

Effect of Nursing Interventions on Patients' Health Outcomes Post Thyroidectomy

Alice E.Reizian, Professor

Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University

Abeer El Shatby, Professor

Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University

Waleed Abdel Haleem Abo-Elwafa , Assistant Professor

Head and Neck Surgery department Faculty of Medicine, Alexandria University

Hoda Abdou El-Deeb, Assistant Professor

Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University.

Bardies Shaban Mohamed Ali, Clinical Instructor

Medical Surgical Nursing Department, Faculty of Nursing, Alexandria University

Abstract

Background: Thyroidectomy is the most common surgical management of many thyroid diseases as simple goiter, benign thyroid tumors, hyperthyroidism and thyroid cancer (TC). Its complications involve hypocalcaemia, swallowing disorders, the presence of a hematoma with less or greater severity or recurrent laryngeal nerve (RLN) injury, especially after a total thyroidectomy. Preoperative and postoperative nursing interventions are important and have a serious influence on patient's recovery directly. **Objective:** To determine the effect of nursing interventions on patients' health outcomes post thyroidectomy. **Settings:** The study was carried out at the head, neck and endocrine surgery unit at Alexandria Main University Hospital, Egypt. The postoperative follow up after discharge was conducted at the head and neck surgery outpatient clinic at the Alexandria Main University Hospital Clinics Department. **Subjects:** A convenience sample of 60 adult's patients who undergoing thyroidectomy admitted to the previously mentioned setting. The sample was divided into two equal groups (30 patients each the group). **Tools:** three tools were used. Tool one: Bio-socio demographic data structured interview schedule. Tool two: Thyroidectomy patient's knowledge structured interview schedule. Tool three: Health outcomes for post thyroidectomy patient assessment sheet. **Results:** The study showed that there was a significant improvement in neck pain, neck disability and decreasing postoperative complications in the study group more than in the control group. **Conclusion:** The implementation of nursing interventions including neck and shoulder exercises significantly improved neck pain, neck disability and decreasing postoperative complications which improve patient health outcomes. **Recommendations:** In service training program should be carried out for nurses working in head and neck surgery department about complete care for patients pre and post thyroidectomy. Hospital administration should facilitate opportunities for nurses to attend continuing educational program about thyroid gland diseases and care of patients undergoing thyroidectomy.

Keywords: Thyroidectomy, neck exercises, shoulder exercises, complications.

Introduction

Thyroidectomy is the most common surgical management of many thyroid diseases as simple goiter, benign thyroid

tumors, hyperthyroidism and thyroid cancer (Abd-Elmohsen et al, 2018). Thyroidectomy is traditionally surgery performed through a small horizontal incision in the front of the neck. The entire thyroid gland may be removed or just a single lobe, a portion of a

lobe and the isthmus or other structures. (University of California San Francisco, 2021). Thyroidectomy may be total; which involves complete removal of the entire gland, it used in most thyroid cancer cases. Subtotal thyroidectomy; involves removal of one side of the gland and isthmus and majority of the other lobe, it performed in cases of small non- aggressive thyroid cancer and goiters. Partial thyroidectomy/lobectomy; involves removal of one lobe of the gland with isthmectomy, commonly done in case of benign tumors and small and non-aggressive thyroid cancer. (Alsaigh & Sulaiman, 2020).

Nurses have a pivotal role as they should reassure patients and provide them with adequate explanation about thyroid gland functions, its disease types, surgical plan, types of surgery, precautions and prevention of complications post-operative. (Cui et al, 2020). One of the most preoperative nursing interventions is teaching patient deep breathing exercises; that is used to decrease the incidence and severity of pulmonary complications, such as pneumonia, atelectasis, and hypoxemia. (Alptekin, H., Kivanc, G., & Unver, S. (2018).

Furthermore, nurses demonstrate to the patient neck and shoulders stretching exercises. These exercises improve pain perception by improving neuromuscular coordination and prevent muscle weakness. (Abdel Mohsen& Ahmed, 2018). Monitoring for complications becomes the primary focus of postoperative care. Nurse should monitor surgical site for excessive bleeding, frequently check wound dressing and the skin on back, neck and shoulder, and also check surgical drain for amount of blood, observe for swelling around wound site. (Cox, 2016).

