THE EFFECT OF NURSING INTERVENTION ON MINIMIZING INCIDENCE OF COMPLICATIONS FOR PATIENTS UNDERGOING SURGICAL RHINOPLASTY

BASMA M. KORNY*

Lecturer of Medical Surgical Nursing, Faculty of Nursing, Cairo University, Cairo, Egypt and Assistant Professor, Faculty of Nursing Almajmaah University, Al-Majma'ah, Saudi Arabia.
*Corresponding Author Email: Basmamagi@cu.edu.eg

SHAIMAA A. KHALIL

Assistant Professor of Medical Surgical Nursing, Prince Sattam Bin Abdulaziz University, Riyadh, Saudi Arabia.

WAFAA MOHAMED AMER

Associate Professor of Medical Surgical Nursing, Prince Sattam Bin Abdulaziz University, Riyadh, Saudi Arabia.

SABAH AHMED AMMAR

Assistant Professor of Medical Surgical Nursing, Prince Sattam Bin Abdulaziz University, Riyadh, Saudi Arabia.

AMIRA ABD EL-AZEEM

Assistant Professor of Medical Surgical Nursing, Prince Sattam Bin Abdulaziz University, Riyadh, Saudi Arabia.

OMNYA MUSTAFA ALI MOHAMED

Assistant Professor of Maternity and Newborn Health Nursing Department, Faculty of Nursing, Prince Sattam Bin Abdulaziz University, Saudi Arabia.

MARIAM I. EL SHAFAEY

Lecturer of Medical Surgical Nursing, Faculty of Nursing, Tanta University, Tanta, Egypt.

Abstract

Background: Rhinoplasty is a surgical procedure used to reconstruct nasal structures for cosmetic and functional purposes. **Aim:** To evaluate the effect of nursing intervention on minimizing incidence of complications for patients undergoing surgical rhinoplasty. **Design** Quasi- experimental study. **Setting:** It conducted in Otorhinolaryngology Department at Tanta University Hospitals. **Subject:** It consisted of a convenience sample of 60 adult patients of both sexes scheduled for rhinoplasty and divided into 2 equal groups, 30 patients in each group as the following: Group 1; Control group: they were received their routine hospital nursing care. Group 2; Study group: they were received nursing intervention was implemented by the researcher. **Tools:** Three tools used for data collection as follows: **Tool (1)** Structured Interview Questionnaire consisted of three parts: Part One Patients; Socio-Demographic Data; Part Two Nasal obstruction symptom evaluation (NOSE) scale; Part Three Patient's Knowledge Assessment Tool. **Tool (2):** Rhinoplasty Complications Monitoring consisted of two parts: Part one was the modified "Surgeon Periorbital Rating of Edema and Ecchymosis (SPREE)" questionnaire: **Tool (3)** Rhinoplasty outcome evaluation (ROE) scale. **Results:** there was highly statistical significance difference between study and control group regarding nasal obstruction symptom. In addition, there was highly statistical significance difference between study and control group regarding the degree of periorbital edema and ecchymosis and

pain intensity level. Moreover, there was highly statistical significance difference between study and control group regarding cosmetic state and Patients' Satisfaction. **Conclusion:** Application of nursing intervention had a positive effect on their clinical outcomes. **Recommendations:** Application of nursing intervention should be carried out as a routine care for patients undergoing rhinoplasty.

Keywords: Rhinoplasty, Nursing Intervention, Complications.

INTRODUCTION

Rhinoplasty commonly known as a "nose job," is the use of functional and aesthetic parameters together, which is performed in patients with congenital anomalies, traumatic nasal abnormalities, and changes in the patient's aesthetic appearance. **(Ali , Kadhim , Khachian 2023)** Functional Rhinoplasty, addresses breathing problems caused by structural abnormalities in the nose, such as a deviated septum and nasal valve compromise. This procedure can improve airflow and nasal passage function. Cosmetic Rhinoplasty Focuses on improving the nose's appearance by altering its size, shape, or angle to create better facial balance and harmony. This can include making the nose smaller, changing the tip, straightening the bridge, or narrowing the nostrils. **(Levin , Ziai H, Roskies 2022)**

Rhinoplasty is considered to be one of the oldest, most challenging and most in-demand surgical procedures in otolaryngology head and neck surgery. It is estimated to represent approximately 21.6% of all plastic and aesthetic surgical procedures performed worldwide. **(Gupta et al 2022)**. Rhinoplasty ranks among the most commonly performed cosmetic procedures in the United States, with >200,000 procedures reported annually. As facial cosmetic enhancement has become more routine and socially acceptable, the procedure has increased in popularity in the United States and around the world because facial cosmetic enhancement has become more routine and socially acceptable **(Manahan, et al., 2021).**

There are two types of rhinoplasty, nonsurgical and surgical rhinoplasty. Surgical rhinoplasty is an actual invasive surgical procedure that involves reshaping the nose through incisions to alter bone and cartilage **(Fallahi, et al., 2021).** Surgical rhinoplasty offers more dramatic and permanent changes, but involves more risks and a longer recovery period. Non-surgical rhinoplasty is medical aesthetic procedure in which injectable dermal fillers, most commonly hyaluronic acid is used to alter the shape of person's nose without a surgery (**Kim, et al., 2021**), it is less invasive, requires less downtime, and is more affordable, but the results are temporary.

Rhinoplasty can be performed under local or general anesthesia. The surgeon will make incisions (either inside the nostrils or across the base of the nose) to access and reshape the bone and cartilage. After surgery, a splint may be placed on the nose to maintain its new shape. Swelling and bruising are normal and will subside over time. It can take several weeks for the swelling to fully resolve and for the final results to be visible. **(Kadhim t al 2024) & Levin M et al. 2022)**

The surgery itself carries known hazards, including pre and post-operative complications. Since one of the most important prerequisites for providing excellent service is patient

happiness. This might impact preoperative anxiety and postoperative mental health after surgery which could effect on postsurgical patient's satisfaction. **(Faleh and Sadeq 2022)** & **(Aldosari B et al. 2021).**

Rhinoplasty has relatively low complication rates ,it is associated with different complications like intraoperative bleeding, postoperative pain, periorbital edema, swelling and ecchymosis which worsen the patient's morbidity, increasing surgical time, extending their post-operative recovery period, delaying their return to work, increasing of the postoperative recovery period, masks and affects the cosmetic results and outcomes, upsetting the surgeon and the patient that lead unsuccessful plastic surgery, it can influence the patient's preoperative concerns and doubts, postoperative emotional status, anxiety, worry ,anger and post-surgical rhinoplasty patient dissatisfaction syndrome that is considered the most predominant problem in this regard (**Bautista, et al., 2021**) & **(Heilbronn, et al., 2020).**

The importance of caring within the field of nursing is significant in the overall health outcome of a patient. Caring is important for nurses to display empathy, support, and confidence, when establishing a relationship with a patient. The idea of caring is crucial when offering care to a patient and determining a care plan that is achievable. The role a nurse displays helps patients and families achieve a positive outcome. A nurse must be organized, creative, flexible, and thorough with all plans and actions that need to be appropriated **(Lewis, Bucher, Heitkemper, Dirksen., 2020**).

