



## Effect of designed nursing guidelines on patients knowledge and post tympanoplasty complications

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### Abstract

Tympanoplasty is a surgical technique to repair a defect in the tympanic membrane with the location of a graft.

**Aim:** To evaluate the effect of the designed nursing guidelines for patients undergoing tympanoplasty on patients knowledge and post tympanoplasty complications.

**Research Design:** Quasi-experimental research design.

**Setting:** Otolaryngology Department and Outpatient Clinics at Assiut University Hospital.

**Patients:** A sample of 60 adult male and female patients with tympanic membrane perforation. Those patients were equally divided into study and control groups 30 patients for each.

**Tools:** Tool I: Patient Questionnaire Sheet: Tool II: Patients evaluation sheet.

**Result:** Study group showed statistically significant improvement in their level of knowledge ( $P < 0.01$ ). and decrease postoperative complications than the control group.

**Conclusion:** Application of designed nursing guidelines for patients undergoing tympanoplasty showed significant improvement in patients' knowledge and decrease postoperative complications.

**Recommendations:** Patients undergoing tympanoplasty should be provided with sufficient written information about preoperative and postoperative teaching and home instructions.

**Keywords:** complications, knowledge, tympanoplasty

### Introduction

A tympanic membrane perforation (TMP) is a small hole or tears in tympanic membrane, which is a thin tissue that divides middle ear and outer ear canal. A ruptured eardrum can result in hearing loss. It can also make middle ear susceptible to infections. A ruptured tympanic membrane usually heals within a few weeks spontaneously. But sometimes it requires a surgical repair to heal (Stomackin *et al.*, 2019) [18].

Incidence of TMP in the general population is unknown. One survey found that 4% of a population of Native American children had TMP. However, the incidence in the general population has not been studied. Analysis of government statistics indicates that perhaps 150,000 tympanoplasties are performed per year in a population of 280 million (Golz *et al.*, 2020) [7].

The Incidence of traumatic TMP is reported in literature at 6.80/ 1000 persons. The traumatic TMP is classified according to duration, acute (<3 months) and chronic (>3 months) and by the presence or absence of otorrhea in wet and dry perforation respectively (Khan *et al.*, 2017) [11].

Tympanoplasty is the procedure of choice for the treatment of simple chronic otitis media. Its main goals are to eradicate middle ear disease and restore sound conduction mechanisms, including the tympanic membrane and the ossicles. Its indication is mainly in cases of tympanic perforations without spontaneous recovery and hearing damage (Rabbani *et al.*, 2015) [15]. Nurses play a vital role for patients with tympanoplasty as those patients need for special nursing care and teaching to improve the patients' state, minimizing or preventing postoperative complications,

and enhance patients' general condition (Ciccone *et al.*, 2018) [4]. Nurses should assess the patient for bleeding or drainage from the affected ear. Infection and hemorrhage are possible complications. Administer antiemetics as ordered to prevent vomiting. Vomiting may increase the pressure in the middle ear, disrupting the surgical site. Elevate the head of bed and have the patient lie on the unaffected side. This position minimizes the pressure in the middle ear. Assess for vertigo or dizziness, especially with ambulation or movement in bed. Avoid unnecessary movements such as turning (Ciccone *et al.*, 2018) [4].

### Significance of the study

According to Assiut University Hospital records, the number of patients underwent tympanoplasty was approximately (200) in 2019. Also, from the researcher experience patients undergoing tympanoplasty don't receive enough knowledge regarding the surgery. So this study was conducted to provide those patients with nursing guidelines to increase their knowledge in attempt to minimize the incidence of post tympanoplasty complications

### Aim of the study

To evaluate the effect of the designed nursing guidelines for patients undergoing tympanoplasty on patients knowledge and post tympanoplasty complications.

### Research Hypotheses

To fulfill the aim of the study, the following research hypotheses were formulated

1. Knowledge of the study group will be higher than the

- control group.
- Post tympanoplasty complications will be higher among the control group than among the study group.

## Patients and Methods

### Research design

Quasi-experimental research design.

### Study variables

The independent variable was the designed nursing guidelines, while the dependent variables were patients' knowledge and post tympanoplasty complications.

### Setting of the study

Otolaryngology Department and Outpatient Clinics at Assiut University Hospital

### Sample

A sample of 60 adult male and female patients with tympanic membrane perforation and their age ranged from (18-65) year. The patients were admitted in Otolaryngology Department for tympanoplasty surgery. Those 60 patients were equally divided on random basis into study and control groups 30 patients for each. Study group received the designed nursing guidelines, while the control group received the routine hospital care. Patients with poor immune system, cholesteatoma, ossicular erosion and sensorineural hearing loss, were excluded for the study.

