Efficacy of Video Modeling as an Adjunct to Patients' Education in Improving Patients' Clinical Outcomes after Endoscopic Sinus Surgery

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Abstract

Background: Patients with sinusitis are usually treated with endoscopic sinus surgery. The need for improve healthcare services quality has been recognized by health-related information and advanced technologies. Video modeling could benefit clinical practices in facilitating knowledge retention and improved self-care. **Aim:** To evaluate the effectiveness of pulmonary rehabilitation with exercise training in improving health outcomes for patients with chronic obstructive pulmonary disease. **Methods:** The study will be conducted in the nose, ear, throat, and maxillofacial unit and outpatient clinics affiliated to Mansoura University Hospitals. A purposive sample of 50 patients was studied by the following tools: a structured interview questionnaire, Rhinosinusitis Disability Index (RSDI), and Pittsburgh Sleep Quality Index (PSQI). **Results:** there was no statistically significant difference between the study and control group pre-intervention. Post-intervention, the video modeling group showed significant improvement in knowledge level compared to the control group (0.002*), sleep quality (0.014*), and quality of life (0.0001*). **Conclusions:** Conclusion: Video modeling had potential benefits for clinical practices in facilitating knowledge retention and improved self-care practice among patients treated with endoscopic sinus surgery. **It is recommended** to use Video Modeling as a routine part of care for patients after Endoscopic Sinus Surgery.

Keywords: Clinical Outcomes, Endoscopic Sinus Surgery, Patients' Education, Video Modeling

Introduction:

Chronic rhinosinusitis (CRS) is marked by inflammation of the sinus mucous membranes, thick nasal mucus, nasal congestion, and facial pain, those Patients are usually managed with endoscopic sinus surgery because of the high recurrence rate, poor response to conventional medication, and the increased risk of injury associated with traditional surgery (**Schuler and Montejo, 2019).** Endoscopic sinus surgery is considered a delicate surgery of the nasal cavity with limited space, so proper nursing coordination is crucial for better outcomes. Because of limited contact with nurses before patients' discharge, patients need to take more responsibility for their own care **(Popat., 2018).**

Nursing care is a key aspect of healthcare services. Many factors can impact surgical outcomes, making it vital to focus on appropriate perioperative nursing care. Establishing a well-defined perioperative nursing system and process is essential for tailored and specialized nursing, enhancing surgical safety, and aiding patients' postoperative recovery (**Zhang, Wang, Zhang & Meng., 2021).** The importance of improving healthcare services has been recognized due to technological advancements, shifting expectations, and increasing patient engagement. However, patient education is often overlooked but is essential. It's crucial to ensure thorough preoperative education to improve patients' knowledge which helps reduce anxiety (**Karaca and Durna, 2019).**

Video instruction developed by nursing staff is considered an effective educational method for non-professionals in definite practices required for self-care. videotaped instruction is an reasonable, effective, and suitable technique to inspire learning and enhance anticipated outcomes **(York, Gang, and Qureshi, 2019).** Video modeling could benefit clinical practices in facilitating knowledge retention and improved self-care. Video-based instruction is useful for showing practical and real-life activities and could be used to capture hazardous and costly experiments for presentation and repeated use **(Devi, Khandelwal, and Das, 2017).**

Aim of the study:

The present study aims to appraise the efficacy of video modeling as an adjunct to patients' education in improving patients' clinical outcomes after endoscopic sinus surgery.

Research hypotheses:

H0: video modeling-based education does not affect patients managed with sinus surgery.

H1: Patients submitted to video modeling education will gain more knowledge regarding post-endoscopic sinus surgery self-care, and experience better sleep quality, and quality of life following endoscopic sinus surgery than those in the control group.

Operational definition

Video modeling is a quick summary of noticeable features of the practice, including what it is, who it can be used, what skills it has been used, settings for instruction, practice Steps for Implementation, and detailing how to implement the practice.