The incidence of thyroidectomy complications increases depending on the pathology of the thyroid, associated with increased gland size, fibrosis, vascularity, or inflammation. (Alanzi, Albalawi,&Alyahya,2017).

Postoperative nursing interventions have a serious influence on patient's recovery directly and then affect the patient's quality of life. Therefore, the nursing management after thyroidectomy carried out by observing the patient condition, assist and cooperate with surgeon for management and aggressively deal with severe post thyroidectomy complications. Providing information and assisting the patients to make right health decisions and motivating him to learn about the health consider a vital nursing role so, implementation of thyroidectomy nursing intervention for patients improve patient's outcomes by promoting patient compliance with medical treatment regimens and improving healthy lifestyles. (Alsaigh & Sulaiman, 2020).

Furthermore, nursing intervention is an opportunity to educate, provide proper continuity of care and ensure best patient centered outcomes. The nurse often takes on the role of educator, providing advice on methods of relieving the symptoms, avoidance or early identification and treatment of complication and decrease in anxiety through patient education that can improve patient health outcomes. (Ibrahim, 2019).

Aims of the Study

This study aims to determine the effect of nursing interventions on patients' health outcomes post thyroidectomy.

Research hypothesis

Post thyroidectomy patients who receive nursing interventions exhibit improvement in postoperative health outcomes than those who do not receive them.

Materials and Method

Materials

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

Settings: This study was conducted at the head, neck and endocrine surgery unit of the Alexandria Main University Hospital. This unit is in the third floor of surgical building, thyroidectomy surgery performed in surgical C unit on Monday and Thursday every week. The postoperative follow up after discharge was conducted at the head and neck surgery outpatient clinic at the Alexandria Main University Hospital Clinics Department. This Clinic is located at the outpatient department and works two days per week; Saturday and Tuesday from 8.30am to 12 pm.

Subjects: A convenience sample of 60 adult's patients who undergoing thyroidectomy admitted to the previously mentioned setting was included in this study. The sample was divided into two equal groups (Thirty patients in each group). Group "I," the control group, and group "II," the study group. The sample size was calculated using power analysis (Epi-info7) program based on the following parameters: population size = 70/3months, Prevalence rate =50%, Margin of error =5%, confidence coefficient =95%.

Tools: In order to collect the necessary data for the study three tools were used:

Tool one: “Bio-socio demographic data structured interview schedule”. This tool was developed by the researcher, it consists of two parts:

Part I: Patients’ socio-demographic data: included age, gender, level of education, area of residence, marital status, occupation and monthly income.

Part II: Clinical data: included information about family history about having thyroid gland diseases, patients' past medical history; complaint of chronic diseases, previous hospitalization and its causes, surgical history; previous surgeries and their causes, present history; duration of thyroid enlargement, symptoms, laboratory investigations and prescribed medications.

Tool two: Thyroidectomy patient's knowledge structured interview schedule. this tool was developed by the researcher based on review of relevant recent literature (Arnaud 2017; Gaetan, 2017; Reinberg, 2019; Shomon, 2022), to assess patients' knowledge related to thyroidectomy. It included 7 structured list questions.

Tool three: Health outcomes for post thyroidectomy patient assessment sheet; it includes three parts:

Part I: Post-operative neck pain assessment sheet; it included two sections. **Section 1** using Indiana Polyclinic Combined Pain Scale (IPCPS); it was adopted from Dimitry Arbuck & Amber Fleming 2001 to assess the severity of neck pain, it included 11-point scale related to intensity of pain. **Section 2:** developed by the researcher after review of relevant literature (Audrey, Frandsen,& Snyder, 2016) to assess neck pain frequency, duration, aggravating and relieving factors and associated signs and symptoms.

Part II: Neck Disability Index (NDI) questionnaire; this tool was adapted from Mior &Vernon (1991), to measure neck-specific disability and to evaluate how neck pain affects ability to manage activities of daily living. This questionnaire has 9 sections including: personal care, lifting, reading, headaches, concentration, work status, driving, sleeping and recreation. Each section includes 6 statements describe how pain affect this activity.

Part III: Post thyroidectomy complications observational checklist. This part was be developed by the researcher after reviewing the related literature to assess the presence of complications post thyroidectomy (Adrian &Michael 2017; Aledo etal 2015; Ali &Hassan, 2020). It included the expected complications as hemorrhage, hematoma, neck pain, respiratory obstruction, wound infection, laryngeal nerve injury, hypo parathyroidism

and hypocalcemia. ((Alanzi, Albalawi,&Alyahya,2017).

