

## Effect of Whats App's Education regarding Wound Massage on Post-Thyroidectomy Patients Wound Adhesion and Voice Changes

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### Abstract

**Background:** Neck discomfort and voice change are common complications after thyroidectomy. These symptoms might be due to damaged laryngeal nerves, intrinsic structures, or extra laryngeal muscles. They can also occur without injury to any structure as with wound adhesion after thyroidectomy. **This study aimed to** determine the effect of Whats App's education regarding wound massage on post-thyroidectomy patients' wound adhesion and voice changes. **Design:** A quasi-experimental research design was used to accomplish this study (study/ control). **Setting:** The study was carried out at the General Surgical Department and General Surgical Outpatient Clinic at Sohag University Hospital, Egypt. **Subjects:** A convenient sampling technique of 50 post-thyroidectomy patients within six months, admitted to the previously mentioned setting were divided into two groups as study (n = 25) and control (n = 25). **Tools:** Data was collected by using four tools; Tool (I): A structured interview questionnaire, Tool (II): The patient and observer scar assessment scale (POSAS), Tool (III): Voice Handicap Index (VHI-10) questionnaire & Tool (IV): Compliance assessment sheet. **Results:** The present study revealed that Following the application of Whats App's wound massage education (2 and 4 weeks postoperatively), there were highly statistically significant differences regarding wound adhesion between the two groups (P-value <0.001\*\*). Following the application of Whats App's wound massage education (2 and 4 weeks postoperatively), there were highly statistically significant differences in voice changes between the two groups (P-value <0.001\*\*). Also, there were highly statistically significant differences between study and control groups regarding post-thyroidectomy patients' wound adhesion and voice changes after applying the Whats App's education regarding wound massage (2 and 4 weeks postoperatively) (P-value<0.001\*\*). **Conclusion:** The application of Whats App's education regarding wound massage post-thyroidectomy significantly reduced wound adhesion and improved voice changes in the study group compared to the control group. **Recommendations:** wound massage is recommended to be an integral part of the pre-operative nursing teaching for patients undergoing thyroidectomy. There is a need to develop comprehensive simple Arabic printed educational materials that can be a reference for them.

**Keywords:** Post-thyroidectomy patients, Voice changes, Whats App education, Wound massage, and wound adhesion.

### Introduction

Following a thyroidectomy, neck pain and voice changes are common side effects. Adhesive symptoms, such as trouble swallowing and pulling sensations during neck extension, are experienced by some patients. Adhesion of the larynx and strap muscles/subcutaneous tissues may be the cause of these neck pains, as they can limit the larynx's ability to move upward during

phonation or swallowing. Localized discomfort can be experienced by patients due to restrictions on larynx movement. Following a thyroidectomy, some patients also report having changed voices. Damage to the extra laryngeal muscles, intrinsic structures, or laryngeal nerves could be the cause of this (Rodriguez et al., 2023).

The most common cause of voice change is thought to be injury to the recurrent laryngeal nerve, which is followed by injury to

the cricothyroid muscle or the superior laryngeal nerve (SLN). However, other factors contribute to the preservation of normal voice after surgery besides nerve preservation. Patients may perceive a change in their voice due to altered laryngeal muscle movement caused by restricted larynx movement. Following a thyroidectomy, postsurgical adhesion may be uncomfortable and visible from the outside. Some doctors have tried using surgical techniques to remove these adhesions (Lee, 2018).

One of the most prevalent medical conditions worldwide is thyroid dysfunction. Thyroid dysfunction, which affects between 30% and 40% of patients who visit endocrine clinics, is one of the most common endocrine disorders and is becoming more common worldwide. Thyroid dysfunction affected approximately 30% of patients at the endocrine clinic, according to an earlier epidemiological study conducted in Egypt. Patients with hyperthyroidism and patients with subclinical hyperthyroidism both had thyroid dysfunction (19.2% and 15.8%, respectively) (Rashad & Samir, 2019).

Many benign and malignant thyroid conditions are treated with a thyroidectomy, which is a common procedure. Between 118,000 and 166,000 thyroidectomies are performed in the US each year; during the previous three decades, the number of thyroid surgeries has tripled. A thyroidectomy involves surgically removing the thyroid gland entirely or in part. It is a common practice in modern medicine and is known to have a low rate of morbidity and death. It can be used to treat hormonal diseases that don't respond to medication, benign diseases, or cancer. Generally, thyroidectomies can be classified into three types: subtotal, where only the bilateral thyroid remnants are removed, and total, which attempts to remove all thyroid tissue on a macroscopic level; and thyroid lobectomy, which entails removal of half of the thyroid gland that has the nodule (D'Orazi et al., 2019).

Many patients experienced voice and swallowing symptoms (PVSS) following thyroidectomy, including Globus sensation, dysphagia, sticky mucus, and throat clearing, even in the absence of laryngeal nerve injuries. Between 30% and 80% of patients

report changes in voice following thyroid surgery. The signs may be nonspecific, like decreased vocal range or difficulty sustaining long speech, or they may be excessively hoarse. PVSS can occur even when there is no injury to the laryngeal nerve. Scar adhesion after surgery could be the reason for the symptoms (Rodriguez et al., 2023).

Scar adhesions, such as those forming between the subcutaneous fascia and the tissues encircling the airways, may develop after thyroid surgery. These cervical adhesions may cause a variety of symptoms, including dysphagia, a pulling sensation around the neck, vocalization problems, inhibited swallowing, and a feeling of a foreign body in the throat (Yu et al., 2021). The act of manipulating fibrous tissue that forms during the healing process of a wound for therapeutic purposes is known as wound massage (Scott et al., 2022).