Nursing role in surgical rhinoplasty focus on optimizing patient outcomes and satisfaction by addressing pain, anxiety, and promoting proper healing. Preoperative education and post-operative care, including wound care, pain management, and addressing potential complications, are key nursing responsibilities. Preoperative Nursing Interventions include Patient Education and assessment. **Patient Education**, providing comprehensive information about the procedure, expected recovery process, and potential risks can help reduce anxiety and improve patient understanding and compliance with post-operative instructions. **Assessment**: Evaluating the patient's physical and psychological readiness for surgery, including identifying any pre-existing conditions or concerns that might affect the outcome. **(Guyuron , Lee 2017)**

Postoperative Nursing Interventions include **Airway Management**, by Ensuring a patent airway and addressing any breathing difficulties that may arise, especially in the immediate post-operative period. **Wound Care**, providing meticulous care to the surgical site, including cleaning, dressing changes, and monitoring for signs of infection, such as redness, swelling, or discharge. **Edema and ecchymosis Management** is very important by implementing strategies like cold compresses and elevation to minimize swelling and bruising, promoting faster recovery and patient satisfaction. **Monitoring** the patient through Observing vital signs, assessing for complications like bleeding or infection, and providing timely interventions if also needed postoperatively. **Patient Education:** Reinforcing post-operative instructions, including wound care, activity restrictions, proper hygiene and follow-up appointments, empowering patients to actively participate in their recovery. *(Sharifzadeh et al 2021).*

Emotional and psychological Support: Providing reassurance and emotional support to patients during the recovery process, addressing any concerns or anxieties Well-executed nursing care, including thorough preoperative education and attentive post-operative management, can significantly improve patient satisfaction with the rhinoplasty experience and also reduce "Postsurgical rhinoplasty dissatisfaction syndrome". **(Seyed 2020) and (Chourpiliadis , Bhardwaj 2021).**

Pain Management for patients undergoing surgical rhinoplasty is an important part of nursing care; it can be controlled through Monitoring pain levels, administering prescribed pain medications as needed, ensuring patient comfort and facilitating recovery through using non pharmacological methods as application of cryotherapy. Cryotherapy is the general or local use of low temperatures in medical treatment. It is the simplest and most commonly used method for treatment of acute tissue injury**. (Li, Shi, Wu, Yan 2021).**

Nowadays; cryotherapy may be applied by using different forms of ice as frozen gel packs, or by evaporation of volatile fluids from the skin**.** The way which ice is applied will vary according to the required effects. It may be applied in the form of immersion, ice cube massage, ice units **(**packs, ice spray, cold compression (**Chen, et al., 2021).** The cryotherapy is considered cost effective method, easy to apply, it is more locally used in the desired location and can be repeated without complications. Due to utilizing coldness in cryotherapy, vasoconstriction occurs and consequently less bleeding. Authorities have explained the effect of cold therapy in reducing periorbital edema and ecchymosis post-surgical rhinoplasty helping patients adjusting the new appearance, psychologically when have a partial view of new nose **(Gruber, et al., 2017).**

Significance of the study:

Today, minimally invasive procedures are becoming more popular because of the fast recovery. Rhinoplasty is a common facial plastic surgery procedure that can be associated with significant postoperative morbidities, especially Post-rhinoplasty edema and ecchymosis can influence patient satisfaction with surgery as well as result in poor quality of life. So in this regard, the recovery outcomes among patients undergoing surgical rhinoplasty should be managed. The nurses should do their best to alleviate patient's postoperative pain, intraoperative bleeding, periorbital edema and ecchymosis and improving patient satisfaction through using non pharmacological methods as application of cryotherapy. **(Armengou et al 2024)**

So, it is very important to explain the effect of nursing care provided pre and post rhinoplasty and its results. Therefore; the aim of this study was to evaluate the effect of Nursing Intervention on Minimizing Incidence of Complications for Patients Undergoing Surgical Rhinoplasty. So in this regard, the recovery outcomes among patients undergoing surgical rhinoplasty should be managed carefully. The nurses should do their best to alleviate patient's postoperative pain, intraoperative bleeding, periorbital edema and ecchymosis and improving patient satisfaction. **(Kwiecien & McHugh, 2021).**

Aim of study:

This study aimed to assess the effect of nursing intervention on minimizing incidence of complications for patients undergoing surgical rhinoplasty.

Research hypothesis:

1) Patients undergoing surgical rhinoplasty who receive nursing intervention (Study group I) will exhibit improvement of nasal symptoms obstruction than patients who will not receive nursing intervention

2) Patients undergoing surgical rhinoplasty who receive nursing intervention (Study group I) will have less intraoperative postoperative pain score than patients who will not receive nursing intervention (Control group II).

3) Patients undergoing surgical rhinoplasty who receive nursing intervention (Study group I) will have less periorbital edema and ecchymosis intraoperative bleeding than patients who will not receive nursing intervention (Control group II).

4) Patients undergoing surgical rhinoplasty who receive nursing intervention (Study group I) will exhibit improvement of Rhinoplasty outcome evaluation which include improvement of patient satisfaction and postoperative cosmetic state than patients who will not receive nursing intervention **cryotherapy** (Control group II).

SUBJECTS AND METHOD:

Research Design: a quasi- experimental was utilized to achieve the aim of the study.

Setting: - The study was conducted in an Otorhinolaryngology Department at Tanta University Hospitals.

Subjects: The sample of this study was consisted of:

A convenience sample of 60 adult patients of both sexes scheduled for rhinoplasty and divided into 2 equal groups, 30 patients in each group as the following:

Group 1; Control group: they were received their routine hospital nursing care.

Group 2; Study group: they were received nursing intervention was implemented by the researcher.

Inclusion criteria:

Patient undergoing aesthetic rhinoplasty, aged 21 years and above, able to communicate verbally or nonverbally. Patients who have revision of rhinoplasty, and those who are not willing to participate were excluded.

Tools of data collection:

The data of the study was collected by using three tools:

Tool (I) Structured Interview Questionnaire it consisted of four parts

Part One: - Patients; Socio-Demographic Data age, sex, marital status, level of education, and occupation, current diagnosis, body mass index, vital signs and type of operation, date of admission, date of operation, date of discharge.

Part Two: - Nasal obstruction symptom evaluation (NOSE) scale,

The nasal obstruction symptom evaluation scale was developed by **Steward and et al .**It is a disease-specific quality of life instrument for use in nasal obstruction. All the patients were asked 5-item self-reporting questions. Each response is assigned a score ranging from 0 to 4, indicating the severity of the symptom. The total score was multiplied by five to base the scale out of a possible score of a 100 for analysis

Part Three: - Patient's Knowledge Assessment Tool

It will be developed by the researcher to assess patient's knowledge regarding rhinoplasty. It includes: concept of rhinoplasty, preoperative preparation, postoperative care, postoperative complications, and discharge instructions procedure such as definition of rhinoplasty, indication of rhinoplasty, types and approaches of rhinoplasty, Preoperative instructions and postoperative care, the complications of rhinoplasty including the complications, how to deal with these complications, definition and action of cryotherapy and how cryotherapy can applied and self-care at home.

Scoring system

Correct and complete answer 2

Correct and incomplete answer 1

Incorrect and no answer zero

Tool (II): Rhinoplasty Complications Monitoring

It will be used to assess the presence or absence of signs and symptoms of postoperative complications. It will be consisted of two parts as follow

Part one: The modified "Surgeon Periorbital Rating of Edema and Ecchymosis (SPREE)" questionnaire:

It was adopted from **Kara and Gökalan**: to measure the degree of edema and ecchymosis find in the periorbital area postoperatively.

The questionnaire was rated the degree of edema and ecchymosis on a 4-points scale. An individual score was given for each side for both edema and ecchymosis. Reliability of the modified SPREE was tested by **Jeremie, et al.,** who found that the intra-observer reliability of the instrument was r = 0.94 and it was considered excellent

Scoring system

Evaluation of eyelid edema

0 = None

1+ = Minimal of the iris

2+ = Partial covering of the iris

3+ = Complete covering of the iris

4+ = Full closure of the eyelid.

Evaluation of periorbital ecchymosis extension

0 = None

1 = Less than 1/4 of medial lower and upper lids

2 = Between 1/4 and 1/2 of medial lower and upper lids

3 = Between 1/2 and 3/4 of lower and upper lids4 = Greater than 3/4 of lower and upper lids.