Method

The study was accomplished as follows : Approval of the Ethical Research Committee, Faculty of Nursing, Alexandria University was obtained before conducting the study.

Official permission from the Faculty of Nursing, Alexandria University was obtained and directed to the responsible authorities of the study settings to take their permission to conduct the study after explaining the aims of the study.

Data were collected from control group firstly and after its completion, data were collected from the study group to prevent the contamination effect between the studied groups that might affect the study results.

Reliability: The reliability of the developed and adapted tools was tested by using Cronbach's Alpha test. The reliability coefficient value for tool II; patient knowledge about thyroidectomy was 0.932, while reliability coefficient value for tool III, post-operative neck pain assessment pain was 0.965 and reliability coefficient value for neck disability index was 0.898.

Validity: All tools were distributed to a jury of five experts specialized in the field of Medical-Surgical Nursing at Alexandria University, to test content validity, completeness, and clarity of items. Every jury member was informed about the aim and method of the study. Comments and suggestions of the jury were considered and modifications were done.

Pilot study: A pilot study was carried out on 10% of the study nurses (6 patients) from the previously mentioned settings who were excluded from the study subjects, to test the clarity and feasibility of the tools.

The study was conducted as the following:

For control group:

- They only receive routine hospital care before and after surgery. Assessment was carried out pre-operative using tools I and II to collect the needed data, clinical data, assess existing knowledge related to thyroid gland and operation.
- Every patient was assessed four times using tool III; during zero day, before discharge, after one week and after three weeks of operation.

For study group:

- Initial assessment was carried out pre-operative using tools I and II to collect the needed data, clinical data, assess existing knowledge related to thyroid gland and operation to assess their needs before developing the nursing interventions.
- Based on assessment of every patient's knowledge deficit by using tool II, the nursing interventions was formulated based on the relevant recent literatures (Abd-Elmohsen et al., 2018; Akhtar , Robert, Waseem 2013; Kuwait Cancer Control Center, 2014; Mater Private Hospital Redland, 2017; United State National Library of Medicine, 2019).
- The researcher reviewed the recent medical and nursing knowledge and relevant literature then developed a booklet. It contains simple anatomy about thyroid gland, its functions, causes and manifestations of thyroid enlargement, indications, types and different ways of thyroidectomy and side effects and complications of thyroidectomy, and manifestations of hypocalcaemia. It also contains information about pre-operative measures, simple explanation about surgery itself, post-operative guidelines including positioning, physical activity, adequate nutrition, taking medications, wound and drainage care, breathing exercises, neck and shoulders exercises, and follow up.
- Nursing interventions were implemented through 2 sessions preoperative (some patients at two days before the surgery and some patients at the day before surgery accordingly); the first session was provided theoretical information about operation and its complications, the second session for practical part including neck, shoulder and

breathing exercises. Each session continued about 30-45 minutes.

- The first session covered simple anatomy of the thyroid gland, definition, causes, indications, types and complications of thyroidectomy. Also, contained preoperative instructions about fasting before operation, skin care for incision site and post-operative instructions about proper positioning, nutrition, fluid intake, wound care, and medications. In addition to pre-discharge instructions that included getting back to work, returning to usual daily activity and follow up visits.
- The second session covered demonstration and re demonstration of neck, shoulder and breathing exercises; as the researcher demonstrated every exercise in front of patient and asked him to re demonstrate this exercise until performed it correctly with oral permission from some patient to photo them during their exercises re-demonstration.
- The motions of neck exercise included flexion, extension, hyperextension, lateral flexion, and lateral rotation. (Guy& Thomas, 2018).
- The motions of shoulder exercise include flexion, extension, circumduction, shoulder roll, shoulder shrug and shoulder squeeze (Ito et al, 2020).
- For breathing exercise: each patient taught the technique of breathing exercise; take deep breathing from nose and hold it from 2:3 seconds and breathe out slowly at least twice as long through mouth, with pursed lips. This exercise done twice daily from 5 to 10 minutes from the zero day postoperative (Lynn, 2014).
- Every patient was assessed four times using tool III; during zero day, before discharge, after one week and after three weeks of operation.
- Comparisons between the control and study groups were carried out using appropriate statistical analysis in order to evaluate the effect of the nursing interventions on health outcomes among patients post thyroidectomy.

