed, and feedback was given to patients.

Postoperatively:

Session 5 and 6 (Practical sessions): It started on the 1st day post-operative. It focused on information on post-operative instructions related to first-time drinking water application techniques and safe swallowing, voice care, also include re-demonstration on deep breathing, coughing, and neck stretching exercises.

Techniques of application of drinking water for the first time

The patient was asked to sit upright at 80-90° (or as high as tolerated >30°). Next, the patient was asked to drink the entire 3 oz. (90cc) of water from a cup or with a straw, in sequential swallows, and slow and steady but without stopping. Lastly, the patient was assessed for interrupted drinking and coughing or choking during or immediately after completion of drinking.

On the 1st postoperative day, the nursing care included assessment of neck pain, the abilities of the patients to start range of motion and assist him at first. The patient was asked to maintain ideal posture as much as possible, avoid over stretching the muscle, avoid extended periods of times in the same position, and stop the exercises if felt server pain. The patient was asked to apply deep breathing, coughing, neck

stretching exercise that was taught to him/her during the preoperative period with colored booklet and educational videos included. The study group performed exercises including five replicates of each exercise three times per day (morning, afternoon, and evening). At the discharge time, the patients had been given booklet and advised with home exercise for 1 month.

Session 7 (Theoretical session): “General pre-discharge instructions.”

It started on the 2nd postoperative day. It focused on the following: post-operative medication and post-operative radioactive iodine for thyroid cancer patients, warning signs that require medical attention, follow-up visits, and post-operative activities such as returning to work, driving, reading, and returning to normal exercise. Before discharge, the researcher arranged with the patients of the study and control groups on the time and place of follow-up, which took place in the 1st and at the 4th week postoperative in the outpatient clinic of the Zagazig University Hospitals.

Phase VI: Evaluation

The final phase was completed by the researchers for both groups using the same tools. The knowledge of patients in both groups was assessed twice using Tool 1, Part 3. Tools II was then applied to the study and control groups once post-operative during hospitalization. Tool III was applied to the study and

control groups three times; once "before discharge" and twice at the first and fourth weeks after discharge (in an outpatient clinic) to assess for complications that may arise after thyroidectomy. The researchers tested the control group first and then the study group to ensure the fairness of the results.

Statistical Design:

All data was collected, tabulated, and statistically analyzed using IBM Corp. Released 2015. IBM SPSS Statistics for Windows, version 23.0. Armonk, New York: IBM Corp. Quantitative data were expressed as mean \pm SD and median (range), and qualitative data were expressed as & (percentage). The t test was used to compare two of the normally distributed variables. The percentages of the categorical variables were compared using chi-square or Fisher's exact test, as appropriate. McNemar's test compared categorical paired variables. The Pearson correlation coefficient was calculated to assess the relationship between the different study variables, the sign (+) indicated direct correlation and the sign (-) indicated inverse correlation, values close to 1 also indicated strong correlation and values close to 0. indicated a weak correlation. All tests were two sided. A p value < 0.05 was considered statistically significant, a p value < 0.001 was considered statistically highly significant, and a p value ≥ 0.05 was considered statistically insignificant.

Results:

Table (1): Frequency and Percentage Distribution of Demographic Characteristics Among the Patients in Study and Control groups (n=60).

	Study group n.30	Control group n.30	χ^2	p-value
Age (year)				
Mean \pm SD	48.7 \pm 8.7	46.5 \pm 7.7	t	0.12
(range)	48(34-61)	42(36- 61)	2.17	
Sex				
Males	10(33.3)	7(23.3)	0.74	0.39
Females	20((66.7)	23(76.7)		
Marital status				
Married	22(73.3)	26(86.7)	1.7	0.19
Single	8(26.7)	4(13.3)		
Education				
Educated	24(80.0)	25(83.3)	0.11	0.74
Illiterate	6(20.0)	5(16.7)		
Occupation				
Worked	14(46.7)	8(26.7)	2.6	0.11
Did not work	16((53.3)	22 (73.3)		

t. Test χ^2 Chi square test

p>0.05: in-significant

Table (2): Frequency and Percentage Distribution of Medical and Surgical Data among the Patients in Study and Control groups (n=60).