Subjects and methods:

Research Design: Quasi-experimental design was utilized in our study. This design is an experimental interference used to estimate its influence on the target population **(Ngusie, et al., 2021)**.

Research Setting: The study was conducted in the Nose, Ear, Throat, and Maxillofacial unit and outpatient clinics at Mansoura University Hospitals, Egypt.

Subjects: A purposive sample of A total of 50 patients undergoing endoscopic sinus surgery were selected to participate in the study. They were randomly divided into two groups using computer-generated randomization. The first group, referred to as control group (submitted to routine care). Second group, referred to as study group (received routine care in addition to video modeling education). ***Inclusion criteria:*** Adult patients aged 20 to 60 y of both genders and scheduled for endoscopic sinus surgery**.** ***Exclusion criteria:*** Patients with impaired consciousness, comorbid diseases (hypertension, DM, and heart diseases), and those with previous sinus surgeries.

Sample size

The sample size was determined using MedCalc Software 15.8. The calculation was based on previous research by Wu et al. (2019), with α= 0.05, a testing power of 80%, and an effect size of 0.7, indicating that 44 patients are needed. To accommodate expected drop-outs, extra patients will be included, resulting in 50 patients (25 to each group).

Tools of the study:

Four tools were utilized for data collection.

Tool I: A structured interview Questionnaire:

The researchers developed this questionnaire grounded on a literature review **(Fujiwara, Kuriyama, Kato, Fukuoka & Ota, 2018).** This tool consisted of two parts; part one, includes the patient's age, gender, marital status, educational level, residence, and occupation. Part two includes health-relevant data including the history of comorbid rhinology diseases, allergies, smoking, and drug history.

Tool II: Patient's knowledge questionnaire:

The researchers developed this questionnaire grounded on a literature review **(Wu et al., 2019; Zieliński et al., 2016)**, to assess patient's knowledge level concerning endoscopic sinus surgery. This questionnaire contained 40 true-false questions about the postoperative recovery and associated care to judge a person's understanding of what generally occurs postoperatively, and needed self-care practice.

Scoring system

Scores are calculated as the total number of correct answers on the tool. The knowledge scores were categorized as: Poor knowledge: less than 50%, Fair knowledge: 50 - < 75% and Good knowledge: 75% or more

Tool III: The Rhinosinusitis Disability Index (RSDI)

This tool is a global quality-of-life measurement established by Benninger and Senior in 1997 for patients with sinusitis and consists of 30 self-rated items grouped in 3 domains: physical (11 items), functional (9 items), and emotional (10 items) and rated on a 5-point Likert scale ('never' = 0 to 'always' = 4). The total score ranges from 0 to 120. Higher scores indicating a worse health-related quality of life (HRQL).

Tool IV: Pittsburgh Sleep Quality Index (PSQI)

A 19-item, self-administered questionnaire was established by **Buysse et al., 1989** and designed to measure sleep quality and disturbance over the past period. The 19 items are grouped into seven components: sleep duration, sleep disturbance, sleep latency, daytime dysfunction due to sleepiness, sleep efficiency, overall sleep quality, and sleep medication use. Each component is scored from 0 to 3, with 3 indicating the most dysfunction. A total score ranging from 0 to 21, with a higher total score indicating poorer sleep quality.

Method

Procedure

1. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing, Mansoura University.
2. Study tools was developed by the researcher based on a recent, relevant literature review, and their reliability was tested using appropriate statistical tests.
3. A pilot study was conducted on 10% of the study sample to test the feasibility and applicability of the study tool. The participants involved in the pilot study were subsequently excluded from the main study sample.

Data collection:

The study was conducted in four phases:

Phase I: Preparatory phase

- Written informed consent was obtained after explaining the study's purpose, and confidentiality was maintained.
- Study tools were reviewed by a panel of seven experts representing the fields of medicine and nursing to evaluate the validity of the tools. All necessary modifications were made accordingly.
- After reviewing recent literature, the researcher developed a session plan, colored booklet, and instructional video in simple Arabic.

