

Effect of Designed Nursing Guidelines on Minimizing Postoperative Complications for Patients Undergoing Thyroidectomy

Eman Mohammed Hashem¹, Zienab Abd El-Lateef Mohammed², Mostafa Thabet Ahmed³, Sahra Zaki Azer⁴, Sahar Ali Abd- Elmohsen⁵.

¹ Demonstrator in Adult Nursing Department, Faculty of Nursing, Assiut University, Egypt.

² Professor of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.

³ Professor of General Surgery, Faculty of Medicine, Assiut University, Egypt.

⁴ Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.

⁵ Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.

Abstract

Background: Thyroidectomy is the surgical removal of a partial or complete thyroid gland in case of hyperthyroidism, thyroid cancer and goiter. **The aims of this study:** were to evaluate effect of designed nursing guidelines on minimizing postoperative complications for patients undergoing thyroidectomy through the following; 1) assess patients' knowledge and practice about thyroidectomy, 2) design nursing guidelines, 3) evaluate the effect of applying these guidelines on minimizing postoperative complications for patients undergoing thyroidectomy. **Patients and method:** This study was conducted in the general surgery department and outpatient surgery clinic at Assiut University Hospital. A convenient sample of 60 adult patients of both sexes, their ages ranged between 20 - 65 years old and were divided into two equal groups (study and control) thirty patients for each. **Tools:** Patient assessment sheet and thyroidectomy complications evaluation sheet. **Results:** there was statistically significant difference between the study and control groups regarding knowledge and practice scores, wound healing and other thyroidectomy complications. **Conclusion:** implementation of the designed nursing guidelines in the management of patients undergoing thyroidectomy had improved patients' outcomes: significantly increased level of knowledge and practice scores, and decreased overall postoperative complications rate. **Recommendation** Providing a written instruction booklet about perioperative care for thyroidectomy is of great importance for the patients.

Key Words: *Nursing guidelines, Postoperative Complications & Thyroidectomy.*

Introduction

Thyroidectomy is a very common surgical procedure worldwide and has a significant role in the management of thyroid disease in patients with simple goiter, benign thyroid tumors, hyperthyroidism (including hyperthyroidism in pregnancy) and thyroid cancer (Tidy, 2011).

Thyroid surgery may involve; total thyroidectomy, which aims to achieve complete removal of the thyroid tissue, subtotal thyroidectomy; bilateral thyroid remnants are left and finally, thyroid lobectomy that involves removing the nodular half of the thyroid gland (Liu et al., 2015).

Rates of thyroid surgery have dramatically increased during the past three decades. 118,000 to 166,000 patients in the United States undergo thyroidectomy each year. Thyroidectomy is performed on patients of both genders, but is more commonly performed on women (Chandrasekhar et al., 2013). In Egypt, there is a continuous increase in percentage of patients who were admitted for thyroidectomy in relation to general surgical patients. It was (19.8%, 25.5%, 31.5%, 38.8%, 44.4%) respectively, in the period between "2004 to 2008" respectively

(Statistical Administration and Medical Records, at Manial University Hospital, 2010).

Although complications following thyroidectomy are rare, their consequences can be life-threatening. It include hypothyroidism, damage to or inadvertent removal of parathyroid glands leading to hypoparathyroidism and hypocalcemia, hemorrhage, injury to the recurrent or superior laryngeal nerve, and wound infection. Also, patients commonly experience discomfort in the neck such as neck pain, stress and pressure in the neck, difficulties in movement of the neck (Lewis et al., 2013).

It is a vital nursing role to provide patients with the information needed to make decisions and to motivate him to appreciate the need for learning. Therefore, implementation of nursing care guidelines for patients with thyroidectomy may improve their care outcomes by improving compliance with medical and surgical treatment regimens and promoting healthy lifestyles (Hassan et al., 2012).

The nurse must inform patients about the purpose of preoperative exams, and explains what preoperative preparation to expect, the nurse also must instruct patients about manifestations of potential

complications, should assess pain intensity plus providing written and verbal information regarding wound care, medications, nutrition, and follow-up visits to the surgeon (Desoky et al., 2009).