		Study group n.30		Control group n.30		χ^2	p-value
		No.	%	No.	%		
BMI	Normal	6	20.0	11	36.7	2.2	0.34
	Underweight	14	46.7	10	33.3		
	Overweight	10	33.3	9	30.0		
Comorbidity	Diabetes	2	6.7	7	30.0	f	0.11
	Hypertension	18	60.0	13	43.3	1.7	0.19
	Cardiac	6	20.0	9	30.0	0.8	0.37
	Respiratory	2	6.7	5	16.7	f	0.42
Surgical Indication	Benign regular Goiter	10	33.3	11	36.7		
	Graves' disease	10	33.3	14	46.7	2.4	0.304
	Malignant neoplasm	10	33.3	5	16.7		
Type of Surgery	Total thyroidectomy	10	33.3	5	16.7		
	Subtotal Thyroidectomy	14	46.7	14	46.7	5.7	0.13
	Hemi thyroidectomy	6	20.0	7	23.3		
	Near total thyroidectomy	0	.0	4	13.3		

χ^2 Chi square test,

f: Fisher exact test ,

$p > 0.05$: in-significant

Table (3): Comparison Between the Studied Patients Total Knowledge Level in Both (Study and Control Groups) at Pre and Post Intervention (n=60).

Items	Study group (n=30)								Control group (n=30)								p-value	
	Pre				Post				Pre				Post					
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Total Patients' knowledge	0	100.0 %	30	100.0 %	21	70.0 %	9	30.0 %	0	100.0 %	30	100.0 %	0	100.0 %	30	100.0 %	t= 1.9	t= 119.
Mean ±SD	5.9±3				45.5±10				4.7±1.9				9.8±2.1				P=.061	P=.0001**
Median (range)	6(2-11)				52(23-55)				5(1-7)				10(15-13)					

t. Test, Mc:nemar test

* $p < 0.05$: in-significant

Table (4): Comparison between the Patients in Study and Control Groups Regarding Pain and Disability (n=60).

Items	Study group n=30		Control group n=30		χ^2	p-value
No Pain or Disability	6	20.0%	0	0.0%		
Mild Pain & Disability	18	60.0%	0	0.0%		
Moderate Pain& Disability	6	20.0%	21	70.0%		
Severe Pain& Disability	0	0.0%	9	30.0%		
Total Pain& Disability score	10.9±4.9 10(3-18)		22.1±5.8 1910(16-34)			

χ^2 Chi square test

** $p < 0.001$: highly significant

* $p < 0.05$: significant

Table (5): Comparison Between the Patients in Study and Control Groups Regarding Post Thyroidectomy Complications (n=60).

		Study group n.30		Control group n.30		χ^2	p-value
Before Discharge	Change of voice	30	100.0	30	100.0	-	-
	Stridor	2	6.7	0	.0	f	0.49
	Hypocalcaemia	30	100.0	30	100.0	-	-
	Thyroid insufficiency	6	20.0	6	20.0	-	-
After 1 st week	Change of voice	2	6.7	8	26.7	4.3	0.037*
	Hypocalcaemia	22	73.3	26	86.7	1.7	0.19
	Seroma	8	26.7	17	56.7	5.6	0.018*
	Wound infection	0	.0	5	16.7	f	0.052
After 4 th week	Thyroid insufficiency	2	6.7	5	16.7	f	0.23
	Hypocalcaemia	0	.0	13	43.3	16.6	0.0004*
	Seroma	3	10.0	17	56.7	14.7	0.0001*
	Wound infection	0	.0	13	43.3	16.6	0.0004*
	Keloid scar	0	.0	12	40.0	15	0.0001*
Thyroid insufficiency	4	13.3	4	13.3	-	-	

χ^2 Chi square test, f: Fisher exact test, $p>0.05$: in-significant, $*p<0.05$: significant

Table (6): Comparison Between Post Thyroidectomy Complications in Relation to Knowledge Level among the Patients In the Study Group (n=30).