Phase II: Implementation phase

The interviews for the study took place in the Nose, Ear, Throat, and Maxillofacial unit and outpatient clinics. A comfortable and private location was selected for the interviews. Participants who met the sampling criteria and agreed to take part in the study were included.

1. Control group, which will receive typical preoperative education from a nurse.

2. Study group, which was receive typical preoperative care along with a nursing-based videotape on postoperative self-care following nasal and sinus surgery. The videotape is approximately 20 minutes long and features models demonstrating the desired behaviors.

The researcher will initially introduce herself to the patients and provide them with a brief overview of the study's aims and nature. After obtaining oral consent from each participant, the researcher was given all necessary instructions and answered any questions. The estimated time for each patient is 30-45 minutes. Participants were provided with a phone number for communication and further explanation or assistance.

Phase III: Evaluation phase:

The study assessed the impact of video modeling on patients' clinical outcomes after endoscopic sinus surgery. This was done by comparing the studied groups one month after proposed nursing intervention was implemented using tools II, III, and IV.

Ethical considerations and human rights

The ethical agreement was obtained from the Research Ethical Committee of the Faculty of Nursing, Mansoura University, Egypt. Informed printed consent will be gotten after explaining the nature of the experiment. It was emphasized that participation is voluntary, and measures were taken to guarantee secrecy, confidentiality, safety, and the right to withdraw from the study at any time. Additionally, their names or identifying information will not be included in the survey.

Statistical analysis of data:

All statistical analyses were conducted using SPSS for Windows version 20.0. Continuous data, which were normally distributed, were presented as mean ± standard deviation (SD). Categorical data were presented as numbers and percentages. The comparison of variables with categorical data

was performed using the chi-square test (or Fisher's exact test when applicable). The reliability (internal consistency) of the questionnaires used in the study was calculated. The significance threshold was set at ≤0.05.

Results

Table (1) shows, about one-third (32.0%) of the control group and about half of the study group were less than 25 y, with their mean age was (26.2 ± 3.9 and 23.5 ± 4.2) for study and control groups respectively. Regarding gender, about two-thirds (60.0%) of the control group and slightly less than three fourth (72.0%) of the study group were male. Concerning marital status, about half (56.0%) of control and study group (52.0 %) were married. Concerning level of education, the table illustrated that more than half (60.0%) of control group and about one-third of study group were highly educated. regarding occupation, about two-thirds (68.0%) of control and study group (60.0%) were working. According to residence, (52.0%) of control group and (48.0%) of study group were live in rural area. Most of study and control groups suffering allergic rhinitis (90.0% and 0.93% respectively)

Table (2) revealed that pre-cognitive behavioral intervention about half (48.0%) of the control group have good knowledge regarding endoscopic sinus surgery compared to (40.0%) of the study group. Post video-modeling intervention patients' knowledge regarding endoscopic sinus surgery in study group improved significantly (80.0%) compared to control group (52.0%). (P= 0.002*)

Table (3). Show no statistical difference between studied groups in the preoperative period about sleep quality whereas, a statistically significant difference appears between studied groups in all dimensions of sleep quality including Sleep duration (0.001), Sleep disturbance (0.001), Sleep latency (0.001), Day time dysfunction due to sleepiness (0.002), Sleep efficiency (0.004), Overall sleep quality (0.002) and Sleep medication use (0.001) in postoperative period

Table (4). Show, preintervention no statistical difference appears between studied groups about sleep quality (0.606) whereas, in the postintervention period, a statistically significant difference appears between studied groups (0.014*) in which (88.0%) of the study group have good sleep quality compared to (40.5%) of the control group

Table (5). Represent significant improvement in QoL in the study group compared to the control group including functional dimension (0.001), emotional dimension (0.001), and physical dimension (0.001)

Table (1). A frequency distribution of the studied groups regarding their demographic data (N=50)