Ethical considerations:

Written informed patients' consent was obtained before data collection after an explanation of the study aim. Anonymity and privacy of the study subjects as well as, the confidentiality of data asserted. Patients' right to withdraw at any time of research participation was considered and respected.

Data processing and Statistical Analysis:

After the data were collected, they were coded and transferred into special design formats, to be suitable for computer feeding. Following data entry, checking and verification processes were carried out to avoid errors during data entry. Data were fed to the computer and analyzed using IBM SPSS software package version 20. Descriptive statistical measures, which included: numbers, percentages, and averages (Minimum, Maximum, Arithmetic mean (\bar{X}), Standard deviation (SD). Chi-square test for categorical variables, to compare between different groups. Student t-test for normally distributed quantitative variables, to compare between two studied groups. Paired t-test for normally distributed quantitative variables, to compare between periods of time.

Results

Table 1 presents the comparison between the control and study groups according to socio-demographic data. There was no significant difference between two groups regarding all socio-demographic characteristics.

Table 2 demonstrates comparison between the control and study groups regarding their total knowledge level about thyroidectomy before surgery. It was found that 66.7% of study group and 70% control group had a poor level of knowledge with no statistically significant difference.

Table 3 shows comparison between the control and study groups regarding the level of neck disability before discharge, one week and three weeks post thyroidectomy. Before discharge, it can be observed that, the majority (90% and 100%) of the study and control group represented high level of neck disability. However, all (100%) of the study group had moderate level of neck disability one-week post implementation of nursing interventions compared to 90% of the control group, had high level of neck disability. After three weeks from implementation of nursing interventions, the majority (83.3%) of the study group had mild level of neck disability. While, 96.7% of the control group had moderate level. The difference was highly statistically significant between both groups at 1st and 3rd week post implementation of nursing interventions ($P_2= 0.000^*$, $P_3= 0.000^*$) respectively.

Table 4 shows distribution of the study and control group regarding the occurrence of complications at zero day, before discharge, after one week, after three weeks post implementation of nursing interventions. All (100%) of the control group and the majority (90%) of the study group complained of neck pain/ stiffness at zero day. One week postoperative, 83.3% of the study group and the majority (90%) of the control group suffered from neck pain/ stiffness. Three weeks postoperative, there was high improvement as 20% of the study group had neck pain/ stiffness, while the majority (80%) of the control group had it. Accordingly, the occurrence of complications with in study group was satisfactory at zero day, before discharge, after one week, and after three weeks as the mean less than two (0.96, 0.90, 1.83, 0.90) respectively. Within control group, the occurrence of complications was satisfactory at zero day, before discharge, after three weeks (mean=1.23, 1.23, 1.80) respectively. After one week, the occurrence of complications within control group was unsatisfactory as mean equal 2.700.

Discussion

Post thyroidectomy, patients often experience discomfort such as neck pain, shoulder stiffness and movement difficulty. So, the nurse has an important role to implement head and neck exercises which provide neuromuscular coordination and flexibility in patients by reducing pain and muscle weakness, and have an effect on health outcome postoperatively. (Ito et al, 2020). The results of the current study revealed that the majority of the study and control group patients were in the age group ranging from 40 to less than 50 years. This finding is supported by Salman (2017) who found that the age from 40 to 50 years is one of the main factors of thyroid diseases. The present study findings revealed that female patients comprised a higher proportion than males. This finding is supported by Al shahrani et al (2016), Bereda (2022), reported that, higher prevalence of thyroidectomy in female than males.

The current study result reported that, the most preoperative manifestations reported by the majority of the studied patients were nervousness, palpitation, neck enlargement, dysphagia followed by difficulty of breathing and headache. This result is in agreement with Bruns et al (2018), who reported dysphagia is a typical symptom complained preoperatively by patients with enlarged thyroid.

The results showed that most of studied patients undergoing thyroidectomy have poor level of knowledge regarding the function of thyroid gland, causes, types, side effects and duration of thyroidectomy. Also, the majority of patients were unaware about preoperative preparation of thyroidectomy as preoperative investigation, written consent, stopping anticoagulant drugs, fasting hours before operation. This result was similar to the result of Ahmed et al (2020); Zhang & Zheng(2022) who found that the majority of the study patients have poor knowledge about thyroidectomy preparations pre using of the health teaching handouts.