### Sample size

Based on the past reviews of literature examine the same outcome found significance difference, a sample size has been calculated according to the following equation:  $n = (z^2 \times p \times q) / D^2$  at power 80% and the sample size was calculated to be 60 patients.

- N= Total patient population
- Z= Confidence levels is 0.95 and is equal to 1.96
- D= The error ratio is = 0.05
- P= The property availability ratio and neutral = 0.50
- q= The rest of the property is 0.50

### Tools

Data pertinent to the study were collected, utilizing the following tools:

#### Tool I: Patient questionnaire sheet:

It was designed by researcher after reviewing of current national and international literatures, it consisted of two parts:

**Part (1): Demographic data about the patients:** Age, gender, level of education, occupation and marital status.

**Part (2): Patients' knowledge regarding tympanic membrane perforation and tympanoplasty:** Definition, causes, signs and symptoms, complications, management, preoperative and postoperative teaching, and home instructions.

### Scoring system

The total numbers of questions were 24 list questions, 4 grades for correct answer, 2 grades for incomplete answer, and zero for the incorrect. Also, 9 true and false questions, 2 grades for the correct answer and Zero for the incorrect one.

The total score was 114 degree. Knowledge was categorized as following (Onianwa *et al*, 2017)

- Poor < 50%
- Fair 50% - 70%
- Good  $\geq$  70%

#### Tool II: Patients evaluation sheet:

It was developed by the researcher after current national and international literature review to assess post tympanoplasty complications that may develop (dizziness, tinnitus, and infection..... etc.).

#### Tool III: Designed nursing guidelines for Patients undergoing tympanoplasty

It was developed by the researcher after reviewing current national and international literatures it included knowledge about definition, risk factors for tympanic membrane perforation, signs and symptoms, and treatment of tympanic membrane perforation, brief description of the surgery. Post tympanoplasty complications. In addition to nursing guidelines for patients before and after tympanoplasty and home instructions that may help in healing process as dressing, medications, diet, Physical activity, prevention of ear infection and follow-up.

## Methods

### Ethical considerations

- Research proposal was approved from Ethical Committee in the Faculty of Nursing.
- There was no risk for study patients during application of the study.
- The study followed common ethical principles in clinical research.
- Oral consent was obtained from patients that participated in study, after explaining the nature and purpose the study.
- Confidentiality and anonymity were assured.
- Patients had the right to refuse to participate and or withdraw from the study without any rational any time.
- Patient's privacy was considered during data collection.

### Procedure

#### The study was proceeded using three phases:

##### 1. Preparatory phase

This phase started by a review of current and past, local and international related literatures as study tools were formulated, and this phase ended by contents validity and pilot study.

##### Content validity and reliability

It was checked by five expertis (3 from medical surgical nursing staff and 2 from Otolaryngology staff) who reviewed the tools for clarity, relevance and applicability. Test reliability of the tools was confirmed by Cronbach's alpha (0.89) for tool I, part 2

##### Pilot study

It was carried on 10 % of the sample to test the feasibility and practicability of the study tools. It also provided an estimate of time needed to fill out the tools. Those patients were included in the main study as no modifications were needed.

##### 2. Implementation phase

- An official letter was issued to the head of

- Otolaryngology department to collect data.
- At initial interview during the preoperative period the researcher introduced herself to initiate line of communication. The researcher divided the patients randomly into both control and study groups. Bseline data were collected using (tool I and tool II).
- The control group exposed to the routine hospital care (included take complete history, physical examination, diagnostic tests, taking prescribed medications and informed consent).
- The study group exposed to the routine hospital care in addition to the designed nursing guidelines by the researcher.
- The designed nursing guidelines were given to the patients on an individual basis in two sessions; the duration of each session ranged from 30-45 minutes in the Otolaryngology department during morning shift and afternoon shift.
- The first session: The researcher started by introducing herself to the patient and telling her/him about the aim of the meeting. The session covered the following parts; anatomy of the ear, of tympanic membrane perforation (definition, causes, signs and symptoms, and treatment), brief description of the tympanoplasty and post tympanoplasty complications.
- The second session: The researcher started by summary about what has been discussed in a previous session and objective of the second session. This session covered the nursing guidelines for patients before and after

tympanoplasty and home instructions that may help in healing process.

