

Effect of Implementing a Nursing Management Protocol on Postoperative Health Outcomes for Patients undergoing Tympanoplasty

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Abstract

Background: Tympanoplasty is a common surgical procedure to repair a defect in the tympanic membrane with the placement of a graft, which aims to restore hearing ability, improve patient outcomes, and increase patient satisfaction. **Aim of the study:** was to evaluate the effect of implementing a nursing management protocol on post-operative health outcomes for patients undergoing tympanoplasty. **Research design:** The study used a quasi-experimental research design with a pretest-posttest control group. **Settings:** The study was conducted at the Otolaryngology department at the Alexandria Main University Hospital and follow up was done in the Otolaryngology outpatient clinic. **Subjects:** A convenience sample of 60 adults undergoing tympanoplasty at the above-mentioned facility. The sample's participants were distributed into two equal groups: the study group, which consisted of 30 patients who were given the nurse management protocol, and the control group, which consisted of 30 patients who were just given routine care. **Tools of data collection:** Four tools were used to collect the needed data, namely: knowledge assessment structured interview schedule, Hearing Handicap Inventory for Adults (HHIA) Scale, Self-Care practices questionnaire structured interview and Tympanoplasty patients' satisfaction with nursing management protocol. **Results:** the study finding shown that a highly statistically significant difference among control and study group regarding their knowledge, social and emotional responses of hearing handicap and level self-care practices immediate post and after one and a half month of application of the nursing management protocol. **Conclusion:** Applying the nursing management protocol had statistically significant enhancement of knowledge, social & emotional responses of hearing handicap, self-care practice and satisfaction for studied subjects undergoing tympanoplasty postoperatively than their control groups. **Recommendations:** the developed booklet with its straightforward instructions and illustrations should be utilized in hospitals as a teaching aid for patients undergoing tympanoplasty.

Keywords: Nursing Management Protocol, Postoperative Health Outcomes, Tympanoplasty.

Introduction

Tympanoplasty is a standard surgical treatment for Chronic Suppurative Otitis Media (CSOM), an essential public health problem characterized by persistent perforation of the tympanic membrane and ear discharge. Perforation of the tympanic membrane, is a hole or tear in the thin tissue that divides the ear canal from the middle ear, can cause hearing loss and make the ear more susceptible to infection. (Hasan, 2019). Suppurative Chronic Otitis media is still a major public health issue in the United States, with a frequency of 29.7% in the general population. It is more common in women, and they are more likely to want surgery. It could be due to the improved social engagement of females in today's society (Agrawal et al., 2017).

Overcrowding, insufficient housing, and poor hygiene have all been linked to the transmission of pathogens through physical contact with a contaminated individual, inhalation of infected droplets, or contact with a passive smoker, anecdotally wood-burning smoke, high rates of naso-pharyngeal colonization with potentially pathogenic bacteria, and inadequate or unavailable health care; all of these factors have been attributed to high rates of chronic otitis media. Poverty is a key risk factor in developing countries and among some marginalised groups. Other otitis media risk factors may be implicated at first (viral and bacterial infection), eustachian tube dysfunction at a young age, compromised immunologic state, upper respiratory allergies,

and family predisposition (Salviz et al., 2015 and Schilder et al., 2016).

Perforation of the tympanic membrane can be classified based on the duration, size, and location of the perforation. Acute tympanic membrane perforation lasts less than three months, while chronic perforation lasts longer than three months. Perforation size is classified as small, medium, large, subtotal, or complete perforation, depending on the degree of perforation. This can also be scored from 1 to 4 or broken down into percentages ranging from 1% to 100% (Ryan et al., 2016).

Patients with tympanic membrane perforation often experience abrupt discomfort, as well as hearing loss, bloody otorrhea, vertigo, or tinnitus. (Waldman and Brewer, 2018). In the study conducted in Nigeria, the most prevalent symptom that people experienced was otorrhea (81.5%), followed by otalgia (72.8%) and tinnitus (55.7%). Vertigo and tinnitus are usually transient unless there is an injury to the inner ear (Adegbiji et al, 2018). The physical examination need to include an otoscopy direct visualisation and a wide assessment of vestibular function and hearing. A complete neurologic examination is also essential to rule out neurologic reasons of tinnitus, hearing loss, and vertigo (O'Neill et al, 2016).

Tympanoplasty is a surgical procedure that includes the implantation of a graft, either medial or lateral to the tympanic membrane annulus, to repair a defect in the tympanic membrane. The purpose of this surgical technique is to improve hearing as well as close the perforation. A multitude of grafting materials is available, and several procedures have been developed and refined (Tseng et al., 2017).

Tympanic membrane closure success rates range from 35 to 98%, but are typically higher than 80 % and are dependent on the size and position of the perforation, surgical procedure, and overall middle ear health. A proper and thorough preoperative evaluation, as well as the careful construction of an efficient surgical plan, will improve outcomes (Sajid et al., 2017).

Nurses play an important role for patients undergoing tympanoplasty because those patients are in need for special nursing

care and education to improve the patients' health condition, reducing or preventing postoperative complications (Neudert and Zahnert., 2017). Nurses should assess the patients' hearing or verify documentation of preoperative hearing evaluation. These details are crucial in assessing the surgical technique's outcomes. Decide on a method of communication for following surgery. Nurses should clarify that blowing one's nose, coughing, and sneezing are prohibited in order to avoid pressure changes in the middle ear and possible disruption of the surgical site. Allowing the patient to cough or sneeze with their mouth open reduces pressure changes in the middle ear. Before surgery, providing instruction and the opportunity to practice increases the patient's compliance in the postoperative phase (Batni et al., 2015, and Marchioni, 2018).

In order to improve patient compliance, the nurse who is also a great educator should take the lead. The nurse's tasks, take account of ensuring that the patient understands the procedure and making any follow-up arrangements. Social, emotional and environmental aspects of quality of life are affected by hearing loss status; treatment helps a lot to improve these aspects (Dawood, 2017 and Härkönen., 2018). Furthermore, this study may assist health practitioners with a more comprehensive understanding of such patients, which includes all the needed instructions that helped in healing process may help in improving social and emotional responses of hearing handicap.

Significance of the study

Hearing loss affects 466 million people worldwide, or more than 5% of the world's population. By 2050, it is anticipated that approximately 900 million individuals, or one out of every 10 people, will suffer from hearing loss (WHO, 2017). According to the Alexandria University Hospital's statistical records, the number of patients receiving tympanoplasty in 2018 was around (150). Patients undergoing tympanoplasty do not receive enough knowledge about the surgery, These patients need meticulous collaborative care to improve the patients' state, increase behavior and emotional responses and reducing

or preventing postoperative complications,. Nursing management protocols are a method for documenting and communicate about patient care. As a result, evaluate the effect of implementing a nursing management protocol on postoperative health outcomes for patients undergoing tympanoplasty.