Significance of the study

During the year 2015 to 2016; 224 patients underwent thyroidectomy at Assiut university hospital most of them developed postoperative complications, (Assiut university hospital records, 2016). In Egypt, there is a continuous increase in percentage of patients who were admitted for thyroidectomy in relation to general surgical patients. So this study was carried out to help those patients in prevention of these complications.

Aim was to

evaluate effect of designed nursing guidelines on minimizing postoperative complications for patients undergoing thyroidectomy through the following;

- Assess patient's knowledge about thyroidectomy.
- Design nursing guidelines for patients undergoing thyroidectomy.
- Evaluate the effect of applying the designed nursing guidelines on minimizing postoperative complications of patients undergoing thyroidectomy.

Hypotheses

- The total knowledge's mean scores of the study group patients will be higher than those of the control group after application of the nursing guidelines.
- Post-operative complications associated with thyroidectomy will be less among the study group than the control group.

Patients & Method

Research design

Quasi- experimental research design was utilized to conduct this study.

Setting

The study was conducted in general surgery department and outpatient surgery clinic at Assiut University Hospital.

Patients

According to Assiut University Hospital records through (2015 to 2016), the incidence of thyroidectomy operations was about "224". So, a convenient sample of 60 adult patients of both sexes in general surgery department and outpatient surgery clinic at Assiut University Hospital were included in this study, their ages ranged between 20 - 65 years old. Patients were randomly divided into two equal groups (study and control) 30 patients for each. The study group received the designed nursing guidelines

while the control group received the routine hospital care.

Tools

Three tools were used to collect the necessary data for this study.

Tool (I): Patient's assessment sheet: To assess demographic data, medical data and knowledge about thyroidectomy operation and its pre and post-operative complications, it was developed by the researcher based on reviewing of literature. It was divided into four parts that covered the following information as follow:-

Part (1): Demographic data for patients as name, age, gender, marital status, level of education and occupation.

Part (2): Patient's medical data as medical diagnosis, medical history, health habits, type of operation, duration of operation, general appearance and patients' vital signs during different follow up periods: pre-operative, post-operative, before discharge and at time of follow up.

Part (3): Physical examination: It included general examination of each body system, local examination of the thyroid gland.

Part (4): Assessment of patient knowledge; regarding the following items.

Anatomy of the thyroid gland & the operation, deep breathing and coughing exercise, postoperative nutrition, wound care, medications, follow up visits and return to the usual activities.

Scoring system

Questions concerning patient's knowledge toward thyroidectomy; it included 33 questions. The total score of the questionnaire was 99 degrees. Scores assigned to each item were between 0 and 3 points as follows; three degrees for complete correct answer, two degrees for incomplete correct answer, one degree for incorrect answer and zero for not known answer. The range of total scores lie between 0-99, patients were classified as; satisfactory if their total score was $\geq 50\%$, and unsatisfactory if their total score was < 50 .

Tool (II): Thyroidectomy complications evaluation sheet: an observational checklist was developed to assess complications which occur after thyroidectomy. It was divided into two parts.

Part 1: Southampton Wound Assessment Scale

Southampton scale was designed for use in the postoperative assessment of wound by (Punder, 2010). The wounds were graded before discharge and after 10 – 14 days postoperatively into one of four categories; normal healing, minor complication, wound infection, and major haematoma.

Grading of Southampton wound assessment scale.

Grade	Appearae
0. Normal healing	Normal healing
1. Normal healing with mild bruising or erythema: A B C	Some bruising Considerable bruising Mild erythemia
2. Erythema plus others signs of inflammation: A B C D	At one point Around suture Along wound Around wound
3. Clear or haemoserous discharge: A B C D	At one point only (< 2 cm) Along wound (> 2 cm) Large Volume Prolonged (> 3 days)
4. Major complication (Pus): A B	At one point (< 2 cm) Along wound (>2cm)
5. Deep or severe wound infection with or without tissue breakdown; haematoma requiring aspiration	

Grading of Southampton wound assessment scale (Azer et al., 2011)

Scoring system of Southampton wound assessment scale

Each item was observed, categorized, and scored into either present = 1 or not present = zero on all items of Southampton scoring system for the study and control groups (Azer et al., 2011).