- At the end of each session the researcher discussed with the patient each point of guidelines to ensure appropriate understanding.
- Each patient in the study group was given a written copy of the booklet in a clear Arabic language.
- The nursing guidelines were carried out throughout a period of 2 months for the study group.
- Data were collected through the period from April 2019 to February 2020.

**3. Evaluation phase**

In this phase, both control and study group patients were reassessed before hospital discharge in the Otolaryngology department using (tool II), and after 2 months in the Outpatient Clinic using (tool 1 part 2 & tool II). The session took about 20 minutes.

**Statistical design**

Collected data was analyzed and tabulated. The researcher used an appropriate statistical method and tests for analysis of the result. The statistical package for (SPSS) version (23) was used to analyze data. Descriptive statistics was used for the quantitative data. It included frequencies, percentages, mean ±SD. Pearson Correlation (Correlation is significant at the 0.05 level). The level of significance for this study was set at (p < 0.05) to detect any indication of differences found in the data available.

**Table 1:** Frequency distribution of study and control groups regarding demographic characteristics.

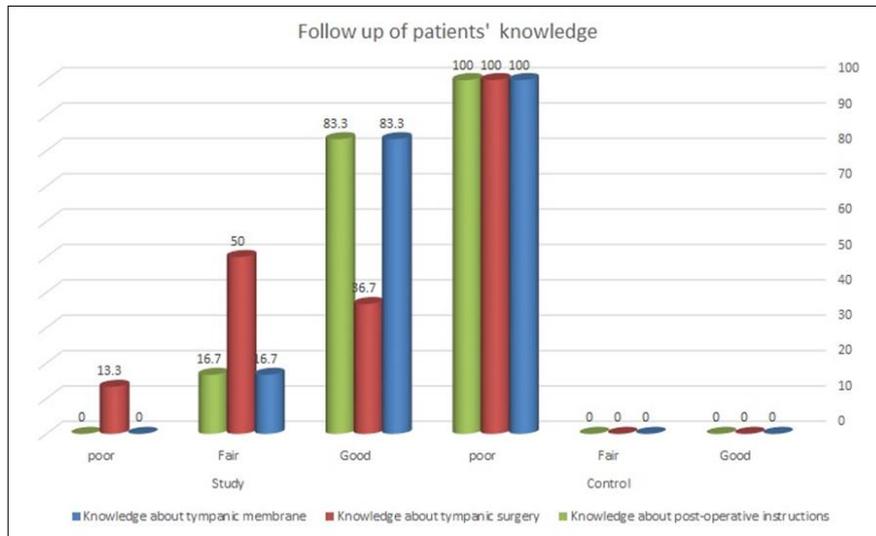
Demographic characteristics	Study (n=30)		Control (n=30)		P. value
	N.	%	N.	%	
Age					0.635 <sup>NS</sup>
Mean ± SD	29 ±9.6				
Sex					
Male	13	43.3	13	43.3	0.603 <sup>NS</sup>
Female	17	56.7	17	56.7	
Marital status					
Single	17	56.7	14	66.7	0.453 <sup>NS</sup>
Married	12	40.0	15	50.0	
Widow	1	3.3	1	3.3	
Level of education					
University	1	3.3	0	0.0	0.415 <sup>NS</sup>
Secondary	12	40.0	8	26.6	
Read and write	6	20.0	12	40.0	
Not educated	11	36.7	10	33.3	
Occupation					
Employee	4	13.3	2	6.7	0.712 <sup>NS</sup>
Farmer	4	13.3	5	16.7	
House wife	9	30.0	12	40.0	
Not work	13	43.3	11	37.7	

Independent sample T-test  
**NS:** not significant, p >.05

**Table 2:** Comparison between study and the control groups regarding their level of knowledge before application of the designed nursing guidelines.

Knowledge	Study (n=30)						Control (n=30)						P. value
	Good		Fair		Poor		Good		Fair		Poor		
	N.	%	N.	%	N.	%	N.	%	N.	%	N.	%	
Knowledge about Tympanic membrane	0	0.0	0	0.0	30	100.0	0	0.0	0	0.0	30	100.0	Ns
Knowledge about tympanic surgery	0	0.0	0	0.0	30	100.0	0	0.0	0	0.0	30	100.0	Ns
Knowledge about post-operative instructions	0	0.0	0	0.0	30	100.0	0	0.0	0	0.0	30	100.0	Ns

Independent sample T-test  
**NS:** not significant p. <0.05,



**Fig 1:** Comparison between study and control groups regarding their level of knowledge 2 months after application of the designed nursing guidelines.