Aim of the study:

Evaluate the effect of implementing a nursing management protocol on the postoperative health outcomes for patients undergoing tympanoplasty.

Research hypothesis:

The hypotheses to be tested in this study are:

- H1:** Patients who receive nursing management protocol for tympanoplasty report higher level of knowledge scores than those who do not.
- H2:** Patients who receive nursing management protocol for tympanoplasty exhibit higher level of self care practice scores than those who do not.
- H3:** Patients who receive nursing management protocol for tympanoplasty show improve of social and emotional responses of hearing handicap loss than those who do not.
- H4:** Patients who receive nursing management protocol for tympanoplasty show higher level of satisfaction than those who do not.

Operational definition

Post-operative patients' health outcomes: are defined as the acquired knowledge related to post-operative care, ability to perform self-care practice, improved social and emotional responses of hearing handicap and show higher level of satisfaction for patients undergoing tympanoplasty.

Materials and Methods

Research design: A quasi experimental research design with a pretest-posttest control group was utilized.

Setting: The study was conducted in the Otolaryngology department at the Alexandria Main University Hospital and follow up was done in the Otolaryngology

outpatient clinic. The department includes 2 rooms with 20 beds and one intensive care unit with 8 beds. It is one of the largest medical sectors in the Alexandria Governorate and provide many citizens in the governorates of Alexandria, Beheira, MarsaMatrouh and other governorates with medical and curative services.

Subjects: A convenience sample of 60 adult patients admitted to the above mentioned settings and scheduled for tympanoplasty

The sample size was calculated by statistical power analysis of patients' admitted to the Otolaryngology unit in Alexandria university hospital.

Subjects estimation method: G power Program

- Medium effect size =0.4
- Power= 80%
- Alpha error=5%
- Minimum required sample size=52.

The study subjects enrolled in this study, according to the following inclusion criteria:

- Adult patients (aged 21-60 years).
- Adult patients of both sexes who were undergoing tympanoplasty for the first time.
- Able to communicate verbally.
- Patients free from a history of other ear disease (e.g. Definite diagnosis of cholesteatoma, ossicular erosion and presence of a Sensorineural Hearing Loss (SNHL).

The study subjects were divided alternatively into two equal groups (30 patients each;

Group I: established the nursing management protocol (study group).

Group II: established the routine hospital care only (control group).

Tools: Based on a review of recent related literature, four tools were employed to collect data in this research.

Tool (I): Knowledge Assessment Structured Interview Schedule. This tool was developed by the researchers and translated into Arabic based on relevant literature (Luers et al., 2016 and Tseng et al., 2017)

and used to identify patient learning needs as pre-requisites for planning the nursing management protocol and included two parts as follows:

Part I: Socio-demographic Characteristics and medical data: This part of the tool included information correlated to socio-demographic characteristics of the subjects regarding age, gender, marital status, level of education, occupation and place of residence and medical data as a diagnosis or indication for tympanoplasty, risk factors (hygienic care, smoking, and past history of otitis media and ear infection).

Part II: Knowledge Assessment: After reviewing the literature (Indorewala et al., 2015, Doan, S., et al., 2017 and Carniol et al., 2018), the researcher developed a questionnaire to assess patient knowledge about tympanoplasty surgery, assess baseline knowledge of patients about the surgery, and ensure the study subject's participation in the nursing care protocol. It consisted of 50 close-ended questions about the following items:

- Knowledge related to tympanic membrane perforation such as meaning, causes and risk factors, types, signs and symptoms, diagnosis, tympanoplasty indications, most common techniques, and complications.
- Knowledge related to preparing for surgery
- Knowledge related to postoperative care after tympanoplasty such as proper position after surgery and dressing ear care.
- Knowledge related to discharge guidelines in patient and family regarding the administration of ear medication, care for the ear, washing hair and protection of the ear, precautions postoperative such as avoiding blowing nose or sniffing, preventing water to enter the ear, heavy lifting, exposure, extreme cold, air travel for 6 weeks after surgery, diet, sleep, activity and, follow-up and finally postoperative complications.

The scoring system was as follows: one for the correct answer, while the wrong or don't know answer given zero. The total obtained

scores ranged from 0 to 50. The total score divided by the number of items, and it was converted into a percentage. The overall knowledge score was considered satisfactory when the percent score was equal or greater than 60%, and unsatisfactory when less than 60%. do not know received zero.

Tool II: Hearing Handicap Inventory for Adults (HHIA) Scale: This scale was adopted from (Weinstein et al., 1991) and used to assess the effects of hearing loss in various social situations as well as the individual's behavior and emotional responses. It includes 25 items with 2 subscales; social subscale, emotional subscale. It is assessed on a 3-points rating scale ranging from (0) = No, (2) = Sometimes, (4) = Yes.

Social subscale included 12 items related to the effects of hearing loss in different social situations include; use the phone, avoid groups, attend a party, understand coworkers, visit friends, going to the movies or theatre, visit friends or neighbors, listen to TV or radio, go shopping, and chat with family members, reduce the amount of time spend watching or listening to television or the radio.

Emotional subscale included 13 items related to evaluates patients' behavior and emotional response in relation to hearing loss which include of feeling embarrassed, irritable, frustrated, nervous, uncomfortable, depressed, handicapped, arguments with family, problem or difficulty with hearing upset at all, stress on patient's relationship with members of their families or friends, difficult to concentrate, afraid to stay home alone and limiting personal or social life,

Scoring system:

Total score for questions was calculated and transferred to percent score. The level of the patient's handicap was presented as follows:

- Less than 16% means no handicap.
- 18% to less than or equal 42% means mild to moderate handicap.
- More than or equal 44% means severe handicap.

Tool III: Self-Care Practices Questionnaire Structured Interview Schedule. It was developed by the researcher based on relevant literature (Naderpour et al., 2016, Sheikh, 2018 & Son et al., 2018 and Aristizabal et al., 2019) and used to evaluate patient postoperative self-care practices, it comprised (6) main items such as medication management (administration of ear medication, following prescribed medication, ear dressing change and precautions of the drug side effects), postoperative ear care, postoperative precautions (maintain supine position or on the un-operated ear during bed time, avoiding blowing nose or sniffing if it is necessary to sneeze, do so with mouth open, when showering or washing the ear, cotton may be placed in the outer ear opening and covered with vaseline, heavy lifting, exposure extreme cold, air travel, avoid water and soap in the ear, avoid compression the ear, avoid bending for long period, and avoiding constipation, diet (time for eating and drinking, following appropriate food regimen and provision of adequate nutrition), life style modifications; time for performing activities (rate of movement, driving, swimming, exposure to cold, return to work and maximum weight for lifting (more than 15 kilograms) or vigorous physical activity, and follow-up visits. For scoring, the respondent was given two points for each correct, complete answer, one point for a correct and incomplete answer and zero points for incorrect answers. The item scores were added together for each area, and the means, standard deviations, and medians were calculated. The highest total score is 140 and a higher overall score signifies greater achieved care.