Part two: Visual Analogue Pain

Scale (VAS): It was adopted from **Bain, et al., (2005)** and to rate the subject's pain intensity level. The total score was from 0 to 10, in which zero mean indicated no pain while a score from1 to 3 indicated mild pain, a score from 4 to 6 indicated moderate pain, a score from 7 to 9 indicated sever pain and 10 indicated worst pain. The reliability of the VAS was tested by **Boonstra, et al., (2008)** [11] who found that the test retest reliability was r = 0.84 and reported that it had excellent test-retest reliability

Tool (III) Rhinoplasty outcome evaluation (ROE) scale:

It was adopted from **Alsarraf et al**. The ROE questionnaire is a rhinoplasty-specific outcome instrument which comprises a total of 6 questions regarding the physical, emotional, and social fields [9]. This questionnaire has excellent test–retest reliability and internal consistency scores following surgical interventions. Each question is scored from 0 to 4. The total score is converted to 100 by dividing by 24 and multiplying by 100.

Validity of tools:

– The study tools were tested and revised by a panel of five experts in the field of medical- surgical nursing and 2 experts of Otorhinolaryngology field professor at the faculty of medicine to ascertain relevance, clarity, understanding, completeness and applicability of tools. The required correction and modifications were done by adding, modifying and rearranging some questions.

Tools Reliability:

– They were tested by using Cronbach's Coefficient Alpha test and it was 0.898.

– Reliability of knowledge questionnaire was determined using Cronbach's alpha coefficient which was 0.753. Nasal obstruction symptoms   0.709, complications 0. 739 pain, outcomes 0.632. This only proves that this tool is an instrument with good reliability.

Data collection process: This study was conducted in three phases:

Phase I: Preparatory phase

- Ethical approval was obtained from the Faculty of Nursing, Tanta University as well as Research Scientific Ethical Committee.

- The scientific research committee of approval was sought and granted with the code number 193/1/2023.

- An official permission to conduct the study was obtained from the dean of Faculty of the Nursing Tanta University.

- Permission was obtained from Tanta University Hospitals directors, affiliated to Tanta University Hospitals.

- No one in the study was ever in danger or discomfort because of the way it was designed.

- Written informed consent was obtained from patients to participate in the study after explaining the purpose of the study and confidentiality was preserved.

- When collecting this data, we were very careful to protect the privacy of our patients and their information.

- Names were replaced with code numbers.

- The patient was asked to provide their informed consent once the study's purpose was explained. Everyone who took part in the study was informed of its goals and given the option to stop at any moment.

- Pilot study was carried out on 10 % (6 patients) of the study sample to test feasibility, objectivity, clarity and the applicability of the study tools, it was excluded from the study sample, and the necessary modification will be done accordingly. The pilot study was also used to estimate the time needed for each subject to fill in the questions. Modifications were done depend on the results of the pilot study. Patients participated in the pilot study were excluded from the main study sample

- Session plan and colored booklet with simple Arabic language was developed by the researcher after reviewing recent literature.

Phase II: Implementation phase:

- The researcher attended to Otorhinolaryngology department inpatient department and out patients' clinics every day from 8:30 Am to 2:00 Pm from October to December 2024.

- Patients who meet the inclusion criteria & who accept to participate in the study was divided into two equal groups, study group submitted to nursing intervention plus routine hospital care for patients submitted to rhinoplasty surgery (A) and control group (B) who will receive routine hospital nursing care.

- A comfortable, private place was chosen for the interview. The researcher started by introducing herself to the patients and giving them a brief idea about the aim and nature of the study. Then, an oral consent from each participant was obtained.

- Assessment aimed to collect data from patients under the study to identify demographic data by using (Tool I, part 1), the nasal obstruction symptom evaluation scale was used four times of assessment for; before surgery, 1st, 3rd, and 14th postoperative day by using (Tool I Part 2) and assessment of patient knowledge by using (Tool I Part 3). The modified "Surgeon **Periorbital Rating of Edema and Ecchymosis (SPREE)"** was used three times of assessment for; 1st, 3rd, and 14th postoperative day by using (Tool II Part 1) **Visual Analogue Pain** was used three times of assessment for; 1st, 3rd, and 14th postoperative day by using (Tool II Part 2). **Rhinoplasty outcome evaluation (ROE) scale** was used two times of assessment for; before surgery, and three months postoperativeby using (Tool III)

- Each patient was given written instructions including nursing intervention for patients submitted to rhinoplasty surgery.

- Interviewing was done with each patient individually to illustrate the aim of the study, gain permission to share applied pre-test.

- Giving all instruction regarding booklet and answer any questions, several teaching methods such as brain-storming, discussion, handouts, and the use of illustrated media (video, pictures and PowerPoint presentation). Time needed to 30-45 minute for each patient.

- The phone number was given to patients to facilitate communication and give chance to patient for any explanation and helping.

Study group

The study group received nursing intervention. Also, the study group received application of **cryotherapy** for 10 minutes starting from one hour preoperative, and for 48 hours postoperatively while patient awake with usual hospital care.

The following nursing intervention includes the following:

Preoperative nursing care as; preoperative assessment, document patient's history and physical assessment, the potential complications, and reassurance the patient about surgical incision.

Immediate preoperative measures as; measuring vital signs, putting on operative gown, administering prescribed preoperative medications.

Immediate postoperative care as; assessment of the patient immediately with focus on airway, breathing, circulation. It also, included checking level of consciousness, measuring vital signs, observation amount of draining discharge and its color, observation of the intravenous infusions, and patency of IV route.

Postoperative care as; administering the prescribed medications, postoperative position (semi-fowler's position), postoperative early ambulation, inspection surgical dressing for any bleeding.

Postoperative instructions as wound care, personal hygiene, driving, nutrition, warning signs requiring medical care, and follow up visits.

Control group

Control group followed the routine hospital nursing care as prescribed by surgical team and consisted of routine preoperative care, routine postoperative care, and routine pharmacological treatment

Phase III: Evaluation phase: The impact of preoperative nursing intervention on patients submitted to rhinoplasty surgery was assessed though comparison between the intervention and control group after after implementation of proposed nursing intervention using tool I (part2, 3) and tool II and III.

− Comparison was done between both groups to determine the effect of impact of preoperative nursing intervention

RESULTS

Table (1): Shows distribution of both studied groups according to their demographic characteristics.

In relation to age, it was noticed that (53.3%) of control group and (46.7%) of the study group are ranged from (30-<40). with close mean age in the early thirty (30.07±0.944 & 30.97±0. 928, respectively), with a higher preponderance of females in both groups among (50.0% & 63.3%, respectively). Moreover, (53.0% & 36.7%, respectively) were housewives. **Concerning the marital status,** it was found that, (56.7%) of control group and (73.4%) of the study group were married. **Concerning the educational level**, it showed that (43.4%) of control group had read and write level of education, while the study group had intermediate level of education.