Part (2): Assessment of other thyroidectomy complications

Observational check list was developed to assess airway obstruction, atelectasis, pneumonia, haemorrhage, recurrent laryngeal nerve injury, thyrotoxic crisis, parathyroid insufficiency, thyroid insufficiency and keloid scar. Those complications were assessed through clinical manifestations and laboratory investigations during hospitalization and then after 4 weeks from discharge.

The designed nursing guidelines

The designed nursing guidelines was developed in simple Arabic language by the researcher based on patient's assessment needs, literature review, experience of researcher, and opinion of the surgical and nursing expertise to evaluate the effect of

designing and applying nursing guidelines on minimizing postoperative complications for patients undergoing thyroidectomy. It consisted of the following:

- Simple anatomical thyroid gland overview.
- Information about thyroidectomy operation as definition, indications, types and complications.
- Preoperative and the day of surgery instructions as deep breathing and coughing exercise.
- Post-operative instructions about positioning, nutrition, wound care, medications and follow up visits.
- Pre-discharge general instructions on getting back to work, car driving, returning to usual exercises and getting pregnancy.

Method**Ethical approval**

An official letter was issued from the dean of the faculty of nursing to the head of general surgery department soliciting the necessary approval to conduct the present research. Each patient was informed for the purpose of the study. The investigator emphasized that the participation is voluntary.

Technique for data collection

A review of relevant literature (nursing and medical textbooks, scientific journals, internet resources about thyroidectomy surgery and its care) was done.

Content validity

The content validity was done by 5 experts from the field of general surgery and nursing staff, who reviewed the tools for clarity, relevance, comprehensiveness and understanding. The required modifications were done accordingly, reliability test was done using internal consistency for the tools measured using Cronbach Alph, reliable R/ 0.73.

Pilot study

A pilot study was carried out on (10 %) 6 of patients during November, 2016. Its purpose was to assess the feasibility & applicability of the study and clarity of the data collection tools. It also helped to estimate the time needed for filling the questionnaire. The data obtained from the pilot study was analyzed and no modifications were made so, those patients involved in the pilot study were included in the main study.

Procedure

Once permission was obtained to proceed with the study, the investigator initiated data collection.

- At initial interview the researcher introduced herself to start line of communication, explained the nature and purpose of the study for patients. Patients were equally and randomly enrolled in the study as study and control groups sequentially.
- Each patient involved in the study was assessed for his or her knowledge pre-test (tool I). The tools

filled through interviewing. The study was carried out at morning, and after noon shifts.

- There were a total three sessions were conducted for each patients, each session ranged between (20-40) minutes except for the session for discharge instruction, which lasted 60 minutes. Each session usually started by a summary of what had been taught during the previous session and the objectives of the new session. Each patient in the study group obtained a copy of the teaching booklet.
- **The first session:** Was started during first 24 hours post admission preoperatively. It contained simple anatomical thyroid gland overview and information about thyroidectomy operation as definition, indications, types and complications.
- **The second session:** was started after 24 hours post admission preoperatively, it contained two parts:
Part I: Information about deep breathing and coughing exercise. At the end of this session, the patient was able to perform deep breathing and coughing exercise independently.
Part II: Information about post-operative instructions about positioning, nutrition, wound care, medications and follow up visits
- **The third session:** It contained pre-discharge general instructions on getting back to work, car driving, returning to usual exercises and getting pregnancy.
- The patient's knowledge and practice of both groups had been evaluated by the researcher using the same tool I. Then tool II was applied to both the study and control groups during hospitalization, before discharge, two weeks and then after four weeks from discharge to assess complications which could occur after thyroidectomy.
- The data collection covered a period of 6 months starting from December, 2016 till the end of May, 2017.