Tool IV: Tympanoplasty Patients' Satisfaction with Nursing Management Protocol

The researcher developed this tool based on relevant literature (Erkorkmaz et al., 2014) and used to assess the level of satisfaction among patients undergoing tympanoplasty and included the amount of time that the researcher spent with patient, knowledge provided for patient care, the way the researcher made patient feel at home work, the amount of information researcher gave to patient about his/her condition and treatment, the way of explaining information, the researcher manner,

the amount of privacy and awareness of patient needs.

Scoring system: each item was scored by 5 point Likert scale, very poor is coded as (1), poor was being coded as (2), neither poor nor good is coded as (3), good is coded as (4) and very good is coded as (5).

- Poor satisfaction < 50%
- Fair satisfaction 50 < 75 %
- Good satisfaction 75% and more.

Methods

1. An approval from the Ethics Research Committee, Faculty of Nursing, and Alexandria University was obtained.
2. An official letter clarifying the purpose of the study was obtained from the Faculty of Nursing, Alexandria University forwarded to the concerned personnel at Alexandria University Hospital to take their permission to collect data.
3. **Development of the study tools:** Tools (I, III & IV) was developed by the researchers after extensive review of recent and relevant literature, then translated into Arabic language specialist in English language translation.
4. **Validity testing:** Five specialists were shown data collection tools in the medical, surgical nursing sector at the Faculty of Nursing to evaluate the validity of the content. The modifications were made according to the experts' judgment on the clarity of the sentences, the adequacy of the content and the sequence of the elements. Experts agree with the content, but recommend minor changes in the language that would make the information clearer and more accurate. Suggested changes have been made.
5. **Reliability testing:** The reliability of the tools was tested by means of Cronbach's alpha. The reliability coefficient for the tool I was (0.811), tool II was (0.97), tool III was (0.795) and tool IV was (0.80) which means all tools were reliable.
6. **A pilot study** was done using 10% of the total sample size to examine the tools' feasibility and applicability, as well as the time necessary to complete them.
7. **Sample size:** Based on G power program, all available subjects of 60 patients were selected according to the inclusion criteria and assigned to either the study or control

group. The first 30 patients were assigned to the control group and received for the routine hospital nursing care postoperatively, whereas the other 30 patients were assigned to the study group and received the nursing management protocol.

8. Data collection: Data collection was carried out nine months in the period from January 2019 to September 2019. The protocol of nursing care for patient undergoing tympanoplasty was conducted with the study group (II) subjects throughout four phases.

Phase I: Assessment phase:

- Data collected from the study group who were subjected to the protocol of nursing care, implemented by the researchers was carried out after completion of the control group data collection.
- On admission the researchers built therapeutic communication with patients to get cooperation after expanding the purpose of the study.
- Prior to the start of the nursing management protocol, all patients (study and control group) were assessed using tool I&II to gather baseline data, health history, previous surgery, current clinical data, and assess existing knowledge and self-care skills. This interview lasted approximately 30 to 45 minutes.

Phase II: Planning phase:

Based on patients' assessment, Nursing Management Protocol for tympanoplasty was formulated based on reviewing current national and international literatures (Cunha and Conrad, 2019 & Miyamoto, 2019) and assessment of patients. To help patients understand the material, it was put into a logical learning sequence (from easy to difficult). The purpose of the nursing management protocol was to see how well a nursing management protocol affected the postoperative health outcomes of patients who had tympanoplasty. It aims to achieve expected patient outcomes which include; acquired a higher level of knowledge, ability to perform self-care practice, improved social and emotional responses of hearing handicap and higher level of satisfaction for patients undergoing tympanoplasty. **Content of the health information protocol:** the content of

tympanoplasty nursing management protocol booklet included the educational and practical components and planned to be covered in three sessions.

First session:

At the beginning of this session the researcher introduced himself to the patient and explained the general and specific objectives of the protocol. It included a simple introduction about anatomy of the ear, tympanic membrane perforation such as definition, causes and risk factors, types, signs and symptoms, and treatment) as well as knowledge related to tympanoplasty its meaning, benefits, types, and complications instruction to be followed before and after the procedure.

Second session (Preparing for Surgery)

Its included preoperative teaching related to tympanoplasty operation, it included information and instructions related to the expected outcome, diagnostic test, laboratory investigation, breathing exercise, nutrition, informed consent and taking prescribed medications.

Third session (post-operative care):

It included items related to postoperative instructions as proper position after surgery and ear care. Discharge guidelines in patient and family regarding the administration of ear medication, care for the ear, washing hair and protection of the ear, precautions postoperative such as avoiding blowing nose or sniffing if it is necessary to sneeze, do so with mouth open, when showering or washing the ear, cotton may be placed in the outer ear opening and covered with Vaseline, heavy lifting, exposure extreme cold, air travel, avoid water and soap in the ear, maintain supine position or other side during bed time, avoid compression the ear, avoid bending for long period, and avoiding constipation, diet (time for eating and drinking, following appropriate food regimen and provision of adequate nutrition), life style modifications; time for performing activities (rate of movement, driving, swimming, exposure to cold, return to work and maximum weight for lifting (more than 15 kilograms) or vigorous physical activity, warning signs required medical care and follow-up visits.

Phase III - implementation phase:

- A Nursing Management Protocol was implanted to the study group.

- The researchers was interviewed and followed up patients in the Otolaryngology department at the Alexandria Main University Hospital.
- Each patient was interviewed by the researchers using tool I within approximately 30-45 minutes, according to patients' response, after explaining the purpose of the study to collect the necessary data related to patient health knowledge, by using tool II&III within approximately 30-45 minute to collect the necessary data related to social and emotional responses of hearing handicap and patient self-care practice. in outpatients clinic and by telephone
- Tool IV was used by the researchers to assess levels of satisfaction by providing nursing care after one and a half month of implementing nursing management protocol.
- The researchers developed the Nursing Management Protocol. It was written and summarised in plain Arabic and supplemented with images and graphics to aid the patient's comprehension of the material.
- It was conducted in 3 sessions as previously mentioned. The first session was carried out during the assessment phase at the patient preparatory visit before tympanoplasty and the second session was carried out on the same day before operation while the third session was carried out on the next day after surgery. Each session was continued for 45-60 minutes.
- During each session the researcher used simple, brief, clear words and photos. At the end of each session, a brief summary was given by the researcher, emphasizing on the most important points.
- Moreover, the colored booklet was given to each patient in the study group to attract his/her attention, motivates and helps in reviewing and support teaching at home.
- Telephone visits were conducted every week during the first month after nursing management protocol for the study group to evaluate them for their adherence skills and evaluate their social and emotional responses of hearing handicap and level of satisfaction after one and a half month.