In the muscles and underlying subcutaneous structures, massage can release shortened bands and adhesions, improving range of motion and reducing pain. Scar tissue release helps patients recover after thyroid surgery from neck pain and voice changes by regaining full laryngeal movement (Hasan & Al Dabbagh, 2021).

These methods, however, produce another surgical adhesion and typically yield less-than-ideal outcomes. Nonsurgical adhesion release techniques are therefore required. Increased range of motion back to normal function, symptom relief, and the release of shortened fibers and adhesions in the muscle and subcutaneous tissue are all possible with wound massage. It can also release the fibrous tension of surgical adhesions. Nonetheless, in terms of managing neck pain and voice alteration following thyroid surgery, the effectiveness is currently unknown (Hong et al., 2017).

It is imperative to reorganize health education initiatives concerning primary healthcare providers and social media to enhance individuals' understanding and mitigate associated issues (Sabry et al., 2021). Through the use of social media platforms like Facebook, Instagram, WhatsApp, Snapchat, and Twitter, barriers to in-person communication can be overcome and continuous support and efficient communication can be provided. By offering a teaching program through Whats App media, knowledge can be increased. People use social media to communicate with others quickly and

effectively, find information specific to a disease, and share medical information with a group of patients going through similar problems (Omar et al., 2020). Additionally, by making the instructional materials accessible via mobile WhatsApp on demand, patients and their carers can view them at home in comfort, which in turn can enhance their practices. Furthermore, the education provided by WhatsApp has the potential to reduce the amount of time that nurses spend providing nursing care in outpatient clinics (Uppu et al., 2021).

Nurses should make sure post-thyroidectomy patients understand this important information. Postoperative instructions from nurses must also cover wound care, medication administration, diet, daily activities, and follow-up. These instructions should include neck exercises in addition to written and verbal instructions on the procedure (Thorsen et al., 2022). **Wound care**

1.Placed ice bag on the neck wound .This will reduce swelling and pain. 2.Frequently check wound dressing and the skin on back, neck and shoulders for any bleeding from the wound. Please inform the nurse if this occurs. 3.Please support the neck when changing positions or sitting. This will help prevent pain due to neck activity. 4.If the patient feels uncomfortable because the dressing is too tight or has difficulty breathing please tell the nurse. 5.Tell the nurse to give medication if the patient cannot endure the pain or is restless. 6.If the patient is unable to cough sputum the nurse will provide instructions about vapor inhalation therapy. 7.Speak as little as possible during the first several days as the voice may be hoarse or weak. This condition is usually restored very quickly. 8.Once sutures are removed apply steri-strips or surgical tape across the suture line. The surgical scar will improve 3 to 6 months after surgery. 9.Use necklaces, scarves and high-necked clothes to conceal the scar. **Diet** 1.The patient may have cold liquid food when fully aware. If there is no nausea and vomiting the

patient may eat a soft diet such as gruel or noodles in the afternoon on the second day. 2.The patient may have difficulty swallowing and choke easily so must eat less and more slowly.Avoiding a pure liquid diet. 3.To promote wound healing the patient should eat foods with protein such as fish, meat, egg, milk and legumes. 4.Avoid ingesting irritants such as liquor, cigarettes, coffee, cola and spicy foods (Thorsen et al., 2022)..

**Activity and movement** 1.Elevate the head of the bed 25 to 35 degrees. This helps to keep the respiratory tract unobstructed and the sputum to be expelled. 2.Please massage the back of the neck every 1-2 hours for relaxation. 3.The patient may get out of bed on the second day post surgery. 4. Please be attentive to rest and only have little exercise for 2-3 weeks after surgery. **Home Care** 1.Please comply with the Doctor's prescription. Do not increase, decrease or discontinue medications by yourself. 2.Please tell the nurse or have the patient return to the hospital as soon as possible if any signs or symptoms occur as listed below. -Feelings of numbness or spasms from any extremity during the first week -Fever, restless, irritable, heart palpitations -Cyanosis (color of lips or fingers becomes blue or purple), difficulty breathing, neck muscles feel tight -Wound swelling 3.The patient must return to hospital for an examination during 1-2 weeks to prevent any complications (Huang et al., 2023).

#### **Significance of the study:**

Innovative methods for enhancing health behavior are not restricted to in-person interactions, according to Uppu et al. (2021); the model can also leverage mobile health services. Depending on the user's needs, smartphones offer a wide range of applications, including email, short message service (SMS), Instagram, WhatsApp, and others. SMS can serve as an inexpensive reminder for health education; however, Whats App media, which is popular and promotes communication, has supplanted SMS and MMS.

Thyroidectomy procedures have become more common as a result of the sharp rise in thyroid

disorders, including thyroid cancer, in recent years. Voice change following thyroid surgery is common even in the absence of recurrent laryngeal nerve (RLN) injury because scar adhesion following surgery can cause it to occur. Voice changes have a significant effect on patients recuperating from thyroid surgery because speech is a means of thinking out loud, communicating ideas, and engaging in social interactions. To help patients recovering from thyroidectomy minimize adhesions in the wound and improve voice abnormalities.