Table (1): Distribution of both studied groups according to their demographic characteristics, control group (n=30), and study group (n= 30)

Patients' demographic characteristics	Variables	Control group N=30		Study group N=30		X^2	P value
		No.	%	No.	%		
Age (year)	21-<30	8	26.7	10	33.3	0.698	0.874 [n.s]
	30-<40	16	53.3	14	46.7		
	40-<50	2	6.7	3	10.0		
	50 60	4	13.3	3	10.0		
	Mean ± SD	**30.07±0.944**		**30.97±0.928**		t= 0.414	0.681 [n.s]
Sex	Male	15	50.0	11	36.7	1.086	FEp 0.435 [n.s]
	Female	15	50.0	19	63.3		
Marital status	Single	12	40.0	7	23.3	1.957	0.376 [n.s]
	Married	17	56.7	22	73.4		
	Divorced	1	3.3	1	3.3		

|		No.	%	No.	%		
Occupation	Housewife	16	53.4	11	36.7	3.069	0.546 [n.s]
	Employee	4	13.3	3	10.0		
	Farmer	3	10.0	3	10.0		
	Worker	1	3.3	3	10.0		
	Retired	6	20.0	10	33.3		
Educational level	Can't read and write	7	23.3	6	20.0	5.346	0.148 [n.s]
	Read and write	13	43.4	6	20.0		
	Intermediate education	6	20.0	13	43.3		
	University education	4	13.3	5	16.7		

Table(2): shows Comparison of patients' knowledge about rhinoplasty pre, and post nursing intervention , it was noticed that there was equal highly statistically significant differences related to indications, post-operative complications, how to apply cryo therapy as P value=<0.001.Moreover ,there was statistically significant differences related to definition as P value=0.006 &Approach of rhinoplasty as P=0.012& preoperative instruction as P=0.016&How to deal with complications as P =0.004&Concept and action of cryotherapy as P =0.005 and self-care at home as P =0.002

Table (2): Comparison of patients' knowledge about rhinoplasty pre, and post nursing intervention, control group (n=30), and study group (n= 30)

Knowledge items	Response	Control group (n=30)				Study group (n=30)				X^2 test P value (1)	X^2 test P value (2)
		pre Intervention		post intervention		pre Intervention		post intervention			
		No.	%	No.	%	No.	%	No.	%		
Definition of rhinoplasty	Completely Correct	0	0.0	7	23.3	0	0.0	19	63.3	0.351 FE 1.000 [n.s]	10.338 0.006[*]
	Incompletely correct	2	6.7	21	70.0	1	3.3	9	30.0		
	Incorrect	28	93.3	2	6.7	29	96.7	2	6.7		
Indication of rhinoplasty	Completely Correct	0	0.0	9	30.0	0	0.0	30	100.0	NA	32.308 <0.001[**]
	Incompletely correct	30	100.0	21	70.0	30	100.0	0	0.0		
	Incorrect	0	0.0	0	0.0	0	0.0	0	0.0		
Approaches of rhinoplasty	Completely Correct	0	0.0	7	23.3	0	0.0	18	60.0	0.000 FE 1.000 [n.s]	8.773 0.012[*]
	Incompletely correct	8	26.7	19	63.3	8	26.7	11	36.7		
	Incorrect	22	73.3	4	13.3	22	73.3	1	3.3		
Preoperative instructions	Completely Correct	0	0.0	8	26.7	0	0.0	10	63.3	0.000 FE 1.000 [n.s]	8.253 0.016[*]
	Incompletely correct	9	30.0	19	63.3	9	30.0	9	30.0		
	Incorrect	21	70.0	3	10.0	21	70.0	2	6.7		
Postoperative complications of rhinoplasty	Completely Correct	0	0.0	4	13.3	0	0.0	20	66.7	0.300 FE 0.785 [n.s]	19.028 <0.001[**]
	Incompletely correct	9	30.0	15	50.0	11	36.7	8	26.7		
	Incorrect	21	70.0	11	36.7	19	63.3	2	6.6		
How to deal with these complications	Completely Correct	0.	0.0	10	33.3	0	0.0	22	73.3	0.373 FE 0.761 [n.s]	11.167 0.004[*]
	Incompletely correct	6	20.0	16	53.4	8	26.7	8	26.7		
	Incorrect	24	80.0	4	13.3	22	73.3	0	0.0		
Concept and action of cryotherapy	Completely Correct	0	0.0	9	30.0	0	0.0	21	70.0	0.000 FE 1.000 [n.s]	10.800 0.005[*]
	Incompletely correct	9	30.0	18	60.0	9	30.0	9	30.0		
	Incorrect	21	70.0	3	10.0	21	70.0	0	0.0		
How cryotherapy can be applied	Completely Correct	0	0.0	4	13.3	0	0.0	20	66.7	0.300 FE 0.785 [n.s]	19.028 <0.001[**]
	Incompletely correct	9	30.0	15	50.0	11	36.7	8	26.7		
	Incorrect	21	70.0	11	36.7	19	63.3	2	6.6		
Self -care at home	Completely Correct	0	0.0	12	40.0	0	0.0	25	83.3	0.373 FE 0.761 [n.s]	12.831 0.002[*]
	Incompletely correct	6	20.0	14	46.7	8	26.7	5	16.7		
	Incorrect	24	80.0	4	13.3	22	73.3	0	0.0		

(FE) Pvalue for Fisher exact for chi square, Not significant (p > 0.05) (*) Statistically Significant at ≤0.05   ** Highly significant (p ≤ 0.001)

Figure (1): shows Comparison between study and control groups related to total knowledge level about rhinoplasty pre, and post nursing intervention. It was noticed that there were no statistically significant differences between the studied groups pre nursing intervention with P =1. 000. Moreover, there was a highly statistically significant differences related to total knowledge level about rhinoplasty pre, and post nursing intervention for the study group as P value=0.001.
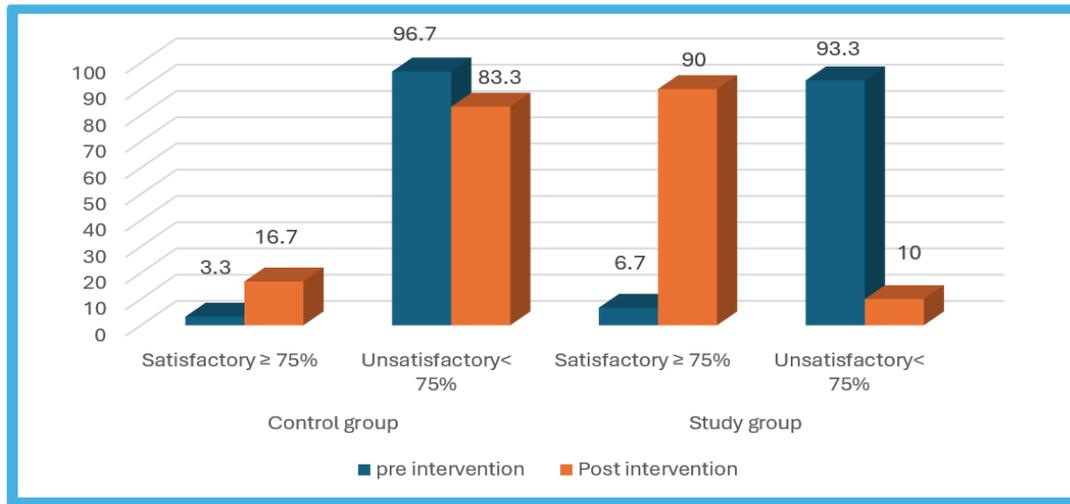
(FE) p value for Fisher exact for chi square   not significant (p > 0.05)
 ** Highly significant (p ≤ 0.001)

Figure (2): Comparison between study and control groups related to total knowledge level about rhinoplasty pre, and post nursing intervention, control group (n=30), and study group (n= 30)

Table (3): Illustrates comparison between the mean scores of nasal obstruction symptoms among the studied patients throughout study phases. It was revealed that there was a highly statistically significant differences related to nasal symptoms obstruction for both groups on the 3rd day and 14th day after surgery as P value=<0.001and also there was statistically significant differences one day after surgery as P =0.011, while there was no statistically significant differences pre operatively as P =0.191.