According to the level of neck disability, this study represented that before discharge,

the majority of the study and control group patients had high level of neck disability. While, all of the study group had moderate level of neck disability one-week post implementation of nursing interventions compared with high level of neck disability of the control group. Moreover, the majority of the study group had mild level of neck disability after three weeks from implementation of nursing interventions including neck and shoulder exercises in comparison with moderate level of neck disability of the control group. This result is in agreement with Kamel, Mohamed, Said (2020), who reported that the neck and shoulder range of motion exercise play an important role for improving the function of the neck, reduce the neck disability and pain. Moreover, this result is in agreement with Armangol et al (2019), who reported that neck exercises post thyroidectomy facilitate neck movement and reduce pain and disability, as well as have no harmful effect on wound healing.

Regarding neck pain/stiffness as a complication post thyroidectomy, this study showed that neck pain/stiffness begun at zero day and continued till three weeks post-operative. This finding is in agreement with Shomon (2022), who reported that neck stiffness lasts for a few days to a few weeks after thyroid surgery. Also, the current study showed that patients of the study group had experience of less neck pain/stiffness at the end of third week after implementation of nursing interventions including neck and shoulder exercises than control group. This finding is supported with Cui et al (2020), whose result showed that the pain score in the intervention group was lower than that in the control group. This indicated that high-quality nursing can reduce the postoperative pain and complication rate.

Conclusion

By the present study data, it can be concluded that, the nursing interventions for patients undergoing thyroidectomy is essential and fundamental. Furthermore, the nursing interventions have a positive effect

on the patient life by improving health outcome and decreasing complications. Therefore, continuous nursing interventions should be provided for those patients on regular basis and increase adherence to the follow-up treatment. In addition, the nursing interventions should be considered as an integral part in the hospital routine care of patients undergoing thyroidectomy to help them to cope successfully with new life situation.

Recommendations

In line with the findings of the study, the following recommendations are made:

- The developed colored illustrated educational booklet should be available and distributed to each patients who undergoing thyroidectomy in the hospital.
- In service training program should be carried out for nurses working in head and neck surgery department about complete care for patients pre and post thyroidectomy.
- Replicate the study on a large probability sample is recommended for generalization of the findings.
- Increase patients' awareness about thyroidectomy operation through mass media. Disseminate health knowledge through posters, photos and booklets as educational campaigns directed to thyroidectomy patients.

Table (1): Comparison between the control and study groups according to socio-demographic data.

Socio-demographic characteristics	Groups				Test of Significance
	Study (n=30)		Control (n=30)		
	No.	%	No.	%	
Age (years)					X ² =1.375 P=0.711
20-	1	3.3	3	10.0	
30-	5	16.7	6	33.3	
40-	15	50.0	14	40.0	
≥50	9	30.0	7	16.7	
Sex					X ² =1.071 P=0.301
Male	12	40.0	14	46.7	
Female	18	60.0	16	53.3	
Level of education					X ² =6.386 P=0.172
Illiterate	4	13.3	4	13.3	
Read & write	10	33.4	9	30	
Primary education	12	40	15	50	
Preparatory education	0	0	2	6.7	
Secondary education	4	13.3	0	0	
University or higher	0	0	0	0	
Occupation					X ² =1.848 P=0.764
Free business	5	16.7	6	20.0	
Worker (manual)	6	20.0	8	26.7	
Employee	4	13.3	5	16.6	
Housewife	14	46.7	11	36.7	
Students	1	3.3	0	0.0	
Area of residence					X ² =0.341 P=0.559
Rural	21	70.0	23	76.7	
Urban	9	30.0	7	23.3	
Marital status					X ² =1.553 P=0.670
Single	3	10.0	2	6.7	
Married	25	83.4	26	86.6	
Divorced	1	3.3	0	0.0	
Widowed	1	3.3	2	6.7	
Monthly income					X ² =2.078 P=0.354
Not enough	20	66.7	19	63.3	
Enough	10	33.3	9	30.0	
More than enough	0	0.0	2	6.7	

Table (2): Comparison between the control and study groups regarding their total knowledge level about thyroidectomy before surgery