	Control		Study	
	n	%	n	%
Age (Years)				
< 25	8	32.0	12	48.0
25 – 30	6	24.0	8	32.0
> 30	11	44.0	5	20.0
Mean ±SD	26.2 ±3.9		23.5 ±4.2	
Gender				
Male	15	60.0	18	72.0
Female	10	40.0	7	28.0
Marital status				
Single	11	44.0	12	48.0
Married	14	56.0	13	52.0
Educational Level				
Read and write	2	8.0	1	4.0
Secondary school	8	32.0	6	24.0
Highly educated	15	60.0	18	72.0
Occupation				
Not working	8	32.0	10	40.0
Working	17	68.0	15	60.0
Residence				
Urban	12	48.0	13	52.0
Rural	13	52.0	12	48.0
Comorbid rhinology diseases				
Allergy rhinitis	20	80.0	18	72.0
Chronic sinusitis	5	20.0	7	28.0
Allergies	14	56.0	7	28.0
Smoking	11	44.0	18	72.0
Drug history				
Intranasal decongestants	25	100.0	25	100.0
Corticosteroids	25	100.0	25	100.0

Table (2). Studied patients' knowledge regarding Endoscopic sinus surgery pre and post-cognitive behavioral interventions

	Control		Study		Chi-Square	
Knowledge Score	n	%	n	%	X^2	P
Pre – Intervention						
Poor	8	32.0	9	36.0		
Fair	5	20.0	6	24.0	0.072	0.764
Good	12	48.0	10	40.0		
Post - Intervention						
Poor	2	8.0	2	8.0		
Fair	10	40.0	3	12.0	9.574	0.002*
Good	13	52.0	20	80.0		

Table (3). Sleep quality of studied groups pre and post cognitive behavioral intervention

Sleep quality	Pre		P- Value	Post		P- Value
	Study Mean ± SD	Control Mean ± SD		Study Mean (SD)	Control Mean ± SD	
Duration	1.15 (0.86)	1.45 (0.86)	**0.548**	0.25 (0.56)	1.95 (0.86)	**0.001***
Disturbance	1.5 (0.92)	1.67 (0.92)	**0.245**	1.0 (0.52)	2.17 (0.92)	**0.001***
Latency	2. 0 (0.68)	1. 92 (0.58)	**0.086**	0.80 (0.48)	2. 15 (0.58)	**0.001***
Day time disfunction	1.6 (0.73)	1.96 (0.63)	**0.987**	0.60 (0.23)	1.76 (0.63)	**0.002***
Efficiency	1.80 (0.78)	1.35 (0.78)	**0.487**	0.20 (0.58)	1.95 (0.78)	**0.004***
Overall sleep quality	1.75 (0.54)	1.85 (0.64)	**0.954**	0.72 (0.34)	1.95 (0.64)	**0.002***
Medication use	1.1 (0.54)	1.48 (0.94)	**0.578**	0.18 (0.24)	2.00 (0.94)	**0.001***
Total	11.35 (4.56)	9.68 (5.21)	**0.457**	3.84 (4.24)	4.8 (1.24)	**0.001***

Table (4). Comparison between studied groups in relation to Sleep Quality total score

	Control Group		Study Group		Fisher's exact test	
Sleep Quality Scale Total Score	n	%	n	%	X^2	P
Pre – Intervention						
Good Sleep Quality	14	56.0	15	60.0		
Poor Sleep Quality	11	44.0	10	40.0	0.267	0.606
Post – Intervention						
Good Sleep Quality	15	40.5	22	88.0		
Poor Sleep Quality	10	72.2	3	12.0	5.079	0.014*

Table (5). The Rhinosinusitis Disability Index (RSDI)

Items	Study	control	P- Value
RSDI Functional	5.95	16.5	0.001*
RSDI Emotional	5.81	12.8	0.001*
RSDI Physical	5.19	13.1	0.001*
RSDI Total	17.25	41.67	0.0001*

Discussion

Chronic rhinosinusitis (CRS) is a persistent, localized inflammatory condition affecting sinuses its incidence ranges relatively high, between 5% and 12% **(Hussein et al, 2019)**. Endoscopic sinus surgery is a commonly performed procedure for rhinosinusitis management as part of minimally invasive procedures **(Dang et al., 2021)**.