Table (3): Comparison between the mean scores of nasal obstruction symptoms among the studied patients throughout study phases, control group (n=30), and study group (n= 30)

Nasal obstruction symptoms	Control group $\overline{X} \pm SD$	Study group $\overline{X} \pm SD$	t-test p value
Pre Operatively	77.33±5.97	74.66±9.27	1.323 0.191 [n.s]
One Day After Surgery	76.33±7.64	71.66±5.92	2.642 0.011[*]
3 Days After Surgery	62.50±11.04	46.83±4.44	7.207 <0.001[**]
14 Days After Surgery	37.50±16.01	21.83±15.78	3.816 <0.001[**]
F test	96.027 (<0.001[**)]	175.219 (<0.001[**)]	

(f) Anova with repeated measures, (t) independent t test, Not significant (p > 0.05),
(*) Statistically Significant at ≤0.05 ** Highly significant (p ≤ 0.001)

Table (4): Clarifies Comparison between the mean scores of rhinoplasty complications among the studied patients throughout study phases.

Regarding Periorbital Ecchymosis extension, it was noticed that there was no statistically significant differences pre operatively as P =0.585, while there was a highly statistically significant differences on the 3rd day after surgery as P =<0.001 and there were statistically significant differences on 14th day after surgery as P=0.027. **Concerning Eyelid edema, it** was noticed that there was no statistically significant differences pre operatively as P =0.289, while there was a highly statistically significant differences on the 3rd day after surgery as P =<0.0013 and on 14th day after surgery for both studied group.

Table (4): Comparison between the mean scores of rhinoplasty complications among the studied patients throughout study phases, control group (n=30), and study group (n= 30)

Rhinoplasty complications		Control group $\overline{X} \pm SD$	Study group $\overline{X} \pm SD$	t-test p value
One Day After Surgery	Periorbital Ecchymosis extension	3.53±0.68	3.43±0.72	0.549 0.585 n.s
3 Days After Surgery		2.73±0.74	2.10±0.54	3.769 <0.001**
14 Days After Surgery		0.37±0.55	0.23±0.50	2.272 0.027*
One Day After Surgery	Eyelid edema	3.37±0.80	3.37±0.80	1.071 0.289 n.s
3 Days After Surgery		2.23±0.93	1.17±0.69	5.004 <0.001**
14 Days After Surgery		0.80±0.80	0.00±0.00	5.442 <0.001**

(t) Independent t test   Not significant (p > 0.05)

(*) Statistically Significant at ≤0.05   ** highly significant (p ≤ 0.001)

Table (5): Illustrates Comparison between the postoperative pain levels among the studied patients throughout study phases. It was found that there was no statistically significant differences pre operatively related to postoperative pain as P =1.000, while there was a highly statistically significant differences related to pain level postoperatively on the 3rd day and 14th day after surgery as P =<0.001.

Table (5): Comparison between the postoperative pain level among the studied patients throughout study phases, control group (n=30), and study group (n= 30)

Postoperative Pain level	Studied groups						test p value (1)	test p value (2)	test p value (3)
	Control group			Study group					
	One Day After Surgery	Three Days After Surgery	14 Days After Surgery	One Day After Surgery	Three Days After Surgery	14 Days After Surgery			
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)			
No pain (0)	0(0.0)	1(3.3)	9(30.0)	0(0.0)	1(3.3)	22(73.3)			
Mild (1-3)	2(6.7)	3(10.0)	12(40.0)	2(6.7)	13(43.3)	8(26.7)			
Moderate (4-6)	6(20.0)	12(40.0)	8(26.7)	6(20.0)	14(46.7)	0(0.0)	χ^2=0.000 1.000 n.s	χ^2=15.471 0.004*	χ^2=15.252 0.002*
Sever (7-9)	21(70.0)	13(43.3)	1(3.3)	21(70.0)	2(6.7)	0(0.0)			
Worse (10)	1(3.3)	1(3.3)	0(0.0)	1(3.3)	0(0.0)	0(0.0)			
$\overline{X} \pm SD$	3.70± 0.65	2.33± 0.84	1.03± 0.85	3.70± 0.65	1.57± 0.67	0.27± 0.45	0.000 1.000 n.s	3.876 <0.001**	4.365 <0.001**

Not significant (p > 0.05) *statistically significant (p <0.05)
**** highly significant (p ≤ 0.001)**

1) **control group vs study group during (one day after surgery)**

2) **control group vs study group during (three days after surgery)**

3) **control group vs study group during (14 days after surgery)**

Table (6): Shows comparison between the mean scores of rhinoplasty-specific outcomes among the studied patients pre and post 3 months of intervention. It was found that there were no statistically significant differences related to rhinoplasty-specific outcomes among the studied patients pre nursing intervention as P value 0.433, while there was a highly statistically significant differences related to rhinoplasty-specific outcomes among the studied patients 3 months post nursing intervention as P =<0.001.

Table (6): Comparison between the mean scores of rhinoplasty-specific outcomes among the studied patients pre and post 3 months of intervention, control group (n=30), and study group (n= 30)

Rhinoplasty-specific outcomes	Control group		Study group		t-test p value (1)	t-test p value (2)
	Pre intervention (before surgery)	Post 3 months of intervention (post-surgery)	Pre intervention (before surgery)	Post 3 months of intervention (post-surgery)		
	$\bar{X} \pm$ SD	$\bar{X} \pm$ SD	$\bar{X} \pm$ SD	$\bar{X} \pm$ SD		
Appearance of the nose	1.30±0.75	3.17±0.46	1.23±0.77	3.57±0.56	0.339 0.736 [n.s]	-2.994 0.004 [*]
Ability to breathe through the nose	1.50±0.86	2.27±0.64	1.63±0.89	4.97±7.20	-0.590 0.558 [n.s]	-2.045 0.045 [*]
How much think that friends and close ones like nose	2.00±0.58	2.17±0.87	1.80±0.66	2.87±0.68	1235 0.222 [n.s]	-3.459 0.001 [**]
Think that current nasal appearance limits social or professional activities	2.27±0.78	3.20±0.76	2.50±0.90	3.80±0.40	-1.070 0.289 [n.s]	-3.808 <0.001 [**]
Confident that nasal appearance is the best it can be	2.03±0.99	2.73±0.78	2.20±0.96	3.57±0.62	-0.658 0.513 [n.s]	-4.546 <0.001 [**]
Would like to surgically improve the appearance or function of nose	2.03±0.89	2.27±1.04	2.87±0.90	3.60±0.62	-0.929 0.357 [n.s]	-3.674 0.001 [**]
Total	11.13±2.35	16.40±2.19	11.63±2.53	22.36±7.59	-0.790 0.433 [n.s]	-4.134 <0.001 [**]

Not significant (p > 0.05) *statistically significant (p <0.05) ** Highly significant (p ≤ 0.001)

4) **control group vs study group during (one day after surgery)**

5) **control group vs study group during (three days after surgery)**

6) **control group vs study group during (14 days after surgery)**

Table (7): illustrates Correlation between studied variables among the studied patients during post intervention. It was noticed that there was a negative and significant correlation between total patients' knowledge with nasal obstruction symptoms, rhinoplasty complications, and postoperative Pain level within control and study groups. Also, there was significant and positive correlation between total patients' knowledge with rhinoplasty-specific outcomes.