Ethical considerations

- Research proposal was approved from Ethical Committee in the Faculty of Nursing .
- There was no risk for study subject during application of the research.
- The study followed common ethical principles in clinical research.
- Oral consent was obtained from patients to participate in the study, after explaining the nature and purpose of the study .
- Confidentiality and anonymity of the subjects were assured.
- Study subject had the right to refuse to participate and or withdraw from the study without any rational at any time.

- Study subject privacy was considered during collection of data.

Statistical analysis

Data entry and statistical analysis were done using SPSS ver. 23 statistical software packages. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, mean and standard deviations for the quantitative variables. Independent t-test and cross tabulation was used for assessment of the inter-relationships among quantitative variables. The level of significance for this study was set at ($p = 0.05$) to detect any indication of differences found in the data available.

Limitations of the study

There were no limitations in the study.

Results

Table (1): Demographic data of the study and control groups (n= 60) ns = Non significant difference

Variable	Study group (n=30)		Control group(n=30)		P. value
	N.	%	N.	%	
1. Age group					
20-38 yrs.	20	66.6	14	46.6	0.29 ns
39-60 yrs.	8	26.6	13	43.3	
> 60yrs.	2	6.6	3	10	
Mean ±SD	39.47± 10.23				
2. Gender					
Male	8	26.7	7	23.3	0.5 ns
Female	22	73.3	23	76.7	
3. Marital status					
Single	3	10.0	1	3.3	0.5 ns
Married	24	80.0	23	76.7	
Divorced	1	3.3	3	10.0	
Widowed	2	6.7	3	10.0	
4. Educational level					
Illiterate	21	70	15	50.0	0.2 ns
Read and Write	2	6.7	1	3.3	
Primary school	2	6.7	4	13.3	
Preparatory school	1	3.3	6	20.0	
Secondary school	1	3.3	2	6.7	
University	3	10.0	2	6.7	
5. Occupation					
Un employed	10	33.3	10	33.3	0.8 ns
Driver	2	6.7	1	3.3	
Farmer	0	0.0	1	3.3	
House wife	16	53.3	16	53.3	
Employer	2	6.7	2	6.7	

ns = Non significant difference

Table (2): Comparison of the mean knowledge score about thyroidectomy between the study and control groups before and after application of designed nursing guidelines (n=60).

Variable	Study group (n= 30) Mean ±SD	Control group (n= 30) Mean ±SD	P.value
Pre-guidelines	23.46±15.24	17.76±12.17	0.11
Post-guidelines	37.50±9.97	17.76±12.17	0.01*

*= Statistically significant difference ($p < 0.05$)

Table (3): Comparison between the study and control groups regarding Southampton wound assessment scale before discharge and after 2 weeks from discharge (n=60).

Variables	Before discharge					After 2 weeks				
	Study group (n=30)		Control group (n=30)		P. value	Study group (n=30)		Control group (n=30)		P. value
	N.	%	N.	%		N.	%	N.	%	
0. Normal healing	26	86.7	25	83.3	0.5	30	100	18	60.0	0.01*
I. Normal healing with mild bruising or erythema	2	6.7	3	10.0	0.1	0	0.0	3	10	0.7
II. Erythema plus other signs of inflammation	1	3.3	1	3.3	0.2	0	0.0	2	6.7	0.1
III. Clear or haemoserous discharge	1	3.3	1	3.3	0.5	0	0.0	4	13.3	0.05*
IV. Major complication (pus)	0	0.0	0	0.0	Ns	0	0.0	3	10.0	0.07
V. Deep or sever wound infection	0	0.0	0	0.0	Ns	0	0.0	0	0.0	Ns

Table (4): Comparison between the study and control groups regarding other thyroidectomy complications during hospitalization and on follow up after 4 weeks from discharge (n=60).