The prevalence of incidental thyroid cancer (ITC) in multinodular goiter (MNG) has been previously estimated to be 5–10%, however, recent studies have reported higher ITC prevalence rates, ranging from 8.6 to 22% (Slijepcevic et al., 2019). Thyroid surgery presents a low incidence of complications. Death is certainly a rare, or even exceptional event. Hypoparathyroidism, above all if definitive, is the main complication of total thyroidectomy with percentages that vary between 0 and 10% in the literature (average 2%). Approximately 150,000 thyroidectomies are performed each year in the United States. Patients undergo thyroid removal surgery for several reasons (Yan et al., 2017). So, this study emphasized determining the effect of Whats App's education regarding wound massage on post-thyroidectomy patients' wound adhesion and voice changes

#### **Aims of the study:**

The current study aimed to determine the effect of Whats App's education regarding wound massage on post-thyroidectomy patients' wound adhesion and voice changes through

1. Evaluating voice changes and wound adhesion in patients who have had thyroidectomies .
2. Creating and implementing wound massage education on the WhatsApp app .
3. Assessing the impact of implementing the Whats App's wound massage education on post-thyroidectomy patients' voice changes and wound adhesion .

#### **Research hypotheses:**

The following research hypotheses were

incorporated:

1. Wound adhesion among post-thyroidectomy patients would be reduced by applying the Whats App's education about wound massage.
2. Voice changes among post-thyroidectomy patients would be improved by applying Whats App's education about wound massage.
3. A positive correlation would be found between patient adherence to wound massage education and wound adhesion & voice changes.

#### **Patients and Methods:**

##### **Research design:**

A quasi-experimental research design was used to accomplish this study (study/ control)

##### **Setting:**

The study was carried out at the General Surgical Department and General Surgical Outpatient Clinic at Sohag University Hospital, Egypt.

##### **Sample:**

A convenient sampling technique of 50 post-thyroidectomy patients within six months, admitted to the previously mentioned setting were divided into two groups as study (n = 25) and control (n = 25). The study group received a WhatsApp education regarding wound massage, while the control group received routine hospital care.

##### **Tools for data collection:**

**Tools: Four tools for data collection were used to achieve the aims of the study**

**Tool (I): A Structured interview questionnaire:** It was developed by the researchers to assess the demographic and medical data of patients: It included two parts

**Part (1): Demographic data:** It included (5) items related to patients' age, gender, occupation residence, and level of education.

**Part (2): Medical data** included (4) items (length of hospital stay, presence of chronic diseases, cause of thyroidectomy, and type of thyroidectomy).

**Tool (II): The patient and observer scar assessment scale (POSAS):** Researchers modified the Arabic version of POSAS, which was created by Nossier et al. (2018), to evaluate wound adhesion. The patient scale and the observer scale were the two numerical scales that made up the system. Six characteristics of scars comprised the observer component: surface area, pliability, relief, thickness, pigmentation, and vascularity. The seven items on the patient scale were divided into two

categories: one was for assessing the overall perception of the scar, and the other six assessed the scar's color, elasticity, thickness, and irregularity. The scale score was determined using the first six items.

#### **Scoring system:**

Every item on the observer and patient scale has a Likert-type score between 1 and 10. The number one represents normal skin, and the number ten represents the most scarring. The total score on this scale is 60. The maximum score (60) on the scale denotes the worst possible scar, while the lowest score (6) represents normal skin. It was used three times: one week following surgery, just before the Whats App's education wound massage was applied; two weeks following surgery, following the application of the Whats App's education; and four weeks following surgery, following the application of the Whats App's education.

**Tool (III): Voice Handicap Index (VHI-10) questionnaire:** Researchers modified the Voice Handicap Index (VHI-10) to assess patients' subjective voice function and views of voice quality in Arabic, which was created by Farahat (2012). A five-point Likert scale is used to rate each of the ten statements in the VHI-10 set regarding voice function.

#### **Scoring system:**

A 5-point rating system was used for each of the 10 items in the VHI, with the options being "never" (0 points), "almost never" (1 point), "sometimes" (2 points), "almost always" (3 points), and "always" (4 points). Thus, the VHI score is assigned a final grade of 40 points. There were four possible total scores: 0 for no impairment and 40 for maximum impairment. Three subdomains comprise the items. • Statements describing how a person's voice disorder affects their daily activities were reflected in the functional (F) subscale from items 1–5. • Statements expressing self-perceptions of laryngeal discomfort and voice output characteristics were reflected in the physical (P) subscale from items 6–8. • The emotional (E) subscale from items 9–10 consisted of statements representing a person's affective (e.g., feeling) responses to a voice disorder. It was used three times: one week postoperatively (before applying Whats App's education wound massage), two weeks, and

four weeks postoperatively (after applying Whats App's education of wound massage).

**Tool (IV): Compliance assessment sheet:** The instrument was created by the researchers to evaluate the study group patients' adherence to wound massage following the second and fourth weeks, based on a review of the literature (Lee et al., 2018; Hasan and Al Dabbagh, 2021).

#### **Scoring system:**

• Higher percentages indicate higher compliance. The calculation was done by comparing the outcome of patients who received massage therapy to the target outcome, which is that the wound massaging technique should be performed for at least 10 minutes, three times a day) one week following the thyroidectomy operation to ensure that the wound is healed and there are no signs of infection.

#### **Tool Validity:**

Before the tool was used in the study, its content validity was tested for clarity, comprehensiveness, and appropriateness by five expert professors in the field (three of whom are staff members in medical-surgical nursing, one in community health nursing, and one in general surgery). The opinions and suggestions of the experts were not followed up on. The experts reached a unanimous consensus regarding the contents of the tool and structured educational program. The Content Validity Index (CVI) for the structured knowledge questionnaire was 0.71. The Whats App program for structured instruction has a CVI of 0.85.