Phase IV-Evaluation phase:

Evaluation of the nursing management protocol was done two times after one week and after one & a half month postoperatively in the outpatient clinic using the tool I assess patient knowledge postoperative and tool II, III, IV to assess nursing management protocol on patient health outcomes.

Ethical Considerations:

- Informed written consent for voluntary participation in the study was obtained from each patient after explaining the aim of the study. For illiterate patients, verbal explanation of the study purpose and patients' oral consents were secured. Subject's privacy and anonymity were assured.
- Patients were informed that they could withdraw out of the research at any time if they didn't want to.
- Data confidentiality was considered and respected

9. Statistical Analysis:

- Using SPSS version 23 (Statistical Package for Social Studies), the acquired data was organized, processed, tabulated, and statistically analyzed (SPSS Inc., Chicago, USA).
- The range mean and standard deviations were determined for numerical values.
- Quantitative continuous data were compared using the parametric Student t-test& Repeated measure ANOVA test
- Chi-square or Fisher exact tests were used to compare qualitative category variables.
- Statistical significance was considered at p-value <0.05.
- Graphics were done by using the Excel program.

Results:

Table (1): Showed the Frequency distribution of the study and control group according to their socio-demographic characteristics. As for age it was observed that more than half of study group patients age and more than two third of the control group patients age (56.7%, 76.6%) respectively ranged from 30 to less 40 years of age. Concerning gender, two third of study group patients and around two third of control group patients (66.7, 63.3%) were females. In relation to the level of education, more than one third of the study group patients (43.4%) and

approximately one third of the control group patients (30%) could not read and write. As regards marital status, more than two third of the study group patients (76.7%) and more than half of the control group patients (56.7%) were married. It was observed that 40% and 50% of the study and the control group respectively were an unemployed. As for residential area, 53.3% of the study group lived in a rural area and 66.7% of the control group lived in urban area. For the overall demographic characteristics, there was no statistically significant difference between the study and control group regarding their demographic characteristics.

Table (2): Showed mean scores of knowledge in the study and control group before and immediately after & after one & a half month of implementing nursing management protocol. As evident from the table, there are statistically significant difference between knowledge mean scores which were elicited among the study group immediately after & after one & a half month of implementing nursing management protocol than before regarding to meaning of tympanoplasty, prepare surgery, postoperative care after tympanoplasty and discharge guidelines as compared to the control group ($P < 0.001^*$). Although some decline was evident between and immediately after & after one & a half month of implementing nursing management protocol yet it was still higher than the pre application protocol of nursing care. Furthermore, after one and a half months of implementing nursing management protocol, the scores for total and all items of knowledge in the investigated patients significantly improved with Mean \pm SD (20.84 \pm 6.28), and (77.48 \pm 5.66) respectively, where p value was found to be 0.001*.

Figure (1): Displayed that differences between studied groups according to total level of knowledge during the study periods, shows that, the study found that the majority of patients in both the study and control groups had unsatisfactory knowledge pre the application of the nursing care protocol, while the majority of the study group had satisfactory knowledge throughout the follow-up period, and all of the patients in the control group had unsatisfactory knowledge after routine nursing care, indicating no statistically significant

differences between the study and control groups prior to the application of the nursing care protocol, while after one & a half month of implementing nursing management protocol, there was a significant differences among study and control group in relation to patients knowledge about tympanoplasty, respectively.

Table (3): Revealed comparison of overall mean score of patient's self-care practice related to postoperative care of tympanoplasty among the study and control group, before and immediately after & after one & a half month of implementing nursing management protocol, it can found that there was a highly statistical significant difference between the study and the control group immediately after & after one & a half month of implementing nursing management protocol in relation to overall self-care practice scores with a mean (122.41 \pm 7.66) which includes medication management, ear care, postoperative precautions, diet, lifestyle modifications and follow-up care. When compared to the control group, the study group's overall total scores of self-care practice improved significantly immediately after and after one and a half month of implementing nursing management protocol, indicating a significant difference between the two groups after implementing nursing management protocol ($P > 0.001$).

Table (4): Displayed comparison of mean difference patients' knowledge and effect size of implementing nursing management protocol in the study and control group before and immediately after & after one & a half month. The mean difference for total and all items of knowledge of the study group was significantly increased immediately after implementing nursing management protocol, as shown in this table, with p values of (0.001*). Also, it can be noticed that there was a highly significant difference ($p < 0.001$) that continued after one and a half month of implementing nursing management protocol with the effect size 99%. Additionally, the control group's total and all-item knowledge scores increased marginally after routine nursing care, but the changes were not statistically significant.

Table (5): Displayed comparison of mean difference and effect size of implementing nursing management protocol in the study and control group, according to the patient's self-

care practice related to postoperative care of tympanoplasty before and immediately after & after one & a half month. it can found that ,the mean difference for each domain of the patient's self-care practice, including medication management, ear care postoperative , postoperative precautions, diet, lifestyle modifications and follow-up care were improved significantly in the study group immediately after & after one & a half month of implementing nursing management protocol with the effect size 96% compared with the control group indicating a significant difference between the two groups after one and a half month of implementing nursing management protocol ($P > 0.001$).

Table (6): Illustrated that overall percent score of the study and control group, according to hearing handicap inventory scores before & after one & a half month of implementing nursing management protocol. There was no

statistically significant differences were found between the study and the control groups regarding handicap inventory (social HHIA, emotional HHIA, and total HHIA) scores pre application protocol of nursing care. While, after one & a half month of implementing nursing management protocol statistically significant improvement was found among the study and the control groups ($p < 0.01$). However, the improvement was more obvious among the study group than among the control group.

Table (7): Presented frequency distribution of the study group, according to patient satisfaction ($n = 30$) after one and a half month of implementing nursing management protocol. it noticed that most of the patients had good satisfaction after one and a half month of implementing nursing management protocol for all time.