Table (7): Correlation between studied variables among the studied patients during post intervention, control group (n=30)

Variables		r-p	Total knowledge	Nasal obstruction symptoms
Nasal obstruction symptoms	Study group	r	-0.868	-
		p	<0.001**	
	Control group	r	-0.825	-
		p	<0.001**	
Rhinoplasty complications	Study group	r	-0.788	0.304
		p	<0.001**	0.056 n.s
	Control group	r	-0.338	0.635
		p	0.033*	<0.001**
Postoperative Pain level	Study group	r	-0.724	0.128
		p	<0.01**	0.430 n.s
	Control group	r	-0.670	0.711
		p	<0.001**	<0.001**
rhinoplasty-specific outcomes	Study group	r	0.640	-0.896
		p	<0.001**	<0.001**
	Control group	r	0.448	-0.375
		p	0.013*	0.041*

Not significant (p > 0.05), (*) Statistically Significant at ≤0.05,
 ** Highly significant (p ≤ 0.001)

DISCUSSION

Rhinoplasty is a common surgical surgery used to address functional abnormalities **(Topan H et al 2021)**, **(Manahan M et al 2021)**. Nursing plays an important role in postoperative care using non-pharmacological methods in nursing care. Cryotherapy, which is suggested for the management of pain is regarded as a cost effective and easily applicable procedure that may be applied locally in the target area and repeated without difficulties **(Ong A et al 2016).**

Regarding socio-demographic characteristics of the studied sample

Concerning the age, the current study show that there was (53.3%) of control group and (46.7%) of the study group are ranged from (30-<40), with close mean age in the early thirty (30.07±0.944 & 30.97±0. 928, respectively). This is because people in this age want to be beautiful and more attractive to other people. These results were similar with **Tabrizi et. al (2025),** who found that the mean age of the study patient population 29.26 ±3.52.

The current study finding was in line with **Parsa, et al., (2021)** who studied the "role of age and gender on perception of women after cosmetic rhinoplasty" and found that most of the patients were in the young adult group between 25and 34years. This finding was not in the same line with **AlHarethy, et al., (2017)** who studied the "Assessment of satisfaction based on age and gender in functional and aesthetic rhinoplasty "and found

that most of the patients were in the young adult group between 17 and 48years. Also this finding not agree with **Santos, et al., (2019)** who studied the" Spare roof technique in reduction rhinoplasty: prospective study of the first one hundred patients" and found that most of the patients were in the adult group between 20and 55years.

This also disagree with **Mohamed R,Hassanein A,Mohamed M 2024** ,who reported that 70% of control group and half (50%)of study group ranged from<25-30 .And also in contrast with **Valsamidis et al., (2018) and García-Chabur et al., (2023)** they showed the prevalence of nasal septal deviation undergoing surgical rhinoplasty is increased in the same age And also on contrary with **Kazemy, et al., (2018)** who studied the "Complications of Rhinoplasty in Patients: An Epidemiological Study" and found that themajority of the subjects were within the age range of 18-25

In relation to sex, the present study found that females are seeking to surgical rhinoplasty more than males. our study noticed that there were a higher preponderance of females in both groups among (50.0% & 63.3%, respectively).

This may be due to that females are seeking to surgical rhinoplasty more than males because they have more facial beauty than men so they seek to repair any defect in their faces such as undergoing surgical rhinoplasty. This is in line with **El Din, El Gaffar, Megahed and Shehata 2022**, who reported that more than half 953.5%) of the both groups **were females. Also** in the same line with **Kazemy, et al., (2018)** who found that the majority of the patients were females. But the present study was in contrast with **kaviani et al, (2015)** who studied the "Impact of Cryotherapy on Reducing Postoperative Periorbital Ecchymosis and Nasal Edema in Patients undergoing Rhinoplasty" and found that the same percentage for both females (50%) and males (50%) who seeking for performance of surgical rhinoplasty

Concerning the educational level, this study showed that (43.4%) of control group had read and write level of education, while the study group had intermediate level of education. the finding of this study agreed with **Kazemy, et al., (2018)** who found that most of patients who undergoing surgical rhinoplasty had secondaryschool education.

This finding was counteracted with **Mehriar, et al., (2017)** who studied the "Mental Health of Rhinoplasty Applicants" and found that most of patients who undergoing surgical rhinoplasty had high education. The current study found that most of patients who undergoing surgical rhinoplasty hadn't work because most of them were females who are housekeepers. This finding agreed with **Belli, et al., (2013**) who found that most of patients who undergoing surgical rhinoplasty unemployed. . But the finding of the current study counteracted with **Alsubeeh, et al., (2019**) who studied the " Prevalence of considering revision rhinoplasty in Saudi patients and its associated factors" and found that most of patients who undergoing surgical rhinoplasty were employers

Regarding patients' knowledge about rhinoplasty pre, and post nursing intervention, it was noticed that there was equal highly statistically significant differences related to patients' knowledge about rhinoplasty pre, and post nursing intervention as P value=<0.001.

This finding agreed with **Tseng, et al., (2021)** who reported that there was an improvement of patients' recovery outcomes and satisfaction. This result was contradicted with **Khawaji N et. al (2024) and Hakimi, et al, (2021)** who found that there was a low level of knowledge regarding rhinoplasty surgery among the study group. This is due to the perfect use of different methods of education during the study and the good response of the studied patients during the sessions.

Related to mean scores of nasal obstruction symptoms among the studied patients throughout study phases. It was revealed that there was a highly statistically significant differences related to nasal symptoms obstruction for both groups on the 3rd day and 14th day after surgery as P value=<0.001and also there was statistically significant differences one day after surgery as P =0.011, while there were no statistically significant differences per operatively as P =0.191. The result was in agreement with the finding with **Shrestha K et. al (2019),** who reported that both groups showed statistically significant improvement in mean NOSE scores after septoplasty with p values less than 0.001

Concerning Eyelid edema, it was noticed that there was no statistically significant differences pre operatively as P =0.289, while there was a highly statistically significant differences on the 3rd day after surgery as P =<0.0013 and on 14th day after surgery for both studied group. This finding matched with the study done by **Ghorbani Z et al (2023),** who stated reduce the postoperative edema on days 1, 3, and 7 significantly. Also, this finding was accepted with **Tasman, (2018)** who studied " Reducing periorbital edema and ecchymosis after rhinoplasty: literature review and personal approach" and found that postoperative cooling of the periorbital region reduced the postoperative ecchymosis after rhinoplasty surgery.

Regarding Periorbital Ecchymosis extension, it was noticed that there was no statistically significant differences pre operatively as P =0.585, while there was a highly statistically significant differences on the 3rd day after surgery as P =<0.001 and there were statistically significant differences on 14th day after surgery as P=0.027. This finding was agreed with **El Din E et al, (2022)** found that application of cryotherapy post rhinoplasty surgery was reduce the postoperative periorbital ecchymosis. Also, this finding was supported with **Apaydin, et al., (2018)** who studied the "Postoperative care in aesthetic rhinoplasty patients" found that postoperative application of ice therapy reduced the postoperative periorbital ecchymosis after rhinoplasty surgery.

This finding disagreed with **Hanci, et al., (2020)** who studied the "Evaluation of the efficacy of heliotherapy for postoperative edema, ecchymosis, and pain after rhinoplasty" and found that traditional ice application was not prevent the postoperative ecchymosis after rhinoplasty surgery.

Regarding postoperative pain levels, it was found that there was no statistically significant differences pre operatively related to postoperative pain as P =1.000, while there was a highly statistically significant differences related to pain level postoperatively on the 3rd day and 14th day after surgery as P =<0.001. This result was similar with **Mohammed R. et. al (2024)**, who reveals that, there was no significant difference

between studied groups in relation to level of pain at pre intervention. In spite, at post intervention evaluation, a highly statistically significant difference was detected between both groups.