#### **Tool reliability:**

The reliability of the tools was evaluated using the Cronbach's  $\alpha$  test. The test-retest reliability coefficient was 0.580 for the OSAS and 0.756 for the PSAS, while the Cronbach's alpha coefficient of (tool II) was 0.914 for the PSAS and 0.724 for the OSAS. High internal consistency was demonstrated by the Tool III VHI-10 (Cronbach's  $\alpha = 0.88$ ). The Arabic VHI-10 total scores showed excellent test-retest reliability ( $r = 0.920$ ,  $P < 0.001$ ).

#### **Data collection methods:**

Data collection lasted six months, from the beginning of July 2023 to the beginning of December 2023. Patients were divided into two groups: the study group (25 patients) and the control group (25 patients). - The data were collected by the researchers twice a week. The data were collected on morning shifts by interviewing patients individually. Whats App's

education regarding wound massage in the form of voice messages, text messages, figures, and videos was designed.

#### **Administrative and Ethical consideration:**

A research proposal was approved by the ethical committee in the faculty of nursing. The study was conducted with administrative permission obtained via a letter issued by the Dean of the Faculty of Nursing at Sohag University. Formal administrative approval from the setting was obtained before the start of this study. The managers of the chosen settings gave their official consent. This letter sought permission to gather research data by outlining the purpose of the study and outlining its anticipated results. The researcher informed the post-thyroidectomy patients about the research study and asked for their written consent to participate in it before receiving any formal consent from them. Patients recovering from thyroidectomies were reassured by the researchers that all information collected would be kept private. The post-thyroidectomy patients were advised that participation in the study was voluntary and that they had the ethical choice to accept or decline it. It also stressed that they could leave the study at any time without having to provide a reason and that their answers would remain private. We steadfastly upheld confidentiality and privacy throughout the entire data collection process.

#### **Pilot study**

To evaluate the feasibility and clarity of the research process, a pilot study involving five patients, or 10% of the studied sample, was carried out. The findings of the pilot study were not taken into consideration when developing the final version of the tools. Patients from the study sample were included in the pilot study.

#### **Fieldwork:**

To fulfill the aim of this research study, the following phases were adopted; the preparatory phase, assessment phase, planning phase, implementation of the teaching program phase, and evaluation phase.

#### **A- Preparatory phase:**

The researchers conducted this phase by reviewing international-related literature concerning the various aspects of the research

problem. The researchers developed a WhatsApp education regarding wound massage after reviewing the related literature and available resources. It was prepared in simple Arabic and illustrated with colored photos to help the participants understand the content.

Wound Massage: Patients in the study group were encouraged to perform wound massage techniques (for at least 10 minutes, three times a day) to ensure that the wound healed and was free of infection a week following the thyroidectomy operation. To allow the larynx to move vertically and relieve the patient's painful pulling sensation in the neck, the massage technique's goal was to release the tension bands that held the larynx and the strap muscles together (Hasan and Al Dabbagh, 2021).

#### **B- Assessment phase:**

In this stage, the researcher conducted interviews with the patients who had undergone thyroidectomies to gather baseline, demographic, and medical data (pre-test) from the patients and their current medical records (Tool I, Parts 1 and 2). Preoperatively, this phase got underway. The participating post-thyroidectomy patients were greeted by the researchers at the start of the interview, who also solicited their oral consent to participate in the study. They were then given a thorough explanation of the study's goals and duration.

#### **C- Planning phase:**

The researcher conducted in-person interviews with patients who had thyroidectomies before disseminating the Whats App instruction. The post-thyroidectomy patients were interviewed for 15 to 30 minutes each, during which the researcher gave an overview of the procedures and goal of the study. The patients who had thyroidectomies gave their written consent. After the pretest, Whats App's education was given out based on the pretest results from the assessment phase. The study's post-test was conducted over the phone with the same instruments as the pre-test. The researchers created an Arabic-language version of the Whats App to help the post-thyroidectomy patients they studied understand more about wound massage.

**D-Implementation phase: (Whats App's education regarding wound massage for post-thyroidectomy patients):**

This stage started when the patient arrived for a dressing change one week after surgery. The Arabic version of the patient and observer scar assessment scale (Tool II) was initially used to evaluate wound adhesion, and the voice handicap index (Tool III) was used to evaluate voice function. When the patient returned one week after surgery for a dressing change, this was evaluated before the Whats App wound massage instruction was applied. Voice messages, text messages, figures, and videos about wound massage were shared on the Whats App group, along with educational content about the practice.

♣ **The Whats App's education of wound massage: -**

The researchers developed the educational content for Whats App by reviewing pertinent literature and existing resources. "- The initial revisions to the goals of wound massage about voice changes and wound adhesion were made for the study group. To make sure the patients understood, education reinforcement was carried out based on their requirements .

-"To ensure the security of program content and prevent its exchange outside the structured concerned groups, the researchers obtained the WhatsApp contact numbers of each patient under strict confidentiality agreements that they would not be shared outside the groups by any member, even the researchers .

Via the WhatsApp groups, the researchers used an audio presentation of the theoretical components of each session along with an illustrative brochure to convey the content of the WhatsApp-based sessions. The two videos from the third session, however, were sent digitally in the form of quick movies that lasted no longer than 20 minutes to keep patients from getting bored or exhausted .

Every patient in the study group was given the chance to edit the videos and audio presentation that had been sent to them after the session. They also had enough time afterward to ask questions and receive additional clarification through a WhatsApp meeting that was scheduled at a time that worked for everyone in the group. For all participants, the researchers provided audio and message-based group discussion and feedback .