Table (1): Frequency distribution of the study and control groups according to their Sociodemographic characteristics

Sociodemographic Characteristics	(N=60)				P
	Study Group (N =30)		Control Group (N =30)		
	N	%	N	%	
Age (years)					2.733 (0.435)
• 20>-30	4	13.3	2	6.7	
• 30- < 40	17	56.7	23	76.6	
• 40- < 50	5	16.7	3	10.0	
• 50-<60	4	13.3	2	6.7	
Gender					0.073 (0.787)
• Female	20	66.7	19	63.3	
• Male	10	33.3	11	36.7	
Level of Education					1.361 (0.715)
• Can't read and write	13	43.4	9	30.0	
• Primary, Preparatory	7	23.3	8	26.7	
• Secondary education	7	23.3	8	26.7	
• University education	3	10.0	5	16.6	
Marital status					2.733 (0.435)
• Single	2	6.7	4	13.3	
• Married	23	76.6	17	56.7	
• Divorced	3	10.0	5	16.7	
• Widow	2	6.7	4	13.3	
Occupation					3.762 (0.152)
• Unemployed	12	40.0	15	50.0	
• Private employee	9	30.0	12	40.0	
• Government employee	9	30.0	3	10	
Residence area					2.443 (0.118)
• Rural	16	53.3	10	33.3	
• Urban	14	46.7	20	66.7	

Table (2): Mean scores of knowledge in the study and control group before and immediately after & after one & a half month of implementing nursing management protocol

Knowledge Score	N= (60)						P1		P2		P3	
	Study(N =30)			Control (N =30)			Preoperative / Immediate		Immediate /1.5m		Preoperative /1.5m	
	Preoperative	Immediate post	1.5month follow up	Preoperative	Immediate post	1.5 month follow up	M/D	P1	M/D	P2	M/D	P3
Tympanoplasty Mean ±SD	2.80±0.95	7.10±0.70	6.60±1.46	2.60±1.12	2.60±1.88	1.97±1.23	0.20	t=0.33 (P=0.71)	4.50	t=13.91 (P=0.00**)	4.63	t=14.17 (P=0.00**)
Preparing for Surgery Mean ±SD	4.63±1.70	12.10±1.10	7.60±1.04	3.10±1.46	3.13±1.50	2.87±1.40	1.53	t=0.54 (P=0.59)	8.97	t=21.41 (P=0.00**)	4.73	t=19.26 (P=0.00**)
Postoperative care after tympanoplasty Mean ±SD	8.13±2.84	44.91±2.19	38.08±3.18	8.87±3.41	10.00±3.37	8.80±3.64	0.74	t=0.42 (P=0.64)	34.91	t=49.80 (P=0.00**)	29.28	t=32.70 (P=0.00**)
Discharge guidelines. Mean ±SD	5.28±2.68	28.88±1.88	25.20±2.95	5.90±3.01	7.59 ±2.13	5.38±3.07	0.62	t=0.55 (P=0.60)	21.29	t=45.00 (P=0.00**)	19.82	t=26.55 (P=0.00**)
Total level of knowledge Mean ±SD	20.84±6.28	92.99±3.79	77.48±5.66	20.47±4.26	23.32±6.20	18.84±7.40	0.37	t=0.70 (P=0.50)	69.67	t=49.73 (P=0.00**)	58.64	t=39.68 (P=0.00**)

P1: P value for Student t-test for comparing between the two groups in Preoperative
 P3: P value for Student t-test for comparing between the two groups in 1.5 month follow up

P2: P value for Student t-test for comparing between the two groups in immediate post
 *: Statistically significant at P ≤ 0.05 M/D: mean difference

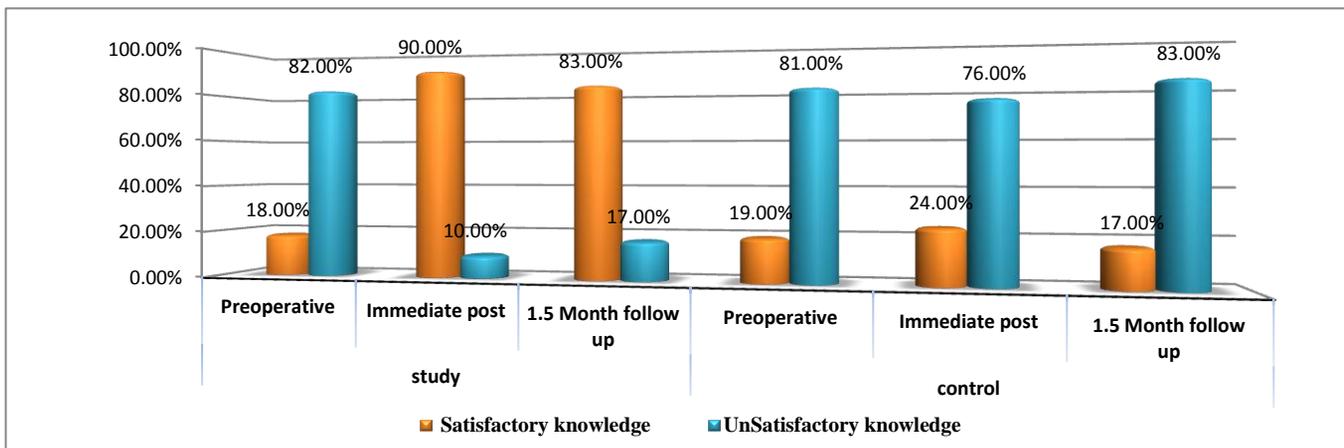


Figure (1): Frequency distribution of the study and control group, according to the patient's knowledge before and immediately after & after one & a half month of implementing nursing management protocol

Table (3): Comparison of overall mean score of patient's self-care practice related to postoperative care of tympanoplasty among the study and control group, before and immediately after& after one & a half month of implementing nursing management protocol

Self-care practice	N= (60)						P1		P2		P3	
	Study(N =30)			control(N =30)			Preoperative /Immediate		Immediate /1.5m		Preoperative 1.5m	
	Preoperative	Immediate post	1.5month follow up	Preoperative	Immediate post	1.5month follow up	M/D	P1	M/D	P2	M/D	P3
Medication management Mean ±SD	11.40±4.49	18.00±2.90	24.50±2.59	10.82±3.22	10.78±4.18	9.97±2.90	0.58	t=1.37 (P=0.19)	7.22	t=10.79 (P=0.00**)	14.53	t=21.16 (P=0.00**)
Ear care Mean ±SD	9.50±3.94	15.29±2.80	18.57±2.77	8.66±2.92	6.94±2.49	4.90±3.00	0.84	t=0.09 (P=0.94)	5.35	t=13.84 (P=0.00**)	13.90	t=18.01 (P=0.00**)
Postoperative precautions Mean ±SD	1.87±2.07	14.75±2.60	18.98±1.79	1.73±2.08	8.95±3.75	4.40±2.79	0.14	t=0.08 (P=0.72)	5.80	t=7.14 (P=0.00**)	14.58	t=22.64 (P=0.00**)
Diet Mean ±SD	1.60±2.00	12.50±1.23	17.39±1.09	1.63±1.77	4.23±2.90	4.13±2.75	0.03	t=0.20 (P=0.84)	8.27	t=12.76 (P=0.00**)	13.26	t=22.80 (P=0.00**)
Lifestyle modifications Mean ±SD	2.50±5.30	24.40±2.89	31.09±2.90	2.30±4.87	7.20±3.52	9.03±4.54	0.02	t=0.40 (P=0.68)	17.20	t=13.82 (P=0.00**)	22.06	t=22.23 (P=0.00**)
Follow-up care Mean ±SD	1.5±2.00	10.07±1.29	11.88±0.39	1.67±1.35	2.30±1.32	2.40±2.04	0.17	t=0.12 (P=0.99)	7.77	t=17.34 (P=0.00**)	9.48	t=22.02 (P=0.00**)
Overall level of Practice Mean ±SD	28.37±9.66	95.01 ±5.16	122.41±7.66	26.81±7.72	40.4±15.29	34.83±12.59	1.56	t=0.47 (P=0.68)	54.61	t=17.85 (P=0.00**)	87.58	t=31.63 (P=0.00**)

P1: P value for Student t-test for comparing between the two groups in pre

P2: P value for Student t-test for comparing between the two groups in post

P3: P value for Student t-test for comparing between the two groups in post 1.5 month

*:Statistically significant at $P \leq 0.05$

M/D: mean difference

Table (4): Mean difference patients' knowledge and effect size of implementing nursing management protocol in the study and control group before and immediately after & after one & a half month.