		Satisfactory knowledge level n.21		Unsatisfactory knowledge level n.9		F p-value
Before Discharge	Change of voice	21	100.0	9	100	-
	Stridor	2	9.5	0	0.0	0.16
	Hypocalcaemia	21	100.0	9	100	-
	Thyroid Insufficiency	1	4.8	5	55.6	0.009*
After 1 st week	Change of voice	0	0.0	2	22.2	0.16
	Hypocalcaemia	13	61.9	9	100.0	0.034*
	Seroma	2	9.5	6	66.7	0.006*
	Thyroid Insufficiency	0	0	2	22.2	0.160
After 4 th week	Seroma	1	4.8	2	22.2	0.41
	Thyroid Insufficiency	1	4.8	3	33.3	0.14

f: Fisher exact test, $p>0.05$: in-significant, $*p<0.05$: significant

Table (7): Comparison Between Post Thyroidectomy Pain in Relation to Knowledge Level among the Patients in Study Group (n= 30).

Post thyroidectomy pain & disability	Knowledge level				χ^2	p-value
	Satisfactory n=21		Unsatisfactory n=9			
No Pain or Disability	5	23.8%	1	11.1%	17.5	0.0001*
Mild Pain& Disability	16	76.2%	2	22.2%		
Moderate Pain& Disability	0	0.0	6	66.7%		

χ^2 Chi square test, f: Fisher exact test, $*p<0.05$: significant

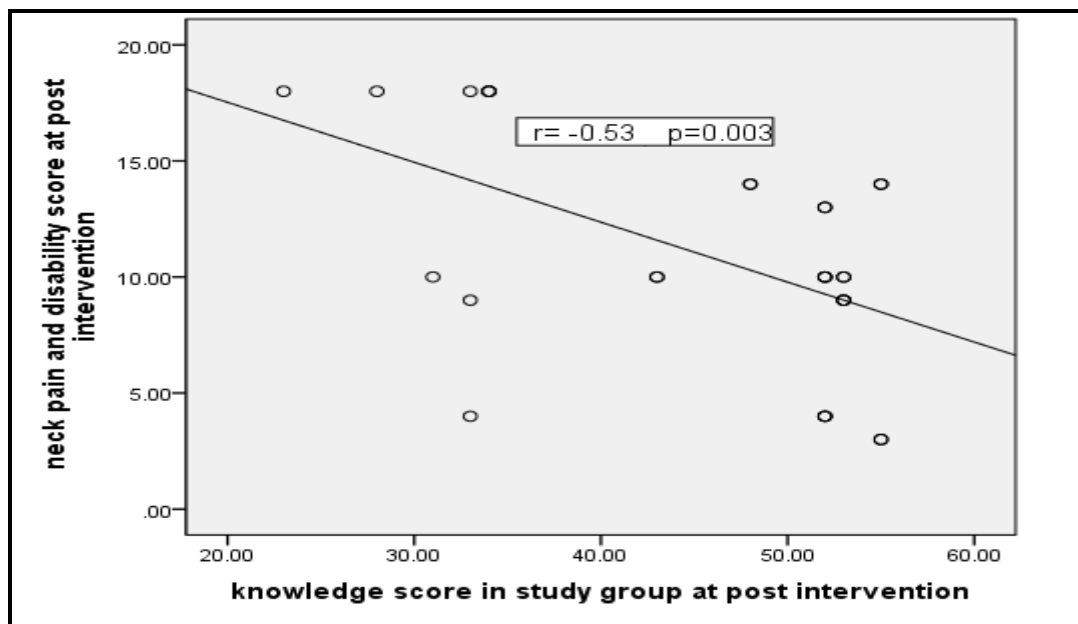


Figure (1): Scatter Dots Shows Correlation Between Knowledge and Neck Pain & Disability Total Levels among the Patients in Study Group (n=30).