Also, these results were in the line with the findings **of Dağli, Ocak, Mirici, Kaya & Acar, (2018)** who concluded that Postoperative pain from septoplasty remains a concern for prospective patients' health, providing patients with health education regarding use of cold compresses, elevation of the head of the bed, and avoidance of straining, may help decrease postoperative pain and discomfort. **It supports the research hypothesis**

In relation to mean scores of Rhinoplasty outcome evaluation among the studied patients pre and post 3 months of intervention. It was found that there were no statistically significant differences related to rhinoplasty-specific outcomes among the studied patients pre nursing intervention as P value 0.433, while there was a highly statistically significant differences related to rhinoplasty-specific outcomes among the studied patients 3 months post nursing intervention as P =<0.001. **Moreover**, it showed that **Rhinoplasty outcome evaluation (ROE)** scores significantly increased from the preoperative to the postoperative period, implying a high index of satisfaction in our patients. This may be interpreted that noticeable advances in surgical technology and the messages delivered by social media concerning beauty and patients should be aware of realistic and unrealistic expectations related to aesthetic outcomes

As regard patients' satisfaction, the current study showed the mean of **Rhinoplasty outcome evaluation (ROE)** preoperatively was 11.13±2.35, 11.63±2.53 respectively in both group and the mean postoperative score was 16.40±2.19, 22.36±7.59 respectively. Also, there was significant improvement in the postoperative cosmetic state compared with the pre-operative state. This finding was accepted with **Baz A et. al (2024)**, who found that **Rhinoplasty outcome evaluation (ROE)** score increased significantly in overall patients from 29.75 (16.67 - 41.67) preoperatively to 81.92 (70.83 - 91.17) and 87.30 (75 - 95.83) one month and 6 months after rhinoplasty respectively with p value < 0.0001. **It supports the research hypothesis**

This result was contradicted with **Awadeen A (2021)**, who mentioned that decrease level of patients' satisfaction.

CONCLUSION

Depend on, the results of our study; implementing the nursing intervention protocol as perioperative nursing intervention among patients undergoing surgical rhinoplasty and it is also effective when implementing care because it reduces the intraoperative and postoperative bleeding, fear, anxiety reduces the postoperative pain, reduces the postoperative periorbital edema and ecchymosis and has a significant improvement of patient's knowledge and satisfaction.

Nursing intervention aids in controlling postoperative complications. It is an important aspect in patients care and can guide health care staff to save the patients from long term chronic complications.

Recommendations:

1) Application of nursing intervention protocol should be done for all patients undergoing surgical rhinoplasty to improve their recovery outcomes.

2) Simplified booklet about surgical rhinoplasty, preoperative instructions, intraoperative and postoperative complications related to surgery, application of cryotherapy to reduce these complications and self-care at home should be available for patients undergoing surgical rhinoplasty

3) The presence of educator nurse as a separate specialty in the plastic department to improve patient's knowledge about the surgical procedure should be considered. Nurses need to fulfill their roles as health educator for patients who undergoing surgical rhinoplasty.

Nursing intervention should be integrated into medical outpatient clinic to assist septoplasty patients cope with their disease and help in healthy life modifications

Investigating patients undergoing septoplasty with continues follow-up and check for adherence to drug regimen in the right way is important for prevention and control of postoperative complications

References

1) **Adham, G., Keyhan, S. O., Fallahi, H. R., Ziaei, H., & Thomas, M. (2021).** Nasal sill augmentation: an overlooked concept in rhinoplasty—a technical note and review of the literatures. *Maxillofacial plastic and reconstructive surgery, 43*(1), 14.

2) **Aldosari B (2021).** Is Nasal skin thickness a prognostic indicator to postoperative edema and ecchymosis? *Ear Nose Throat J.;100*:206–9

3) **AlHarethy, S., Al-Angari, S. S., Syouri, F., Islam, T., & Jang, Y. J. (2017).** Assessment of satisfaction based on age and gender in functional and aesthetic rhinoplasty. *European Archives of Oto-Rhino-Laryngology, 274*(7), 2809-2812.

4) **Ali, N. M., Kadhim, A. J., & Khachian, A. (2023).** Vibration and Exercise Maneuvers to Minimize Patients' Shoulder Pain Post laparoscopic cholecystectomy: A Randomized Clinical Trial. *Iraqi National Journal of Nursing Specialties, 36*(2), 110-116.

5) **Alsubeeh, N. A., AlSaqr, M. A., Alkarzae, M., & Aldosari, B. (2019).** Prevalence of considering revision rhinoplasty in Saudi patients and its associated factors. *Maxillofacial Plastic and Reconstructive Surgery, 41*(1), 59.

6) **Apaydin, F., Stanic, L., Unadkat, S., & Saleh, H. A. (2018).** Postoperative care in aesthetic rhinoplasty patients. *Facial Plastic Surgery, 34*(06), 553-560.

7) **Armengou, X., Frank, K., Kaye, K., Brébant, V., Möllhoff, N., Cotofana, S., & Alfertshofer, M. (2024).** Facial Anthropometric Measurements and Principles–Overview and Implications for Aesthetic Treatments. *facial plastic surgery, 40*(03), 348-362.

8) **Awadeen, A. E. R. (2021).** Evaluation Of Patients'satisfaction After Rhinoplasty: A Prospective Study. Al-Azhar *Medical Journal, 5*0(4), 2433-2442.

9) **Bautista, S. A., Kim, D. H., Meer, E., & Ramesh, S. (2021).** Update on Modalities for Reducing Preoperative and Postoperative Swelling. *Advances in Cosmetic Surgery, 4*(1), 225-236.

10) **Baz, A., Sidhom, S., Amr, W. M., Abdelaziz, A., & Anany, A. (2024).** Outcomes Of Open Versus Closed Rhinoplasty: A Prospective Comparative Clinical Study. *Zagazig University Medical Journal, 30*(4), 1163-1172.

11) **Belli, H., Belli, S., Ural, C., Akbudak, M., Oktay, M. F., Cim, E. F., ... & Pehlivan, B. (2013).** Psychopathology and psychiatric co-morbidities in patients seeking rhinoplasty for cosmetic reasons. West *Indian med. j,* 481-486.

12) **Brown, D., & Lewis, S. M. (2007).** Lewis's medical-surgical nursing: Assessment and management of clinical problems. Elsevier Australia.

13) **Chen, W. S., Annaswamy, T. M., Yang, W., Wang, T. G., Kwon, D. R., & Chou, L. W. (2021).** Physical agent modalities. In Braddom's physical medicine and rehabilitation (pp. 338-363). Elsevier.

14) **Chourpiliadis, C., & Bhardwaj, A. (2022).** Physiology, respiratory rate. In StatPearls [Internet]. StatPearls Publishing.

15) **Dağli, E., Ocak, E., Mirici, E., Kaya, M., & Acar, A. (2018, December).** Effects of early postoperative nasal decongestant on symptom relief after septoplasty. *In International forum of allergy & rhinology (Vol. 8*, No. 12, pp. 1476-1480).

16) **Faleh, J. N., & AL-Fayyadh, S. (2022).** Preoperative Incentive Spirometer to Prevent Postoperative Pulmonary Complications following Open Heart Surgeries: A Randomized Single Blinded Multi-Centric Clinical Trial. *Journal of Contemporary Medical Sciences, 8*(4).

17) **García-Chabur, M. A., Castellanos, J., Corredor-Rojas, G., Salgar, M., Moreno, S., Pinzón, M., & Peñaranda, A. (2023).** Improvement in nasal obstruction and quality of life after nasal septoplasty with turbinoplasty: A pre-and post-study. *International Archives of Otorhinolaryngology, 2*7(02), e266-e273.

18) **Gruber, R. P., Roberts, C., Schooler, W., & Pitman, R. K. (2009).** Preventing postsurgical dissatisfaction syndrome after rhinoplasty with propranolol: a pilot study. *Plastic and Reconstructive Surgery, 123*(3), 1072-1078.

19) **Gupta, R., John, J., Ranganathan, N., Stepanian, R., Gupta, M., Hart, J., ... & Chaiyasate, K. (2022).** Outcomes of closed versus open rhinoplasty: a systematic review. *Archives of plastic surgery, 49*(05), 569-579.

20) **Guyuron, B., & Lee, M. (2017).** An effective algorithm for management of noses with thick skin. *Aesthetic plastic surgery, 41*(2), 381-387.