Complications	During hospitalization					After 4 weeks				
	Study group (n==30)		Control group (n=30)		P. value	Study group (n==30)		Control group (n=30)		P. value
	N.	%	N.	%		N.	%	N.	%	
Early complications										
Obstructed air way	0	0.0	3	10	0.07	0	0.0	0	0.0	-
Atelectasis and pneumonia	1	3.3	5	16.6	0.02*	0	0.0	0	0.0	-
Hemorrhage	1	3.3	1	3.3	1.0	0	0.0	0	0.0	-
Recurrent laryngeal nerve damage	2	6.7	4	13.3	0.3	0	0.0	2	6.7	0.1
Thyroid crisis	0	0.0	0	0.0	-	0	0.0	0	0.0	-
Hypocalcaemia	2	6.7	6	20.0	0.12	0	0.0	4	13.3	0.03*
Late complications										
Thyroid insufficiency	0	0.0	0	0.0	-	0	0.0	1	3.3	0.3
Keloid scar	0	0.0	0	0.0	-	1	3.3	4	13.3	0.05*
Recurrence	0	0.0	0	0.0	-	0	0.0	0	0.0	-

Table (1): This table shows that; the highest percentage of the studied patients their ages ranged between 20-38 years old, with mean of 39.47 ± 10.23 years. Also there was a predominance of females in both the study and the control groups (73.5 % and 76.7 %) respectively. As regard the marital status, the majority of patients in the study and control groups were married (80.0% and 76.7%) respectively.

Concerning the patient's educational level, (70.0% and 50.0%) respectively in the study and control groups were illiterate. In relation to patients' occupation, more than half of patients in both groups (53.3%) were housewives.

Table (2): The above table illustrates that; as regard the mean knowledge score, there was no statistically difference between the study and control groups

before application of the nursing guidelines with P .value = 0.11. While after application of the nursing guidelines, the study group had higher mean knowledge score than the control group with statistically significant difference between both groups (P .value= 0.01*)

Table (3): This table states that, no significant difference was existed between the study and control groups before discharge regarding all items of Southampton wound assessment scale. Also, this table enumerates that significant difference was found in post discharge (after 2 weeks) between both groups regarding normal healing (grade 0) and wound infection (grade III) with P .value = (0.01*, 0.05*) respectively.

Table (4): This table exhibits that, the study group had less overall complications rate compared to the control group during hospitalization and at follow up after 4 weeks from discharge. As regard complications during hospitalization, the commonest complication was hypocalcaemia in both groups. The second commonest complication was recurrent laryngeal nerve damage in both groups. Also, this table demonstrates that hypocalcaemia and recurrent laryngeal nerve damage continued to develop in the control group until time of follow up with the following percentage (13.3 %, 7.5 %) respectively. Looking for late complications, (13.3%) of patients in the control group and (3.3%) of patients in the study group were complaining from keloid scar. Such difference was statistically significant ($p = 0.05^*$).

Discussion

Thyroidectomy is one of the most commonly performed surgical procedures; it represents the principal treatment modality for both benign and malignant thyroid disease, such as hyperthyroidism, symptomatic goiter, indeterminate thyroid nodules, and thyroid cancer (Adam et al., 2017). Complications following thyroid surgery are rare but their consequences can often be life -threatening as compared to other surgeries being performed routinely (Memon et al., 2012), so the perioperative care given by the nurse should cover the comprehensive needs of the patient, improving the patient's confidence to face surgery, and return to regular life activities (Chen & Wang, 2011).

The aims of this study were; to evaluate effect of designed nursing guidelines on minimizing postoperative complications for patients undergoing thyroidectomy through the following; assess patients' knowledge about thyroidectomy, design nursing guidelines and then to evaluate the effect of applying these guidelines on minimizing postoperative complications for patients undergoing thyroidectomy.

The present study showed that; the mean age of the study and control group was 39.47 ± 10.23 years. According to El-Khateeb et al., (2015) who mentioned that the mean age of the patients undergoing thyroidectomy was 37.53 ± 10.48 . Also, Mishra et al., (2013) reported that, thyroid diseases are very common in middle-aged and older adults.