- Then, the researchers made a demonstration about massage techniques. The researchers explained the instructions about the massage technique for the wound to the study group as follows:

The Massage Technique of the Wound was instructed as the Following

1. Softly put pressure on the site of the operation (healed wound) and move it over the underlying tissues with your fingers.
2. Perform big circles by moving the skin over the underlying tissues rather than rubbing on the skin surface.
3. Make a vertical movement on the incision site with your fingers extended toward the chin.
4. Continue massaging for about 10 minutes at a time, at least 3 times a day.
5. Do not perform the massage, and notify your doctor once you feel: pain, redness, and discharge.

The patients were asked to repeat all instructions twice, and the researchers ensured that they could refer to the education on WhatsApp at home if needed. A copy of the Whats App's wound massage instruction was given to each participant to improve compliance with the exercises at home .

Following an assessment of the educational program's impact, WhatsApp groups are also created for the control group. While the hospital's standard nursing care was provided to the control group. Following the second and fourth weeks, patients were asked to return for a follow-up visit during which the researchers evaluated any changes in voice and wound adhesion. The researchers followed up with patients over the phone to find out how they were feeling overall well-being and to assess their compliance with wound massage.

To encourage each study subject to continue adhering to the instructions provided in each session at home, follow-up calls and WhatsApp chats were used .

**E- Evaluation phase:**

It was carried out at Sohag University Hospital's General Surgical Outpatient Clinics. This phase was carried out twice: a posttest was administered after the second week, and a follow-up evaluation was conducted after the fourth week of wound massage implementation. Patients were assessed using three different tools: Tool II was used to evaluate the wound adhesion, Tool III was used to evaluate voice

changes, and Tool IV was used to evaluate the patients' adherence to the booklet's instructions.

#### **Statistical analysis:**

The chi-square test and Fisher exact test were used to compare categorical variables where compare between continuous variables by t-test and ANOVA Test and a correlation coefficient test was used to show the association between scores; a two-tailed  $p < 0.05$  was considered statistically significant.

#### **Results:**

Table 1 shows that the majority of patients in both the study and control groups were housewives (36.0% and 56%), with ages ranging from 30 to 40 years old and mean ages of  $36.55 \pm 11.77$  and  $40.46 \pm 8.08$ , respectively. In both groups, the majority was found to be female (60.0% and 80.0%, respectively). In both groups, the majority of patients (80.0% and 76.0%, respectively) were from rural areas. Of the patients who were enrolled, two-thirds in the control group (40.0%) and more than half in the study group (56%) were illiterate and 52% of them in both groups were housewives. Regarding the group, there was no statistically significant difference in the demographic variables.

Table 2 displays the average duration of hospital stay for the study and control groups. It is observed that the majority of patients in both groups spent three days in the hospital (80% and 88%, respectively), with the study group's mean stay being ( $3.9 \pm 0.77$ ) days and the control group's being ( $2.89 \pm 0.19$ ) days. In terms of the prevalence of chronic illnesses, it is evident that the largest proportion of patients (76.0% and 88.0%, respectively) in the study and control groups had no chronic illnesses. Furthermore, it makes clear that the majority of patients in the study and control groups (84% and 88.0%, respectively) had multinodular goiter as the reason for their thyroidectomy, and 88% and 80%, respectively, of those patients had a total thyroidectomy.

Table (3): Portrays that, before implementing Whats App's instruction regarding wound massage (one week postoperatively), there were no statistically significant differences regarding wound adhesion in variables of patient and observer scar scale between the

study and control groups (P-value 0.575). Following the application of Whats App's wound massage education (2 and 4 weeks postoperatively), there were highly statistically significant differences between the two groups (P-value  $< 0.001^{**}$ ).

Table (4) explains that, before implementing Whats App's wound massage education (one week postoperatively), there were no statistically significant differences in voice changes based on the voice handicap index between the study and control groups (P-value 0.865). When the two groups used the Whats App's wound massage instruction, there were highly statistically significant differences (2 and 4 weeks postoperatively) (P-value  $< 0.001^{**}$ ).

Table (5) shows that there was a highly statistically significant difference with  $p < 0.001$  regarding the time of app applying Whats App's education regarding wound massage, and there was no significant difference in the frequency of applying massage per day.

Table (6) illustrates that, after two and four weeks, there was a statistically significant positive correlation between wound adhesion and compliance with implementing Whats App's education regarding wound massage .

Table (7) demonstrates that after two and four weeks, there was a significant positive correlation between voice changes and compliance with applying Whats App's education regarding wound massage .



Table (1): Distribution of post-thyroidectomy patients in both groups regarding their demographic data (n=50).

Demographic data	Study group (n=25)		Control group (n=25)		Test of sig.	P. value
	N	%	N	%		
<b>Age</b>						
18> 30	4	16.0	2	8.0	1.97	0.741
30>40	9	36.0	14	56.0		
40>50	8	32.0	5	20.0		
50>60	2	8.0	2	8.0		
60- 65	2	8.0	2	8.0		
<b>Mean±SD(range)</b>	36.55±11.77		40.46±8.08		<b>T=-1.35</b>	<b>0.131</b>
<b>Gender</b>						
Male	10	40.0	5	20.0	0.94	0.578
Female	15	60.0	20	80.0		
<b>Residence</b>						
Urban	5	20.0	6	24.0	0.77	0.832
Rural	20	80.0	19	76.0		
<b>Educational level</b>						
Illiterate	10	40.0	14	56.0	3.22	0.179
Primary school	5	20.0	5	20.0		
Secondary school	6	24.0	4	16.0		
University & higher education	4	16.0	2	8.0		
<b>Occupation</b>						
Employer	6	24.0	4	16.0	4.66	0.432
Housewife	13	52.0	13	52.0		
Not work	5	20.0	8	24.0		
Retired	1	4.0	2	8.0		

*The chi-square test and Fisher's exact test*

Table (2): Distribution of post-thyroidectomy patients in both groups regarding their medical data (n=50).