Table (1): Shows that the mean and standard deviation of age of the patients in the study and control groups was 48.7 ± 8.7 , 46.5 ± 7.7 years respectively. As well as there was a high proportion of females in both the study and the control groups (66.7%, and 76.7%) respectively. As regards the marital status, nearly less than three quarters (73.3 %) of patients in the study group and majority (86.7%) of them in the control group were married. Pertaining to the patient's educational level, the majority (80.0% & 83.3 % respectively) of patients in study and control groups were educated. 53.3 % and 73.3% correspondingly of patients in the study and control groups didn't work. Finally, there was no statistically significant differences between both groups (p value > 0.05).

Table (2): Reports that more than two fifths (46.7%) of patients in the study group and one third (33.3%) of them in the control group were under weight. Less than two thirds (60.0%) of the patients in the study group and more than two fifths (43.3%) of them in the control group were having hypertension. As regards surgical indication, one third (33.3%) of patients in study group and more than two fifths (46.7%) of patients in the control group were having graves' disease. Concerning type of surgery, more than two fifths (46.7%) of patients in both groups had subtotal thyroidectomy. Finally, there was no statistically significant differences between both groups (p value > 0.05).

Table (3): Indicates that all studied patients (100.0%) in the study and control groups had unsatisfactory levels of knowledge at pre intervention with Mean

\pm SD (5.9 ± 3 & 4.7 ± 1.9 respectively). While more than two thirds (70.0%) of patients in the study group had satisfactory level of knowledge at post intervention with Mean \pm SD 45.5 ± 10 , while that all patients (100.0%) of the control group even now had unsatisfactory level at post intervention with Mean \pm SD 9.8 ± 2.1 . There was a highly statistically significant difference between the patients in the study and control groups concerning their knowledge at post intervention with p-value < 0.001 .

Table (4): Reveals that the high percentage (60.0%) of the patients in the study group equivalent two thirds of them had mild level of pain & disability post-intervention and one fifth of them (20.0%) hadn't pain or disability. While more than two thirds (70.0%) of the patients in the control group had moderate level of pain & disability and just about one third of them (30.0%) experienced severe level of pain & disability post-intervention. There was a highly statistically significant difference between the patients in the study and control groups about the level of pain & disability at post intervention at p-value < 0.001 and with Mean \pm SD (10.9 ± 4.9 & 22.1 ± 5.8 respectively).

Table (5): Explores that all (100%) patients in both groups (study & control) had change of voice, and hypocalcemia as post thyroidectomy complications before discharge compared to nearly less than three quarters (73.3%) of patients in the study group and majority (86.7%) of patients in the control group had hypocalcemia in the first week after thyroidectomy. There were statistically significant differences between both groups post intervention in the first

week post thyroidectomy on the subject of change of voice, and seroma (χ^2 4.3 at $P \leq 0.05$, & χ^2 5.6 at $P \leq 0.05$ respectively). There were statistically significant differences between both groups post intervention in the fourth week post thyroidectomy regarding hypocalcemia, Seroma, wound infection, and keloid scar (χ^2 16.6 at $P \leq 0.05$, χ^2 14.7 at $P \leq 0.05$, χ^2 16.6 at $P \leq 0.05$, & χ^2 15 at $P \leq 0.05$ respectively).

Table (6): Demonstrates that there were statistically significant differences in satisfactory level of knowledge and post thyroidectomy complications among the patients in the study group before discharge regarding thyroid insufficiency ($P \leq 0.05$). In addition, there were statistically significant differences between satisfactory level of knowledge and post thyroidectomy complications in the study group in the first week concerning hypocalcemia, and seroma ($P \leq 0.05$).