In this study the majority of the studied patients were females. In accordance with this study result, Hariadha et al., (2013) revealed that thyroid disorders were present among females more than males. (Vanderpump, 2011), also mentioned that more females undergone surgery as compared to males (5:3). This is mostly because thyroid diseases mostly appear in the females Viswanathan et al., (2014).

Regarding level of education, more than two thirds of patients in the study group and half in the control group were illiterate. Concerning occupation, more than half of patients in both groups were housewives. This study finding was in agreement with Desoky et al., (2009) who revealed that more than two thirds of the studied patients were illiterate and a little more than three quarters were housewife.

As regard the patients' knowledge about thyroidectomy, the present study revealed that, the majority of patients in the study and control groups had unsatisfactory level of knowledge. This can be justified by in availability of training programs and lacking of continuous educations.

However, after implementing the designed nursing guidelines, study group patients had a highly significant improvement than those of control ones in relation to all items of knowledge. This result supports the study hypothesis which suggested that the knowledge of the study group patients after application of the nursing guidelines will be higher than those of the control group.

This study result was in agreement with Tang & Newcomb, (2009) who reported that providing verbal and printed summary information to patients improve their understanding of their care, enhance their relationships with providers, improve their satisfaction with care, and motivate them to adhere to treatment plans.

The rationale for knowledge improvement among the study group might be attributed to the implementation of educational guidelines, provision of booklet and verbal instructional information as a part of educational guidelines. In support to this explanation, Kearney et al., (2011) reported that patients who attended the preoperative education class reported feeling better prepared for surgery and better able to control their pain after surgery. Similar finding was pointed by Blinder et al., (2009) who mentioned that verbal and written recommendations

worded simply with details were important for patient compliance and reduced postoperative stress and complaints.

As regard Southampton Wound Assessment Scale, the present study revealed that, no significant difference existed between the study and control groups before discharge since more than three quarter of both groups had normal healing pre-discharge. This might be related to antibiotics prescribed during hospital stay. This finding supported by **Gentile et al., (2014)** who illustrated that most hospitals are still using antibacterial medications perioperatively in order to prevent the incision infection.

On the other hand, when subsequently the patients were followed up in the outpatient clinic, all patients participated in the study group were having normal healing. While more than half of patients in the control group were normal healing, and less than one fifth were having clear or haemoserous discharge, mild bruising or erythema and wound infection. This findings can interpreted by wound care guidelines which were received by the study group about importance of using sterile dressing, supporting wound during coughing and taking good nutrition. In this regard, **Alam et al., (2014)** stressed that strict follow-up protocol in outpatient clinic and patient education can significantly decrease the incidence of surgical site infections. Also, **Van Dam et al., (2013)** added that wound assessment and drainage under aseptic technique can enhance wound healing process.

As regard other thyroidectomy complications, the present study showed that, hypocalcaemia and recurrent laryngeal nerve damage were the most prevalent which are similar to **Kerimoglu et al., (2013)** who declared that complications such as hypoparathyroidism and recurrent laryngeal nerve injury represent nearly half of all the complications of thyroid surgery. However, the control group developed more number of these complications than the study group. Moreover, these complications continued to develop on control group at follow up after four weeks of discharge.

Regarding the occurrence of pneumonia and atelectasis, the study group had less incidence rate than the control group. In this regard, **Shakouri et al., (2015)** stated that respiratory rehabilitation as (breathing exercises consisting of 10 deep breathing attempts, diaphragmatic breathing and pursing of the lips) before surgery also minimized the possibility of pulmonary complication and accelerated the speed of patient recovery.

Regarding the occurrence of keloid scar, the control group had higher incidence rate than the study group with statistically significant at 0.05. This was possibly related to that the control group received no

instructions about wound care. In this context, **Zimmer, (2012)** pointed that, hypertrophic scars and keloids occur frequently and nurse practitioners have an important role in education, advocacy, prevention and treatment of these scars. Education regarding hypertrophic scars and keloids should be patient focused to minimize the risk of postoperative excessive scarring.