	Study group (n=30)		Control group (n=30)		Test of sig.	P. value
	N	%	N	%		
<b>length of hospital stay</b>						
One day	1	4.0	0	0.0	1.56	0.632
Two days	2	8.0	1	4.0		
Three days	20	80.0	22	88.0		
Four days	2	8.0	2	8.0		
<b>Mean±SD(range)</b>	3.9±0.77		2.89±0.19		<b>T=-1.72</b>	<b>0.142</b>
<b>Presence of chronic diseases</b>						
Yes	6	24.0	3	12.0	0.76	0.674
No	19	76.0	22	88.0		
<b>Type of surgery</b>						
Total thyroidectomy	22	88.0	20	80.0		
Subtotal thyroidectomy	3	12.0	5	20.0		
<b>Cause of thyroidectomy</b>						
Multinodular goiter	21	84.0	22	88.0	0.83	0.693
Cancer	2	8.0	1	4.0		
Graves 'disease	1	4.0	1	4.0		
Others	1	4.0	1	4.0		

**Table (3): Differences between study and control groups concerning to wound adhesion during three phases (n=50).**

The patient and observer scar assessment scale	Group	one week postoperatively	Test Used	After 2 Week	Test Used	After 4 week	Test Used
		Mean ± SD		Mean± D		Mean ± SD	
<b>Observer component</b>							
Overall Opinion of the Observer (=60)	Study	37.54±8.88	T=0.67	26.22±6.44	T=-5.67	14.31±5.54	T=-8.55
	Control	36.42±7.43	P=0.648	35.3±13.78	P<0.001**	40.36±14.62	P<0.001**
<b>Patient component</b>							
Overall Opinion of the Patient Maximum=60	Study	35±9.42	T=0.72	25.08±6.9	T=-6.26	14.78±4.22	T=-8.98
	Control	33.32±8.78	P=0.546	37.87±10.22	P<0.001**	44.43±10.79	P<0.001**
Total patient and observer score (Max=120)	Study	71.54±19.33	T=0.63	48.34±13.67	T=-7.03	27.68±9.8	T=-9.55
	Control	67.87±18.23	P=0.575	72.05±26.76	P<0.001**	82.66±27.43	P<0.001**

Independent T-test quantitative data between the two groups

\*Significant level at P value < 0.05

\*\*Significant level at P value < 0.01

**Table (4): Differences between study and control groups related to voice changes during three phases (n=50).**

Voice Handicap Index items	Max Score	One week postoperatively			After 2 weeks			After 4 weeks		
		Study	Control	T	Study	Control	T	Study	Control	T
		Mean±SD	Mean±SD	P.V	Mean±SD	Mean±SD	P. value	Mean±SD	Mean±SD	P. value
Total Voice Handicap Index score	40	24.46±6.22	23.8±3.78	-0.19 0.865	13.56±5.33	26.88±3.66	-13.46 <0.001**	9.43±3.04	26.05±4.42	-14.06 <0.001**

Independent T-test

\*\*Significant level at P value < 0.01

**Table (5): Differences between compliance rates for applying of wound massage among study group patients after 2&4 weeks postoperatively (n=25).**

Compliance	Target	After 2 weeks		After 4 weeks		T	P. value
		Mean±SD	%	Mean±SD	%		
<b>Compliance rates for applying for a massage</b>							
Frequency of applying massage per day	3	2.4±0.33	75.11	2.56±0.3	83.32	-3.88	0.005
Time of Massage(minutes)	10	7.44±1.21	78.22	8.7±1.04	87.12	-9.97	<0.001**

Paired-sample t-test

\*\*Significant level at P value < 0.01

**Table (6): Correlation Coefficient between study group wound adhesion and compliance with applying wound massage after 2 & 4 weeks.**

Compliance	Overall Opinion of the Patient			
	After 2 week		After 4 week	
	R	P	R	P
Frequency of applying massage per day	-.723-**	0.000	-.456-*	0.015
Time of Massage per day	-.833-**	0.000	-.425-*	0.017
	Overall Opinion of the Observers			
	After 2 week		After 4 week	
	R	P	R	P
Frequency of applying massage per day	-.665-**	0.000	-.467-*	0.011
Time of Massage per day	-.873-**	0.000	-.583-**	0.001

\*Statistically Significant Correlations at P. value <0.05

\*\*Statistically Significant Correlations at

P. value <0.01

**Table (7): Correlation Co-efficient between study group voice changes and compliance with applying wound massage after 2 & 4 weeks**

Compliance	Voice Handicap Index			
	After 2 week		After 4 week	
	R	P	R	P
Frequency of applying massage per day	-.523- <sup>**</sup>	0.004	-.379- <sup>*</sup>	0.037
Time of Massage per day	-.789- <sup>**</sup>	0.000	-.565- <sup>**</sup>	0.002

<sup>\*\*</sup>Statistically Significant Correlations at *P* .value <0.01

## Discussion

Voice changes are a common complaint following thyroid surgery that significantly lowers quality of life. Massage therapy for wounds improves range of motion, and neuromuscular coordination, and reduces pain and discomfort in the muscles (Magdy et al., 2022). Due to an increase in the diagnosis of thyroid pathologies, thyroid operations (total thyroidectomy) are becoming less common. However, the majority of patients who undergo thyroid operations have excellent pathologic outcomes (Kim et al., 2018). However, many patients continue to complain of neck pulling sensation and phonation change even in the absence of obvious stigmata of nerve injury (Won et al., 2016 Stojadinovic et al., 2022).