21) **Hakimi, A. A., Standiford, L., Chang, E., & Wong, B. J. F. (2021).** Development and assessment of a video-based intervention to improve rhinoplasty informed consent. *Facial Plastic Surgery, 37*(05), 585-589.

22) **Hanci, D., Üstün, O., Yılmazer, A. B., Göker, A. E., Karaketir, S., & Uyar, Y. (2020**). Evaluation of the efficacy of hilotherapy for postoperative edema, ecchymosis, and pain after rhinoplasty. *Journal of oral and maxillofacial surgery, 78*(9), 1628-e1.

23) **Heilbronn, C., Cragun, D., & Wong, B. J. (2020).** Complications in rhinoplasty: a literature review and comparison with a survey of consent forms. *Facial Plastic Surgery & Aesthetic Medicine, 22*(1), 50-56.

24) **Kadhim, A. J., Mohammadi, N., Hezbiyan, Z., Abbasinia, M., Norouzadeh, R., Taghadosi, M., & Aghaie, B. (2024).** The effects of a mindfulness training intervention on fatigue and job satisfaction among emergency nurses: A quasi-experimental study. *Nursing and Midwifery Studies, 13*(1), 9-17.

25) **Kaviani, H., Abdiyazdan, G. H., Ghodousi, A., & Paryavi, B. (2015**). The impact of cryotherapy on reducing postoperative periorbital ecchymosis and nasal edema in patients undergoing rhinoplasty. *Bull Env Pharmacol Life Sci, 4*, 22-29.

26) **Kazemy, S., Najari, F., Khalilzadeh, M., Safavi, H., & Najari, D. (2018).** Complications of rhinoplasty in patients: an epidemiological study. *International Journal of Medical Toxicology and Forensic Medicine, 8*(3 (Summer)), 109-112.

27) **Kermani, M. S., Shamsadini, A., Fazeli, F., Ahmadi, M., Dehghani, A., & Salajegheh61, S. (2021).** Comparison of different concentrations of epinephrine on hemodynamic changes and bleeding after rhinoplasty in patients under general anesthesia. Med. Edu. *Bull, 2*(1), 161-171.

28) **Khawaji, N. K., Mokarbesh, H. M., Kariri, K. I., Dallak, F. H., Othathi, F. A., Hakami, A. M., & Wafi, A. Y. (2024).** Awareness of rhinoplasty surgery among the population in the Jazan Region, Saudi Arabia. *Journal of Family Medicine and Primary Care, 13*(9), 4008-4015.

29) **Kim, Y. K., Kim, S. Y., & Yu, H. C. (2021).** The Application of Soft Tissue Filler in the Oral and Maxillofacial Field. In Integrated Procedures in Facial Cosmetic Surgery (pp. 367-387). Cham: Springer International Publishing.

30) **Kwiecien, S. Y., & McHugh, M. P. (2021).** The cold truth: the role of cryotherapy in the treatment of injury and recovery from exercise. *European journal of applied physiology, 121*(8), 2125-2142.

31) **Levin, M., Ziai, H., & Roskies, M. (2022).** Modalities of post-rhinoplasty edema and ecchymosis measurement: a systematic review. *Plastic Surgery, 30*(2), 164-174.

32) **Li, Z., Shi, R., Wu, H., & Yan, P. (2021).** First identification of a patient with prosthesis-related infection caused by an mcr-1.1-producing ST131 Escherichia coli after rhinoplasty. *Infection and Drug Resistance*, 249-257.

33) **Malekpour Ghorbani, Z., Shahriar, A., & Ghassemi, A. (2023).** Postoperative Periorbital Edema and Ecchymosis After External Lateral Osteotomy "Comparing Conventional Osteotome and Piezo Scalpel in Rhinoplasty". Indian *Journal of Otolaryngology and Head & Neck Surgery, 75*(1), 74-79.

34) **Manahan, M. A., Fedok, F., Davidson, C., Ahmad, J., Constantinides, M., Davis, R., ... & Rohrich, R. J. (2021).** Evidence-based performance measures for rhinoplasty: a multidisciplinary performance measure set. *Plastic and reconstructive surgery, 147*(2), 222e-230e.

35) **Mehriar, O., Asghari, F., Nemati, S., Sadeghi, A., Faghih Habibi, A., & Salehpoor, G. (2017).** Mental Health of Rhinoplasty Applicants: A Case Control Study. *Journal of Holistic Nursing And Midwifery, 27*(3), 75-84.

36) **Mohammed, R., & Hassanein, A. (2024).** Effect of Preoperative Nursing Intervention on Postoperative Outcome among Septoplasty Surgery Patient. *Mansoura Nursing Journal, 1*1(1), 397-405.

37) **Ong, A. A., Farhood, Z., Kyle, A. R., & Patel, K. G. (2016).** Interventions to decrease postoperative ecchymosis after edema rhinoplasty: and a systematic review of the literature. *Plastic and reconstructive surgery, 137*(5), 1448

38) **Parsa, K. M., Charipova, K., Coerdt, K., Clark, C. M., Wang, H., Chu, E., & Reilly, M. J. (2021).** The role of age and gender on perception of women after cosmetic rhinoplasty. *Aesthetic Plastic Surgery, 45*(3), 1184-1190.

39) **Resuli, A. S. (2020).** Is Pitanguy's ligament a true ligament? A prospective cohort study. *Journal of Surgery and Medicine, 4*(4), 251-254.

40) **Salah El-Din, E., M Abd El-Ghaffar, S., A Megahed, M., & Said MH Shehata, O. (2022).** Effect of Cryotherapy on Recovery Outcomes among Patients Undergoing Surgical Rhinoplasty. *Egyptian Journal of Health Care, 13*(2), 1148-1169.

41) **Saraf, A., Gupta, N., Manhas, M., & Kalsotra, P. (2023).** Evaluation of quality of life after septorhinoplasty using Rhinoplasty Outcome Evaluation questionnaire. *The Egyptian Journal of Otolaryngology, 39*(1), 82.

42) **Shrestha, K. K., Joshi, R. R., Rijal, A. S., Dhungana, A., & Maharjan, S. (2019).** Assessment of septoplasty outcome using Nasal Obstruction Symptom Evaluation scale. *Nepal Medical College Journal, 21*(2), 142-146.

43) **Standring, S. (Ed.). (2021).** Gray's Anatomy E-Book: Gray's Anatomy E-Book. Elsevier Health Sciences.

44) **Tabrizi, A. G., Ghazizadeh, M., & Zahedi, A. (2025).** Intraocular Pressure Changes After Rhinoplasty: A Before-and-After Cross-Sectional Study. *Health Science Reports, 8*(1), e70389.

45) **Tasman, A. J. (2018).** Reducing periorbital edema and ecchymosis after rhinoplasty: literature review and personal approach. *Facial Plastic Surgery, 34*(01), 014-021.

46) **Tseng, C. C., Gao, J., Talmor, G., & Paskhover, B. (2021).** Characterizing patient questions before and after rhinoplasty on social media: a big data approach. *Aesthetic Plastic Surgery, 45*(4), 1685-1692.

47) **Topan H, Mucuk S, Yontar Y 2022.** The effect of patient education prior to rhinoplasty surgery on anxiety, pain, and satisfaction levels. *Journal Nursing. 2022 of Jun PeriAnesthesia 1;37*(3):374-9. https://doi.org/10.1016/j.jopan.2021.07:0 01 2.

48) **Valsamidis, K., Titelis, K., Rachovitsas, D., Konstantinidis, I., Markou, K., & Triaridis, S. (2018).** Long-term evaluation of nasal septoplasty followed by inferior turbinate cauterization for the treatment of nasal obstruction using objective and subjective methods. *International archives of otorhinolaryngology, 22*(03), 284-290.