Also, the present study showed that the percent of thyroid crisis and recurrence were zero and didn't occur in any patient during all times of researcher's follow up. In the same line with this study findings, **Akamizu et al., (2012)** mentioned that thyroid storm is a rare, life-threatening condition characterized by severe clinical manifestations of thyrotoxicosis. In a national survey from Japan, the incidence of thyroid storm in hospitalized patients was 0.20 per 100,000 per year.

We can finally conclude that, the designed nursing guidelines for patients undergoing thyroidectomy achieved its objectives by improving patients' knowledge and reducing postoperative complications.

Conclusion

Implementation of the designed nursing guidelines in the management of patients undergoing thyroidectomy had improved patients' outcomes: significantly increased level of knowledge and practice scores, and decreased overall postoperative complications rate.

Recommendations

- Educate patients undergoing thyroidectomy about pre-operative and post-operative care as deep breathing exercise, wound care, nutrition, medication, follow up and home instructions included in the designed nursing guidelines to minimize postoperative complications.
- Providing a written instruction booklet about perioperative care for thyroidectomy is of great importance for the patients.
- Replication of the current study on larger probability sample is recommended to achieve generalizability and wider utilization of the designed program.

References

1. **Adam M., Thomas S., Youngwirth L., Hyslop T., Reed S., & Scheri R., (2017):** Is there a minimum number of thyroidectomies a surgeon should perform to optimize patient outcomes? *Ann Surg*, Vol.265, N.2, pp.402-7.
2. **Akamizu T., Satoh T., Isozaki O., Suzuki A., Wakino S., Ihuri T., Tsuboi K., Monden T., Kouki T., Otani H., Teramukai S., Uehara R.,**