To allow the larynx to move much more smoothly, the neck massage technique can both help and cause the adhesions to release. By raising the voice pitch and removing the feeling of the neck being pulled, that technique may also help with phonation. It has historically been thought that iatrogenic injury to the laryngeal nerves during the thyroidectomy operation caused a change in phonation (Hong et al., 2019). So the researchers in the present study aimed to determine the effect of WhatsApp's education regarding wound massage on post-thyroidectomy patients' wound adhesion and voice changes.

A review of the study's demographic data revealed that, with mean ages of 36.55±11.77 and 40.46±8.08, respectively, most of the patients in the study and control groups were in the 30- to 40-year-old age range. The mean ages of the patients in the study and control groups were 35±25.99 and 40±11.67, respectively, according to El Shafae et al. (2022), whose results were consistent with our findings. Furthermore, the majority of the study participants in both the study and control groups were between the ages of 30 and 40,

which is consistent with the findings of Abd Elazeem et al. (2020) and the current study.

Regarding gender, it was evident from the current study that both groups were predominately composed of females. This result was in line with the findings of El Shafae et al. (2022), who observed that most patients undergoing thyroidectomies were female. A review of the literature (Sruthy, 2023) corroborated these findings by demonstrating that gender is one of the constant risk factors for thyroid diseases, with women having a significantly higher likelihood of having thyroid abnormalities than men or children.

According to the current study, the majority of patients in both groups were rural residents. A study by Hashem et al. (2018) titled "Effect of Designed Nursing Guidelines on Minimising Postoperative Complications for Patients Undergoing Thyroidectomy" confirmed this by showing that most of the participants in both groups were from rural areas.

Regarding education, the majority of the patients in the study group and the control group—more than half of them—were illiterate. This finding was acknowledged by Ali et al. (2020), who also pointed out that this was the case for the patients in the study group. Ibrahim et al. (2019), found that over half of the patients under investigation had formal education, which conflict with the current study's findings. According to the researchers, there's a chance that the characteristics of the study subjects' communities and natures explain why the results vary. From the researchers' point of view, it may be the cause of knowledge deficit about massage technique among the studied patients. Regarding occupation, the majority of patients in the study and control groups were housewives, according to the current study's findings. The fact that women made up the bulk of the study's patients may have had an impact on the outcome. The results of Alhusami et al. (2019) and Gezer & Arslan (2019), which made

it clear that housewives made up the majority of participants in both the study group and control group, corroborate this finding .

This study found no statistically significant difference in the demographic variables of the two groups. From the researchers' point of view, it confirmed that the sample was similar which is consistent with the findings of Thorsen et al. (2022) that no statistically significant difference was found in the patient demographic data .

About the medical data, the current study made it clear that the study group's mean hospital stay was (3.9±0.77) days, while the control group's was (2.89±0.19) days. That was consistent with the statement made by Altinbas & Gürsoy (2023) that patients were released from the hospital where the study was done as soon as possible, two days after thyroidectomy, in compliance with hospital policy .

In both the study and control groups, most of the patients had no chronic illnesses, according to the current investigation. According to Khamis et al. (2021), most study participants and control groups did not have any co-occurring disorders. This finding was consistent with their observations .

Based on the current study's findings, multinodular goiter was the primary reason for total thyroidectomy for most patients in both the study and control groups. The majority of patients underwent surgery after being diagnosed with multinodular goiter, as reported by Altinbas & Gürsoy (2023), which corroborated this finding. This finding is consistent with the reports by Abd Elazeem et al. (2020) and Turkmen et al. (2020) that the majority of patients had multinodular goiter, which led to total thyroidectomy surgery. Thorsen et al. (2022) reported that most patients had hemithyroidectomy, which is contrary to the current findings. According to the researchers, this could be because of the different nature of the study sample.

Based on the patient and observer scar assessment scale, this study showed that, before implementing Whats App's wound massage education, there were no statistically significant differences in wound adhesion between the study and control groups in terms of variables related to the patient and observer scar scale (one week postoperatively). When the two groups used the Whats App's wound massage

instruction (2 and 4 weeks postoperatively), there were highly statistically significant differences. It demonstrated, in the words of the researchers, the effectiveness of deploying a Whats App education about wound massage as well as the regularity and lucidity of the messages sent to patients through Whats App groups.

This was in line with Turkmen et al.'s (2020) findings, which involved head-neck exercises for thyroidectomy patients and the average postoperative POSAS score demonstrating a significant difference between the experimental and control groups' ratings of wound healing one day and one week following surgery. The experimental group recovered from surgical adhesion significantly better than the control group, according to the same findings published by Lee et al. (2018). They explained this difference by stating that wound massage had an impact on the release of adhesion between the larynx and strap muscles/subcutaneous tissues. They also calculated the wound adhesion grade and noted that the wound scar in the control group retracted at 4 weeks and was only marginally diminished at 12 weeks. However, the scar from the experimental group's wound decreased.

The findings clarified that a total thyroidectomy procedure would almost certainly result in wound adhesions, which could be managed or released by the technique of massaging the wound or scar tissue. It also lessened neck discomfort and phonation changes. Adhesions following a total thyroidectomy may be extremely severe and strong. Over time, it might not get better or get smaller on its own. In this kind of situation, neck pain accompanied by phonation changes might not go away for very long. Additionally, the skin at the site of the incision may appear to be adherent to the trachea and underlying tissues. The skin at the operation site moves up and down in one portion, particularly when the patient begins swallowing saliva, liquids, or different kinds of food (Hong et al., 2017).