Total knowledge score	Group				Test of Significance
	Study (n=30)		Control (n=30)		
	No.	%	No.	%	
Poor	20	66.7	21	70.0	X ² =0.202 P=0.977
Satisfactory	9	30.0	8	26.7	
Good	1	3.3	1	3.3	
Min-Max	3.00-6.00		3.00-6.00		t=0.000
Mean ± SD	5.000±0.870		5.000±0.830		P=1.00

X² Chi Square Test

t Student t test

* Statistically significant at p ≤ 0.05

Table (3): Comparison between the control and study groups regarding the level of neck disability before discharge , one week and three weeks post thyroidectomy

Items	Group				Test of Significance
	Study (n=30)		Control (n=30)		
	No.	%	No.	%	
Total neck disability (before discharge)					X ² =3.158 P1=0.076
Mild	0	0.0	0	0.0	
Moderate	3	10.0	0	0.0	
High	27	90.0	30	100.0	
Min-Max	12.00-18.00		13.00-21.00		t=55.811
Mean ± SD	14.50±1.635		17.90±1.882		P=0.000*
Total neck disability (one week)					X ² =49.091 P2=0.000*
Mild	0	0.0	0	0.0	
Moderate	30	100.0	3	10.0	
High	0	0.0	27	90.0	
Min-Max	14.00-20.00		22.00-35.00		t=239.816
Mean ± SD	16.97±1.752		28.10±3.527		P=0.000*
Total neck disability (3 weeks)					X ² =42.941 P3=0.000*
Mild	25	83.3	0	0.0	
Moderate	5	16.7	29	96.7	
High	0	0.0	1	3.3	
Min-Max	7.00-19.00		13.00-26.00		t=268.68
Mean ± SD	9.800±2.511		20.97±2.760		P=0.000*
Test of Significance across the three times	X ² =139.737 P=0.000*		X ² =73.998 P=0.000*		

X² Chi Square Test

t Student t test

* Statistically significant at p ≤ 0.05

P1=p value comparing between both group patients before discharge.

P2=p value comparing between both group patients one week post implementation of nursing interventions

P3=p value comparing between both group patients three weeks post implementation of nursing interventions.

Table (4) Distribution of the Study and Control Group According to Occurrence of Complications at zero day, before discharge, after one week, after three weeks post implementation of nursing interventions.

Present complication#	study (n = 30)								control (n = 30)								Test of Significance	
	Zero day		Before discharge		After 1 week		After 3 weeks		Zero day		Before discharge		After 1 week		After 3 weeks			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Hemorrhage	2	6.7	0	0.0					7	10.0	0	0.0					$X^{2a}=1.995$ P= 0.158 $X^{2b}=2.303$ P= 0.316 $X^{2c}=9.557$ P= 0.145 $X^{2d}=7.755$ P= 0.170	
Hematoma	0	0.0	1	3.3	3	10.0			0	0.0	0	0.0	8	26.6				
Neck pain/stiffens	27	90.0	25	83.3	25	83.3	6	20.0	30	100.0	30	100.0	27	90.0	24	80.0		
Respiratory obstruction/difficulty					5	16.6	0	0.0					8	26.6	3	10.0		
Wound infection					0	0.0	0	0.0					7	23.3	2	6.7		
Hypoparathyroidism & Hypocalcemia			1	3.3	10	36.7	8	26.7			0	0.0	21	70	16	53.3		
Hypothyroidism					9	30.0	3	10.0					16	53.3	8	26.7		
Laryngeal nerve injury					4	13.3	3	10.0					2	6.7	1	3.3		
Mean ± SD	0.96±0.413		0.90±0.402		1.83±1.44		0.90±1.44		1.23±0.431		1.233±0.430		2.700±1.711		1.80±1.494			$t^a=2.450$ P=0.017* $t^b=3.098$ P=0.003* $t^c=2.123$ P=0.038* $t^d=2.371$ P=0.021*

X^2 Chi Square Test t Student t test * Statistically significant at $p \leq 0.05$
 Mean less than 2(satisfactory) , mean more than 2(un satisfactory)
 X^{2a} Comparison between the study and the control group at zero time
 X^{2b} Comparison between the study and the control group at before discharge
 X^{2c} Comparison between the study and the control group at after 1 week
 X^{2d} Comparison between the study and the control group at after 3 weeks.

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