Knowledge Score (I)Factor 1	Factor (J)1		(N=60)							
			Study No= (30)				Control No= (30)			
			M-D(I-J)	Sig	P	Partial Eta Squared	MD(I-J)	Sig	P	Partial Eta Squared
Tympanoplasty	Pre	Immediate post	4.30	0.00 ^{**}	f = 183.95 (P= 0.00 ^{**})	88%	0.00	0.81	f = 1.90 (P= 0.20)	7 %
		1.5month follow up	3.80	0.00 ^{**}			0.63	0.06		
	Immediate post	1.5month follow up	0.50	0.00 ^{**}			0.63	0.14		
Preparing for Surgery	Pre	Immediate post	7.47	0.00 ^{**}	f = 229.70 (P= 0.00 ^{**})	90 %	0.03	0.70	f = 5.04 (P= 0.03 [*])	15 %
		1.5month follow up	2.97	0.00 ^{**}			0.23	0.05 [*]		
	Immediate post	1.5month follow up	4.50	0.00 ^{**}			0.26	0.01 [*]		
Postoperative care after tympanoplasty	Pre	Immediate post	36.78	0.00 ^{**}	f = 910.02 (P= 0.00 ^{**})	96 %	1.13	0.01 [*]	f = 4.48 (P= 0.04 [*])	13%
		1.5month follow up	29.08	0.00 ^{**}			0.07	0.27		
	Immediate post	1.5month follow up	6.83	0.00 ^{**}			1.20	0.30		
Discharge guidelines.	Pre	Immediate post	23.60	0.00 ^{**}	f = 867.88 (P= 0.00 ^{**})	94 %	1.69	0.39	f = 2.80 (P= 0.19)	9%
		1.5month follow up	19.92	0.00 ^{**}			0.52	0.50		
	Immediate post	1.5month follow up	3.68	0.00 ^{**}			2.21	0.06		
Total level of knowledge	Pre	Immediate post	72.15	0.00 ^{**}	f = 2191.55 (P= 0.00 ^{**})	99 %	2.85	0.00 ^{**}	f = 7.90 (P= 0.06)	19 %
		1.5month follow up	56.64	0.00 ^{**}			1.63	0.70		
	Immediate post	1.5month follow up	15.51	0.00 ^{**}			4.48	0.01 [*]		

P: P-value for Repeated measure ANOVA test for comparing between before operation and each other period for every item in each group.

*: Statistically significant at $P \leq 0.05$

Partial ETA Squared: effect size of nursing management protocol

M/D: Mean Difference (i-j) between each other period for every items in each group

Table (5): Mean difference and effect size of implementing nursing management protocol in the study and control group according to the patient's self-care practice related to postoperative care of tympanoplasty before and immediately after & after one & a half month .

Practice Score (I)Factor 1	Factor (J)1		(N=60)							
			Study No= (30)				Control No = (30)			
			M-D(I-J)	Sig	P	Partial Eta Squared	MD(IJ)	Sig	P	Partial Eta Squared
Medication management	Pre	Immediate post	6.60	0.00**	f = 132.91 (P= 0.00**)	84 %	0.40	0.00**	f = 16.55 (P= 0.00**)	37%
		1.5month follow up	13.10	0.00**			0.85	0.00**		
	Immediate post	1.5month follow up	6.50	0.00**			0.81	0.56		
Ear care	Pre	Immediate post	5.79	0.00**	f = 78.25 (P= 0.00**)	75%	1.72	0.00**	f = 27.03 (P= 0.00**)	51%
		1.5month follow up	9.07	0.00**			3.76	0.00**		
	Immediate post	1.5month follow up	3.28	0.00**			2.04	0.00**		
Postoperative precautions	Pre	Immediate post	12.88	0.00**	f = 855.39 (P= 0.00**)	98 %	7.22	0.00**	f = 88.50 (P= 0.00**)	72 %
		1.5month follow up	17.11	0.00**			2.67	0.00**		
	Immediate post	1.5month follow up	4.23	0.00**			4.55	0.00**		
Life style modifications	Pre	Immediate post	21.90	0.00**	f = 395.03 (P= 0.00**)	93 %	4.90	0.00**	f = 43.31 (P= 0.00)	63 %
		1.5month follow up	28.59	0.00**			6.73	0.00**		
	Immediate post	1.5month follow up	6.69	0.00**			1.83	0.08		
Diet	Pre	Immediate post	10.90	0.00**	f = 740.22 (P= 0.00**)	95 %	2.60	0.00**	f = 13.29 (P= 0.00**)	33 %
		1.5month follow up	15.79	0.00**			2.50	0.00**		
	Immediate post	1.5month follow up	4.89	0.00**			0.10	0.89		
Follow- up care	Pre	Immediate post	8.57	0.00**	f = 794.18 (P= 0.00**)	95%	0.63	0.00	f = 9.48 (P= 0.00**)	24%
		1.5month follow up	10.38	0.00**			0.73	0.16		
	Immediate post	1.5month follow up	1.81	0.00**			0.10	0.05		
Overall level of practice	Pre	Immediate post	66.64	0.00**	f = 1020.03 (P= 0.00**)	96 %	13.59	0.00**	f = 21.28 (P= 0.00**)	44%
		1.5month follow up	94.04	0.00**			8.02	0.00**		
	Immediate post	1.5month follow up	27.40	0.00**			5.57	0.00**		

P: P-value for Repeated measure ANOVA test for comparing between before operation and each other period for every item in each group.

Partial Eta Squared: effect size of nursing management protocol

M/D : Mean Difference (i-j) between each other period for every items in each group

*: Statistically significant at $P \leq 0.05$

Table (6): Overall percent score of the study and control group, according to hearing handicap inventory scores before & after one & a half month of implementing nursing management protocol.