- Nakamura Y., Nagai M., & Mori M., (2012) : Diagnostic criteria, clinical features, and incidence of thyroid storm based on nationwide surveys, *Thyroid*, Vol. 22, N. 7, pp.661.
3. Alam S., Khan M., Gul A., & Jan Q., (2014): Surgical Site Infection; frequency after Open Cholecystectomy Using Southampton Wound Scoring System in Surgical Unit Khyber Teaching Hospital Peshawar, *Professional Medical Journal*, Vol.21, N.2, pp.377-381.
 4. Azer S., Alaa Eldeen S., Abd-Elwabh M., Ahmed A., (2011): Impact of Educational Program among Open Heart Surgery Patients on Minimizing the Incidence of Post Operative Infections, *Journal of American Science*, Vol.7, N.6, PP.820-834.
 5. Blinder D., Rotenberg L., Peleg M., & Taicher S., (2009): Patient compliance to instructions after oral surgical procedures. Department of Oral and Maxillofacial Surgery, *International Journal of Oral and Maxillofacial Surgery*, Vol.30, N. 3, pp.216-219
 6. Chandrasekhar S., Randolph G., Seidman MD, Rosenfeld R., Angelos P., Barkmeier-Kraemer J, Benninger M., Blumin J., Dennis G., & Hanks J., (2013): Clinical practice guideline: improving voice outcomes after thyroid surgery, *Otolaryngology—Head and Neck Surgery*, Vol.148, N.6, pp.S1-S37.
 7. Chen H., & Wang M., (2011): An Experience in Perioperative Nursing Care for a Patient Who Underwent Total Thyroidectomy, *Tzu Chi Nursing Journal*, Vol.10, N.5, pp. 98-107.
 8. Desoky A., Mohamed M., Ahmed M., & Ghanem H., (2009): Assessment of Nursing Performance for Patients Undergoing Thyroidectomy, *AAMJ*, vol.7, N.2, pp.1-19.
 9. El-Khateeb A., Ali H., Makhlof G., & Rizk M., (2015): Total extracapsular thyroidectomy versus subtotal thyroidectomy in nonmalignant goiter, *The Egyptian Journal of Surgery*, Vol.34, N.3, pp.166.
 10. Gentile I., Rosato L., Avenia N., Testini M., D'AJello M., & Antonino A., (2014): Do Italian surgeons use antibiotic prophylaxis in thyroid surgery?, *Ann Ital Chir*, Vol.85, pp.33-37.
 11. Hariadha E., Sulaiman S., Gillani S., & Baig M., (2013): A preliminary study on post-surgical complications after thyroidectomy in Pulau Pinang, Malaysia, *International Journal of Pharmacy & Life Sciences*, Vol.4, N.6, pp2717-2721.
 12. Hassan A., El-Sayed S., & Taha M., (2012): Impact of a Designed Educational Program on Thyroidectomy Patients' Discharge Compliance Instructions, *Journal of American Science*, Vol.8, N.11, pp.1-13
 13. Kearney M., Jennrich M., Lyons S., Robinson R., & Berger B., (2011): Effects of preoperative education on patient outcomes after joint replacement surgery, *Orthopaedic Nursing*, Vol.30, N.6, pp.391-396.
 14. Kerimoglu R., Gozalan U., & Kama N., (2013): Complications of thyroid surgery: Analysis of 1159 cases, *International Journal of Mevlana Medical Sciences*, Vol.1, N.3, pp.35-38.
 15. Lewis S., Bucher L., Heitkemper M., Harding M., Kwong J., & Roberts D., (2013): Medical-surgical nursing: assessment and management of clinical problems, single volume. *Problems Related to Regulatory and Reproductive*, Elsevier Health Sciences, 9th ed, chap.10, pp.1189-1218
 16. Liu Z., Masterson L., Fish B., Jani P., & Chatterjee K., (2015): Thyroid surgery for Graves' disease and Graves' ophthalmopathy, *The Cochrane Library*, Vol. 15, N.11, pp. 1-76
 17. Memon A., Junejo A., & Balouch T., (2012): Postoperative Complications of Thyroidectomy – An experience at Tertiary Care Hospital, *Medical Channel*, Vol.18, N4, pp.4-11.
 18. Mishra A., Sabaretnam M., Chand G., Agarwal G., Agarwal A., & Verma A., (2013): Quality of life (QoL) in patients with benign thyroid goiters (pre-and post-thyroidectomy): a prospective study, *World J Surg.*, Vol.37, N. 10, pp.1-8.
 19. Pudner R., (2010): Nursing the Surgical Patient, wound healing in surgical patients, Elsevier Health Sciences, 3rd ed, chap.5, pp.51-73.
 20. Shakouri S., Salekzamani Y., Taghizadieh A., Sabbagh-Jadid H., Soleymani J., & Sahebi L., (2015): Effect of respiratory rehabilitation before open cardiac surgery on respiratory function: a randomized clinical trial, *Journal of cardiovascular and thoracic research*, Vol.7, N.1, pp.13.
 21. Tang P., & Newcomb C., (2009): Informing Patients: A Guide for Providing Patient Health Information, *The Journal of the American Medical Informatics Association*, Vol.5, N.6, pp.563-570.
 22. Tidy C, (2011): Thyroid disease and surgery, *Egton Medical Information*, Vol.1631, N. 23, pp.1-25
 23. Van Dam P., Verheyden G., Sugihara A., Trinh X., Van Der Mussele H., & Wuyts H., (2013): A dynamic clinical pathway for the treatment of patients with early breast cancer is a tool for better cancer care: implementation and prospective analysis between 2002–2010, *World journal of surgical oncology*, Vol.11, N.1, pp.70.

24. **Vanderpump M., (2011):** The epidemiology of thyroid disease, Br Med Bull, Vol.99, N.1, pp.39-51.
25. **Viswanathan K., Jithunath M., & Viswanathan M., (2014):** Incidence of postoperative hypocalcaemia after thyroidectomy: a case control study. International Journal of Advanced Health Sciences, Vol.1, N.5, pp. 1-9.
26. **Zimmer T., (2012):** Treatment of Hypertrophic Scars and Keloids and the Role of the Nurse Practitioner, Masters of Nursing, available at <https://research.wsulibs.wsu.edu:8443/xmlui/handle/2376/3107>.2012, accessed at June, 2017.
27. **Statistical Administration & Medical Records, at Manial University Hospital, (2010).**