Table (7): Shows that over three quarters (76.2%) of patients in the study group who had a satisfactory level of knowledge suffered from mild level of pain & disability post- intervention. While two thirds (66.7%) of them who had unsatisfactory level of knowledge experienced moderate level of pain & disability post- intervention. There was a highly statistically significant difference between the patients in study group regarding their level of knowledge and post thyroidectomy pain & disability at post intervention with p-value < 0.001 .

Figure (1): Shows inverse significant correlation between knowledge and neck pain & disability in study group at post intervention ($r = -0.53$ $p = 0.003$).

Discussion:

Thyroidectomy has been reported to be an effective, safe, and cost-saving procedure and to have the lowest recurrence rate (Gerard et al., 2021). Patients who endure thyroid surgery often face discomfort symptoms such as stretching, pressing, or choking feelings in the neck, headache, shoulder rigidity, and difficulty in moving the neck or shoulders. These symptoms may persist for long times. Patients who experienced thyroid surgery are essential to perform stretching exercises beginning from the day after the surgery (Miyachi, et al., 2021).

As regard the patients' knowledge about thyroidectomy, the current research found that, all studied patients in the study and control groups had unsatisfactory level of knowledge pre intervention. However, post- application of the ERP, study group patients had a highly significant progress than those of control group. This study result was in the line with Hashem et al, (2018) who stated that the majority of patients in the study and control groups had unsatisfactory level of knowledge. This can be explained by a lack of educational opportunities and

ongoing education. However, after implementing the intended nursing instructions, study group patients significantly outperformed those in the control group in terms of all knowledge-related domains.

Moreover, Abd Elhafiez et al, (2022) & El Shafae et al, (2022) revealed that majority of the study group patients had poor knowledge before fulfilling protocol of nursing care compared to no one immediately after implementing protocol of nursing care. Also, this study showed that there was a significant difference between the study group pre and post protocol of care.

From the point of researchers view the justification for knowledge perfection among the patients in study group might be credited to the implementation of the ERP, active participation of patients in session, provision of booklet; its clarity, simplicity, using of audio-visual aids and verbal teaching as a part of protocol. Along with support to this clarification, Ramesh et al, (2017) noted that preoperative education had a positive impact on patient by letting them know what would happen at each stage of the surgery, improving their physical and mental well-being, improving the surgical outcome, as well as helping them understand the role and responsibilities of own individual care and clearing up any misconceptions.

According to pain and disability post intervention, the current study revealed that there was a highly statistically significant difference between the patients in study and control groups concerning the level of pain & disability after implementing the ERP. This result was supported by Abd-El Mohsen & Ahmed, (2018), Mohamed, (2019) & Shehata et al, (2020) who indicated that neck pain and related disability significantly diminished in the study group when followed one week after thyroidectomy than in the control group. Furthermore, Pan et al, (2021) stated that the Visual Analog Scale VAS scores in the study group after surgery were significantly lower than those in the control group and the difference between the two groups was statistically significant. According to the researchers' point of view, the reduction of pain level and neck disability among the patients in study group reflected the positive effect of implementing the ERP, and effective demonstration and re demonstration of stretching exercises pre- and postoperatively. In contrast, Jang et al, (2014) didn't find any significant difference between stretching exercise and control groups in terms of neck discomfort and range of motion 3 months after a thyroidectomy. This might be due to that neck pain and disability enhances naturally within 1 month after thyroidectomy. In relation to post thyroidectomy complications, the current study revealed that all patients in both groups (study & control) had change