Hearing Handicap Inventory for Adults (HHIA)	N= (60)									
	Pre (N =30)				P1	Post 1.5month (N =30)				P2
	Study		Control			Study		Control		
	N	%	N	%		N	%	N	%	
HHIA Emotional										
No handicap	18	60	20	66.7	0.656	29	96.7	21	70	0.001**
Moderate handicap	4	13.3	5	16.7		1	3.3	0	0.0	
Sever handicap	8	26.7	5	16.7		0	0.0	9	30	
Mean ±SD	12.2±5.1		14.02±6.8			21.08±6.08		15.07±4.4		
P. value	0.001**		0.541			0.001**		0.541		
HHIA – Social										
No handicap	17	56.7	18	60	0.0738	29	96.7	20	66.7	0.001**
Moderate handicap	10	33.3	4	13.3		1	3.3	5	16.7	
Sever handicap	3	10	8	26.7		0	0.0	5	16.7	
Mean ±SD	11.6±6.53		12.2±5.1			21.08±6.08		14.02±6.8		
p. value	0.001**		0.172			0.001**		0.172		
HHIA total score										
No handicap	20	66.7	18	60	0.656	29	96.7	25	83.3	0.001**
Moderate handicap	5	16.7	4	13.3		1	3.3	1	3.3	
Sever handicap	5	16.7	8	26.7		0	0.0	4	13.3	
Mean ±SD	14.02±6.8		12.2±5.1			21.08±6.08		17.02±4.02		
p. value	0.001**		0.409			0.001**		0.409		

p1: p value for Student t-test comparing between study and control group in pre

p2: p value for Student t-test comparing between study and control group in post 1.5 month

*: Statistically significant at $P \leq 0.05$

Table (7): Frequency distribution of the study group, according to patient satisfaction after one & a half month of implementing nursing management protocol (n =30).

Patient Satisfaction	< 50%poor (n = 0)		50 <75 %fair (n =5)		75% and more good (n =25)	
	No.	%	No.	%	No.	%
- The amount of time spent with the researcher	0	0.0	4	16.0	26	84.0
- The amount of information given to the patient about your condition and treatment.	0	0.0	2	8.0	28	92.0
- The way information was explained to the patient	0	0.0	0	0.0	30	100.0
- The type of information that was given about the patients condition and treatment.	0	0.0	3	12.0	27	88.8
- The amount of privacy given to patients	0	0.0	2	8.0	28	92.0
- Awareness of patient needs	0	0.0	0	0.0	0	100.0
- Explained what was wrong with patients.	0	0.0	3	12.0	27	88.0
- Help patient to get the information wanted	0	0.0	0	0.0	30	100.0
- Discuss care options with patient	0	0.0	2	8.0	28	92.0
- Listen to patient problems	0	0.0	1	4.0	29	96.1

Discussion

Tympanoplasty is a technique that can help individuals enhance their hearing performance while also preventing recurring ear discharge. Enhanced recovery after surgery refers to a set of interdisciplinary initiatives implemented during the perioperative period to improve perioperative patient outcomes and reduce psychological and physical stress effects. An improved post-operative health outcome for patients undergoing any surgeries is an essential component that aims to assist the patient in early recovery and helps the patient independently.

Patients' outcomes, such as knowledge, skills, attitudes, behaviours, condition, or status, can be altered by any educational intervention as a result of their participation in a programme or service. Nursing management protocol is a valuable and potentially effective instrument that can increase patient awareness, self-care, quality of care, cost savings, treatment transparency, and patient satisfaction while providing the benefits of training and education. (Ghebreyesus, 2018). According to the findings of this study, there were no statistically significant differences in demographic and clinical data between the study and control groups, including age, gender, level of education, marital status, occupation, medical history, current diagnosis, and indication for tympanoplasty. These data point to the potential for extraneous factors to confuse the influence of nurse management protocol on postoperative health outcomes.

These findings were in line with (Gamra et al, 2016), who reported that the mean age of patients undergoing tympanoplasty was between 20 to 40 years old. Moreover, these findings were in agreement with (Naderpour et al, 2016) who reported that the mean age groups were (33.6±7.32) years, (range, 18 to 49 years.). It is justified that, the large number of adult patients had otitis media, and young patients had traumatic causes, As it was found that there are several factors including the climatic condition, the patients' socioeconomic status, education level, bad health habits, decreased awareness and ignorance towards the seriousness of persistent and offensive ear discharge, negative attitudes

and practices such as untimely cleaning of the ear by inappropriate objects and congestion from high number of people all of this led to a high risk factor that triggered contact tympanic membrane intolerance and consequently a need for earlier surgical intervention.

On the contrary (Yorgancilar et al, 2013) who stated that the age of tympanoplasty patients ranged from 21 to 30 years. Hence it seems to be better when the surgery is performed in the middle age groups. Also, the study finding was in the line with (Weiss et al, 2017) who reported that, more females than males have hearing problem and undergoing hearing surgery, they added that this is partly explicable by the longer life span of women and therefore over-representation in the age groups where hearing is most common While coming into contradiction with (Mohamed and Shabaan, 2015), who stated that the majority of sample of 72 patients 49 (68.05%) were male and 23 (31.94%) were female. The male to female ratio was 2.1:1.

Furthermore, this finding is in the same line with (Spanoudakis et al, 2017) regarding prevention and management of hearing problems among adults reported that the majority of patients were females married and house wives. This finding is agreed with (Adegbiji et al, 2018) who found that a large percentage of patients undergoing tympanoplasty were not working.

This contradicts the findings of (Kaya et al. 2018), who observed that a large majority of patients having tympanoplasty were working.

In terms of patient knowledge, the results showed that there were no statistically significant differences in patient knowledge between the study and control groups prior to implementing the nursing management protocol, and that it improved among the study group after implementing the nursing management protocol. This was in line with a study by (Mulugeta et al, 2018), who stated that patient education is vital because the patient has the right to know and be informed about the diagnosis, prognosis of illness, treatment options, and risks connected with therapies. A well-designed, comprehensive teaching plan that meets the individual learning needs of patients, thereby improving quality,

lowering health-care costs, and allowing them to become more self-sufficient.

According to Lewis (2016), personalized education is the key to successful disease treatment, and the nurse plays an important role in patient education. Patients and their families require accurate information about the disease as well as treatment options. The current study found that after implementing nursing management protocol, patients' knowledge about tympanic membrane perforation, tympanoplasty indications, preparing for surgery, post-operative care, and predischarge instruction in patient and family regarding the administration of ear medication, care for the ear, washing hair and protection of the ear, precautions postoperative such as avoid blowing nose or sniffing, water to enter the ear, heavy lifting, exposure extreme cold, air travel for 6 weeks after surgery, diet, sleep, activity and, follow-up and finally postoperative complications improved statistically significantly compared to the control group.