**Table 3:** Relationship between knowledge of the studied sample and their demographic characteristics after application of the designing nursing guidelines.

Demographic Characteristics		Study (n=30)			Control (n=30)			P. value
		Good	Fair	Poor	Good	Fair	Poor	
Age group	18>40 years	9	15	1	0	0	25	<b>0.027*</b>
	40> 60 years	0	3	2	0	0	5	
Sex	Male	6	5	2	0	0	13	<b>0.535<sup>NS</sup></b>
	Female	3	13	1	0	0	17	
Marital status	Single	17	0	0	0	0	14	<b>0.456<sup>NS</sup></b>
	Married	12	0	0	0	0	15	
	Widow	1	0	0	0	0	1	
Level of Education	High educated	1	1	0	0	0	0	<b>0.500<sup>NS</sup></b>
	Secondary	12	6	1	0	0	8	
	Read & write	6	3	0	0	0	12	
	Not educate	11	8	2	0	0	10	
Occupation	Employee	3	1	0	0	0	2	<b>0.027*</b>
	Farmer	1	1	2	0	0	5	
	House wife	1	7	1	0	0	12	
	Not work	4	9	0	0	0	11	

Independent sample T-test.

NS: not significant p>.05, \*Significant p <0.05

**Table 4:** Comparison between study and control groups regarding post tympanoplasty complications.

Complications	Study (n=30)				Control (n=30)				P. value
	Postoperative		Follow up		Postoperative		Follow up		
	N.	%	N.	%	N.	%	N.	%	
Hearing changes	29	96.7	0	0.0	28	93.3	3	10.0	0.132 <sup>NS</sup>
Dizziness	26	86.7	0	0.0	28	93.3	4	13.3	0.119 <sup>NS</sup>
Tinnitus	6	20	0	0.0	10	33.3	2	6.6	0.355 <sup>NS</sup>
Facial paralysis	0	0.0	0	0.0	3	3.3	0	0.0	0.19 <sup>NS</sup>
Infection of sit surgery	0	0.0	0	0.0	0	0.0	4	13.3	0.11 <sup>NS</sup>
Failure to close the perforation	0	0.0	0	0.0	0	0.0	0	0.0	-
Taste changes	0	0.0	6	20	0	0.0	12	40	0.127
Post auricular incisions hematoma	0	0.0	0	0.0	0	0.0	0	0.0	-
Cholesteatoma	0	0.0	0	0.0	0	0.0	0	0.0	-
Otorrhea	19	63.3	0	0.0	22	73.3	2	6.7	0.246 <sup>NS</sup>

Independent sample T-test

NS: not significant

Table (1) shows that the mean age of both study and control group was (29 ±9.6). The highest percentage of them was female (56.7%) and single (56.7 and 66.7%, respectively). 40% of the study group was secondary school but the control group was read and write, regarding their occupation

43.3% of the study group was house wife and 40% of the control group was not work. No statistical significance difference was found between both groups regarding the demographic data.

Table (2) shows that both study & control group had poor

level of knowledge before application of the designed nursing guidelines. No statistically significant difference was found between the study and control group in pre-test.

Figure (I): reveals significant statistically differences were found between the study and the control group regarding their knowledge about tympanic membrane perforation, tympanic surgery and home instructions in post-test ( $P < 0.01$ ).

Table (3) shows that there was no statistically significance relation between knowledge of studied sample about tympanoplasty and their demographic characteristics 2 months after application of the designed nursing guidelines except age and occupation.

Table (4) shows that control group patients had more post tympanoplasty hearing change, dizziness, tinnitus, infection of surgical site, taste changes, and otorrhea during the follow up period (after 2 months) than the study group patients, but no statistical significant difference was found between both groups regarding post tympanoplasty complications.

### Discussion

As regarded to demographic data this study showed that the mean age of both groups (study and control) was ( $29 \pm 9.6$ ). The highest percentage of both groups were female which may be due to woman with hearing problem less likely to use hearing aids than men. Also, about two fifth of them were house wives, secondary school, read and write, and not work.

Congruent with the current study Çayır & Kayabaşı (2019) documented that the highest percentage of patients undergoing tympanoplasty was between 20 to 40 years old. Also, Weiss *et al.* (2017) [20] reported that, more females than males undergoing hearing surgery, they added that this may be due to the longer life span of women, therefore over-representation in the age groups where hearing is most common.