of voice, and hypocalcemia as post thyroidectomy complications before discharge compared to nearly less than three quarters of patients in the study group and majority of patients in the control group had hypocalcaemia in the first week post thyroidectomy. These findings were in harmony with **Hashem et al., (2018)** who exhibited that the most common complication during hospitalization was hypocalcaemia in both groups. Also, demonstrated that hypocalcemia and frequent laryngeal nerve injury persisted in the control group till the period of follow up with the following percent. In addition, **Altaf et al., (2019)** in the study entitled "Experience of thyroid surgery at a tertiary care hospital in Karachi, Pakistan" who presented that most common complication stated was transient hypocalcaemia, which was reported in 89 patients who endured thyroidectomy. The results of the current study demonstrated that there were statistically significant differences between satisfactory knowledge level and post thyroidectomy complications post intervention in the study group before discharge after thyroidectomy regarding thyroid insufficiency. In addition, there were statistically significant differences between satisfactory level of knowledge and post thyroidectomy complications after intervention in the study group in the first week post thyroidectomy regarding hypocalcaemia, and seroma. This might be related to the improved level of knowledge for patients in study group after implementing the ERP therefore being able to decrease the occurrence of post thyroidectomy complications.

These results weren't consistent with **Elesawy et al., (2022)** in the study entitled " Effect of Educational Program on Self-efficacy and Peristomal Skin Complications for Patients with Permanent Colostomy" who showed that there was a statistically significant negative correlation between the patients' overall knowledge scores, practice, self-efficacy and peristomal skin complication pre and post three months after implementing educational program. **Concerning the comparison between Post thyroidectomy pain at post intervention and the total knowledge level among the patients in the study group**, the present study indicated that over three quarters of patients in the study group who had a satisfactory level of knowledge suffered from mild level of pain& disability post- intervention. While two thirds of them who had unsatisfactory level of knowledge qualified moderate level of pain& disability with a highly statistically significant difference.

These findings were in coordination with **Nasir, & Ahmed, (2020)** who assumed that insufficient knowledge about pain managing was due to a lack of preoperative information and unsatisfactory

preoperative discussions about pain management. And inadequate preoperative discussion regarding pain management associated with higher postoperative pain.

These findings were not in accordance with **Valeberg et al, (2020)** who mentioned that no significant differences in pain intensity or pain interference with function were found between the usual care and intervention groups at any time points after the intervention. The researcher explained these results as the time frame from obtaining the booklet to the actual surgery (several weeks) may have been too long. So, the patients may not have been interested in reading the booklet at that time, and it may not have been the ideal time to provide information about what to do and expect after surgery. **As regard the correlation between the level of knowledge and neck pain & disability**, the current results pointed to that there was an inverse significant correlation between the level of knowledge and neck pain & disability among the patients in the study group post implementation of the enhanced recovery protocol. This means that patients with satisfactory level of knowledge were experienced with diminished level of pain and disability. **Corresponding to the researchers' point of view**, this inverse significant correlation related to the effective patient education represented in accurate application of the ERP. These finding were supported by **Dahodwala et al, (2018)** who found clear evidence to support the effectiveness of video-based patient education in improving short-term outcomes, including increased knowledge, understanding of health-related medical information, lightening pain and anxiety, and improving patient satisfaction. Moreover, **Rahmani et al, (2020)** confirmed that as inadequate preoperative discussion regarding pain management correlated with higher postoperative pain.

Conclusion

Corresponding to the study findings, it can be assumed that application of enhanced recovery protocol for patients undergoing thyroidectomy had a statistically significant positive effect on alleviating neck pain, functional disability, and post operative complications. There was a highly statistically significant difference between the patients in the study group regarding their total level of knowledge and post thyroidectomy pain, disability, and complications after implementation of the enhanced recovery protocol, which sponsored the proposed hypotheses.

Recommendations

Based on results of the present study it can be suggested that:

1. Repetition of the present study on greater possibility population is advised to gain generality and larger application of the proposed protocol.
2. Arabic booklet with simple language and different simple pictures should be available and presented for undergoing thyroidectomy patients, involving procedures for therapeutic exercises, proper body mechanics, and lifestyle modification.
3. The enhanced recovery protocol should be licensed in different surgical departments.

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