The current study results agreed with (Mathew, 2016) who carried out a study to investigate the implementation of structured teaching program on knowledge and attitude regarding ear infection, management, he found that before application of the teaching program all the studied sample were having moderate level of knowledge, however after of application the program they found significant improvement in knowledge level. These findings were supported by (Yang et al, 2016 and Alicandri et al, 2018) who reported that there was highly significant difference between pre knowledge and post knowledge regarding tympanic surgery in their comparative study for cartilage tympanoplasty.

In this respect, (Mavridou, 2013) pointed that no one can neglect the importance of preoperative knowledge as well as postoperative nursing care for patient with tympanoplasty that includes concerns about the risks of surgery and anesthesia. Furthermore, this finding was reported by (Rosdable, et al.,2011) who mentioned that patient teaching is important because the patient has the right to know and to be informed about diagnosis, prognosis of illness,

treatment options, risks associated with the treatments. Moreover, Individualized education in the perioperative period, according to (Aarts et al,201), can considerably effect and optimize the surgical scheme, decrease the fasting time, reduce pain, and raise the postoperative comfort of the patients, and reduce postoperative complication.

Regarding post-operative self-care practice the results showed that there were no statistically significant differences between the study and control group regarding self-care practice pre-application of nursing management protocol as of how to care for their ear, changing ear dressing and the administration of ear drops, ADL, diet postoperative precautions and follow up. While there was a very statistically significant difference between them at post an application of nursing management protocol. This could be explained by the fact that providing an educational support programme for patients following surgery can help them adapt and improve their self-care.

This result is supported by (Portland, 2014, Avelar, 2017, Ghandi et al,2019 and Sedney, 2019), who concluded that post-operative instructions for tympanoplasty is the greatest chance for a successful hearing result such as, cleaning the ear, diet, drainage care of the incision, ear drops, keep ears dry, resuming activities, washing hair, postoperative problem as swelling, bleeding, pain, dizziness, fever, weakness, postoperative precautions such as avoiding all activities that may increase the blood pressure in the head area, avoid all bending over and lifting heavy objects for at least two weeks after surgery, should not blow your nose for three weeks, avoid sneezing for the first several weeks post-operatively, excessive coughing should also be avoided, avoid strenuous activity as swimming, diving and water skiing, able to return to work one to two weeks following surgery, and follow up appointment.

These findings were in line with (Olajide et al, 2018) who found in her study (topical ear drops self-medication practice among the ear, nose, and throat patients) that most of the studied patients' malpractices such as the technique of the administration of ear drops,

inadequate dosing, incomplete courses and indiscriminate drug. Also, (**Richard et al, 2014 and Cleveland Clinic, 2018**) reported that perioperative multimode analgesia is an important measure for enhancing recovery after surgery. Patients can benefit from early oral feeding and ambulation if their pain is well controlled. Early postoperative ground activities are very important in determining how well a patient recovers following surgery. This finding is in harmony with (**Adoga and Nimkur, 2013**) who stated that health care professionals have a poor knowledge and attitude towards the practice of ear care.

As regard to hearing handicap inventory for adults (HHIA), the present study revealed that about one third of both study and control group patients had severe and significant handicap in pre-test, which may be due to the effect of tympanic membrane perforation that can cause hearing loss which affects the patients social and emotional response. However, during the follow-up period (2 months) after application the designed nursing guideline both study and control group showed improvement in HHIA scores, but it was significantly obvious among the study group than the control group. From the researcher point of view, this may be due to the effect of tympanoplasty which corrected the hearing problem, as well as the effect of the nursing guidelines which included all the needed instructions that helped in the healing process (e.g. dressing, how to prevent infection of the ear, medication, and the important to follow-up after discharge), in addition to the one and a half one month follow-up period by the researcher to ensure implementation of the nursing management protocol.

This was in agreement with study a conducted by (**Baumann et al, 2011&Kumar et al, 2014**) about middle ear surgery in patients with chronic otitis media, they found that several participants with tympanoplasty hearing loss showed significant improvements in both social and emotional aspects after health education guidance, and stated that similar results have been reported in other studies.

Concerning to patient satisfaction, the result revealed that the most of the patients in

the study group had better satisfaction after one and a half month of implementing a nursing management protocol for all items. This finding agrees with (**Wolferts et al , 2017**) who stated that the study participants reported high satisfaction after tympanoplasty. Moreover, (**Erkorkmaz et al ,2014**) reported that postoperative patient satisfaction should be taken into consideration to assess the success of tympanoplasty including healing of the tympanic membrane, relief of tinnitus, improvement of hearing, and relief from harm were significantly related to patient satisfaction. Finally, this study highlights the importance of include education in the care of tympanoplasty patients by all health professionals, including nurses, because gaining information and practice can lead to changes in human behaviour that are required for the maintenance or improvement of health. The purpose of patient teaching is for the patient to be able to apply the information and skills learned in the classroom to everyday life.

Patient education is the single most critical step toward the patient's independence, confidence, and rehabilitation. It is impossible to leave teaching to chance. Teaching should be planned and based on strong teaching and learning concepts, with teaching plans used when necessary to guarantee that no important components are overlooked. So, based on the previous data, evaluating the effect of a nursing management protocol of knowledge, self-care practice, and social and emotional responses of hearing handicap regarding tympanoplasty will aid nursing personnel in increasing patient awareness and taking proper precautions to prevent the occurrence of disease, reduce morbidity and mortality rates, and their complications, and follow the necessary prevention strategy. As a consequence of the findings of this study, it can be concluded that implementing the nursing management protocol for tympanoplasty patients improved patients' knowledge, self-care practice, and social and emotional responses of hearing handicap.

Conclusions

In the light of the present study results, it can be concluded that preoperative patients undergoing tympanoplasty in both study group

and the control group had an inadequate level of knowledge, social and emotional responses of hearing handicap and low level of self-care practices about post-operative care for patients with tympanoplasty. The application and implementation of the nursing management protocol yielded a highly statistically significant improvement on the knowledge, self-care practice, social and emotional responses of hearing handicap and satisfaction for studied subjects undergoing tympanoplasty after the operation than their control groups.

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

- The developed booklet with its simple instructions and illustrations should be utilized in hospitals as a teaching aid for patient undergoing tympanoplasty.
- Nursing management protocol for tympanoplasty patients must be implemented in the clinical ,out patients and hospitals when the patient admitted to provide them with the necessary and required knowledge, self care practice, and improve social and emotional responses of hearing handicap about their disease.
- Nurses should attend update conferences and in-service training program of workshops, about preoperative patients undergoing tympanoplasty.
- Develop preservice, and on the job training programs for nurses about protocol of care needed for patient undergoing tympanoplasty.
- Update standard of care for patients undergoing tympanoplasty according international guidelines.
- It is suggested that the current study be replicated under other conditions (sample, setting, measurement, and management duration) to corroborate its findings.

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