Similarly, a study conducted by Spanoudakis *et al.* (2017) [17] regarding prevention and management of hearing problem among adults found that the majority of sample were females and house wives. Also Li *et al.* (2020) reported that large percentage of patients undergoing tympanoplasty was not work.

Generally, the present study found no statistical significance difference between both groups regarding demographic data. This was important to ensure comparability of the two groups, and indicate successful randomization of the two groups which confirmed by Boonchoo *et al.*, (2019) [11].

As regard to patients' knowledge the present study found that both study and control group patients didn't have enough knowledge before application of the designed nursing guidelines, after application the guidelines, study group patients showed statistical significant improvement in their level of knowledge than the control group, from the researcher point of view this may be due to containment of the nursing guidelines with needed information about tympanic membrane perforation, tympanoplasty and home instructions. In addition to continuous follow up of the study group patients by the researcher up to 2 months to ensure retain of information.

In this regard Fu *et al.* (2020) stated that education is the key to successful treatment of the disease, and nurse plays a major role as patient educator. Patients and families need accurate information about the disease and the strategies to

minimize its impact. Also, Castiglia *et al.* (2017) [2] found that most of patients had unsatisfactory knowledge in the initial assessment at the time of admission before application of the nursing guidelines. This could be explained by the fact that patients didn't receive enough information from health care team. Some patients were lacking interest to know any information while others were interested to know but they didn't find the person who had enough time to provide them with enough information and the majority of the study and control groups were illiterate. Similarly Collinson (2020) [5] conducted a study to investigate the application of structured teaching guidelines about hearing loss and management, results showed that before application the teaching guidelines all the studied patients were having poor knowledge; however after application the guidelines they found significant improve in knowledge level. This improvement emphasizes the fact that, most patients have a strong desire to learn more knowledge about their conditions and also showed the effect of the guidelines.

Regarding post tympanoplasty complications the current study demonstrated that control group patients had more post tympanoplasty hearing change, dizziness, tinnitus, infection of surgical site, taste changes, and otorrhea during the follow up period (after 2 months) than the study group patients but no statistical significant different was found between both groups regarding post tympanoplasty complications. From the research's point of view this may be attributed to the educational sessions that were provided to study group which cover all aspects of tympanoplasty and how to care with their wound in the home as dressing, prevention of wound infection, signs & symptoms of immediately return to hospital, and follow-up, all these helped in decrease post tympanoplasty complications.

In this regard Ito *et al.* (2016) found early postoperative complication included the few cases of otorrhea /infection or impaired wound healing showed complete resolution after conservative medical treatment. Delayed postoperative complications consisted of three prosthesis extrusions and five persistent iatrogenic eardrum perforations; all of these patients underwent successful revision surgery.

The current study results revealed that a tympanic membrane closure rate was 100%, where no failure to close the perforation occurred. This is similar to other studies (Raghuwanshi, 2018) [14] and even better than some studies Iacovou *et al.*, (2017) [8]. This difference in the levels of tympanic membrane closure rates may be due to different conditions of the middle ear throughout different studies.

Shetty (2018) conducted a study about preoperative and postoperative assessment of hearing after tympanoplasty, he found that the highest hearing loss occurs with the perforation of the large central and the lowest hearing loss occurs with the perforation of the anterior central. Therefore, the size of perforation is an important factor for hearing loss. In the current study, hearing change occurred with 10% of the control group. On the other hand Karela *et al.* (2019) [10] examined the outcome of myringoplasty and hearing improvement and stated that the size and location of the perforation has no effect on the tympanic membrane closure rate and hearing improvement. Other studies have also demonstrated that the perforation size does not affect the surgical outcome (Perkins, 2016) [13] while some studies show that perforation size affects the outcome (Yung,

2017). In our study, the size of the perforation had no effect on tympanic membrane closure rate and hearing improvement after surgery. Finally, Vukovic & Dinie (2018) revealed that preoperative assessment and education leads to improve postoperative outcomes. So, it seems logic to say that, the implementation of the nursing guidelines is very important for patients undergoing tympanoplasty, where all the studied patients (study & control) had poor, level of knowledge during the preoperative period. They need guidelines to improve their postoperative outcomes.

### Conclusion

Application of designed nursing guidelines for patients undergoing tympanoplasty showed improvement in patients' knowledge and decrease postoperative complications.

### Recommendations

Patients undergoing tympanoplasty should be provided with sufficient written information about preoperative and postoperative teaching and home instructions. Also, increase patient's awareness about the importance of periodic checks up to prevent developing any complications which can effect on the life.

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