The literature review indicated that this was consistent with the current study's earlier finding, which stated that the method of massaging the wound decreased adhesions by boosting circulation there. This, in turn, led to the adhesion's destruction and aided in the healing process following surgery (Hasan & Al

Dabbagh 2021). Furthermore, some researchers discovered that massage therapy can improve soft tissue extensibility (Ault et al., 2018).

About voice changes, emphasized that, before implementing Whats App's instruction regarding wound massage (one week postoperatively), there were no statistically significant differences between the study and control groups regarding voice changes based on the voice handicap index. After using Whats App's wound massage education, there were highly statistically significant differences between the two groups (2 and 4 weeks postoperatively). According to the researchers, this outcome shows the beneficial effects of Whats App education on wound massage, which satisfies patients' needs and gives them enough knowledge about how to massage their wounds.

Ault et al. (2018) have suggested that iatrogenic injury to the laryngeal nerves during the thyroidectomy is the cause of voice changes that occur after the thyroid is surgically removed. One major complication after thyroid surgery is injury to the recurrent laryngeal nerve. Nevertheless, vocal abnormalities have been reported even in cases where the laryngeal nerves are healthy. The following conditions have been linked to voice changes: arytenoid trauma, surgery trauma, endotracheal intubation, larynx fixation with strap muscles, or subcutaneous tissue (Lee et al., 2018).

The study's conclusions showed that while there was a highly statistically significant difference ( $p < 0.001$ ) in the time spent applying Whats App's education about wound massage, there was no significant difference in the frequency of applying it daily. According to the researchers, these results could be explained by teachers frequently repeating and remembering messages that were taught to them through Whatsapp videos and photos, as well as by patients' instructions and their insurance company's adherence to them.

Regarding this, Lee et al. (2018) reported that wound massage reduced patients' subjective voice discomfort, elucidating that patients' subjective voice discomfort was assessed after surgery and proving that there was a significant difference in voice impairment score (VIS) between the two groups, which corroborated the findings of the current study. Furthermore, the outcome aligned with the findings of

Thorsen et al.'s research from 2022, which indicated that the baseline VHI-10 scores of the study group and the control group were comparable. However, when comparing these results to baseline, they continued, that there was no discernible difference between the two groups' subjective voice function at one, two, four, and three months after surgery.

Through increased circulation to the affected area and subsequent adhesion destruction, the technique and procedure of wound massaging likely contribute to a reduction in adhesions. This can help promote the healing process following surgery. Massage therapy increases the extensibility of soft tissues, according to certain research (Ault et al., 2018). Massage therapy is therefore thought to be able to assist patients with voice alteration and neck pain. When there are no more open areas, redness, or pain, the wound should be fully healed before beginning any massage therapy. According to Moyer et al. (2018), my research has revealed that applying pressure to wounds can expand the larynx's range of motion.

The results of this study show that there is a highly statistically significant difference in the compliance rates of study group patients in performing wound massage. While there was a highly statistically significant difference regarding the time of massage performance, there was no significant difference in the frequency of massage performed daily. According to the researchers, the effect of their instructions, the availability of a pamphlet, and their follow-up phone calls could all be contributing factors. In the same context, Lee et al. (2018) reported that the average number of massages per day and the percentage of minutes spent receiving massages were 88% and 8%, respectively, of the wound massage compliance rate. This conclusion is further supported by Hasan & Al Dabbagh's (2021) observation that the majority of patients had high wound massage compliance percentages for both the average number of massages per day and the duration of the massage. Additionally, they demonstrated how neck massage techniques can both help and contribute to the release of wound adhesions, which frees up space in the larynx to move much more freely. That technique may also improve phonation by increasing the voice pitch and removing the pulling sensation in the neck.

Regarding the correlation between wound adhesion and the study group's compliance with wound massage, the current study shows that, after two and four weeks, there was a significant positive correlation between wound adhesion and compliance with applying Whats App's education regarding wound massage. According to the researchers, this indicated that Whats App's education on wound massage needed to be put into practice. A review of the literature provided evidence for this claim, stating that wound massage may help break down adhesions by promoting circulation. This, in turn, may cause the adhesion to break down or release, facilitating the healing process following surgery and promoting soft tissue extensibility (Ault et al., 2018 & Hasan and Al Dabbagh 2021).

After using Whats App's education about wound massage for two and four weeks, the study group's voice changes and massage compliance were compared. The results show that voice changes and compliance with applying Whats App's education about wound massage were significantly positively correlated. Releasing wound adhesions through adherence to massage may be crucial for improving the larynx's vertical movement flexibility and reducing patients' recovery times, according to Hasan & Al Dabbagh (2021), who also supported the idea that phonation and voice changes, along with neck discomfort, may be related to total thyroidectomy procedures. According to Scott et al. (2022), in the same context, patient compliance with massage significantly improves neck movement in the study group relative to the control group and also significantly reduces discomfort.

### **Conclusion:**

Based on the findings of the current study, it can be concluded that the application of Whats App's education regarding wound massage post-thyroidectomy significantly reduced wound adhesion and improved voice changes in the study group compared to the control group.

### **Recommendations:**

From the previously mentioned conclusion, the following recommendations could be inferred

Wound massage is recommended to be an integral part of the pre-operative nursing teaching for patients undergoing thyroidectomy. There is a need for developing comprehensive simple Arabic printed educational materials about wound massage techniques such as (booklets, pamphlets, and posters) for post-thyroidectomy patients that can be a reference for them after that.

Replication of the current study with a larger sample of patients in different settings is required to generalize the results.

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