Enhanced recovery after surgery involves using optimized protocols during the perioperative phase to minimize psychological and physical stress reactions **(Wu et al., 2019)**. Previous studies have identified several informational needs in otolaryngology patients. most patients have reported feeling unprepared for surgery and have experienced functional limitations throughout the recovery process. Use of audiovisual information technologies may help address these communication barriers, improve compliance with care, and enhance information retention **(Turkdogan et al., 2021)**.

In our study mean age was (26.2 ± 3.9 and 23.5 ± 4.2) for the study and control groups respectively and mostly males. Our results were contradicted by **Dang et al. (2021)** in their study titled 'The Utility of Preoperative Phone Calls for Endoscopic Sinus Surgery Procedures.' They reported that the mean age of the endoscopic sinus surgery patients in their study was 52.4, and the majority of them were female. Another study by **Yang et al. (2021)** documented that the mean age of their endoscopic sinus surgery patients was 42.10 ± 12.9, and slightly more than half were females. These differences may be attributed to environmental variations, atmospheric conditions, genetic and risk factors.

In relation to the level of knowledge regarding endoscopic sinus surgery, knowledge level in study group improved significantly compared to control group. In this regard, **Hakimi, Standiford, Chang & Wong, (2021) and Bozec et al. (2019)** stated that up to 80% of the information provided to patients through traditional educational methods may be forgotten. Video modeling is more effective in improving patients' knowledge than standard perioperative education, it also helps change negative emotions and bodily responses by altering inappropriate thoughts

Similarly, **Ma et al., (2019) and Villaet al., (2020)** emphasized that video modeling is a brief, guiding intervention through video and animation content, which are easy to understand and operate and reported a growing interest in using video modeling technologies within healthcare settings to enhance standard clinician-led preoperative teaching. Also, **Steinbrenner et al (2020) and Raikundalia et al. (2019)** explain that video modeling is an assistive technology method utilizes video recording and display equipment to provide a visual model of a targeted behavior or skill to maximize the learner's ability to apply what they have observed.

In our study, we found different results compared to **Maniaci et al. (2021)** They discovered low adherence to preoperative educational materials, along with feelings of fear and discomfort such as nasal fullness, headaches, and difficulty breathing.

Concerning sleep quality, all aspects of sleep quality show improvement in the study group compared to the control group. Our study results explained that Perioperative stress related to surgery can have a significant impact on patients'

neuroendocrine pathways. Nursing education that incorporates video modeling has been shown to reduce cortisol levels, possibly through cognitive adjustment and behavioral coping **(O'Connor et al. 2021)**.

The findings were consistent with those of **Meng et al., (2020) and Mehta, Peynenburg, and Ueki et al., (2018).** They discovered that video modeling techniques in nursing education resulting in better understanding, preview postoperative care, and practice the required skills to improve outcomes. This approach also led to lower levels of anxiety and insomnia compared to other educational practices. Also, findings by **Yang et al., (2021)** suggest, video modeling techniques in nursing education can help patients better understand the surgical procedure and postoperative care, leading to improved self-care skills and lower levels of anxiety and insomnia.

The findings of our study explained a significant quality of life improvement in study group compared to control group, including functional, emotional, and physical dimensions.

In the same line, **Sgrò et al. (2019) and Ali E and Abdallah (2020)** demonstrated that patients educated with video modeling techniques experienced faster postoperative recovery times and improved perioperative outcomes, resulting in an overall enhancement of their quality of life.

The findings aligned with the results of a study by **Mehta, Peynenburg & Ueki et al. (2018) and Villa et al. (2020)**, which demonstrated the positive impact of video modeling interventions on surgical stress response and outcomes, especially for individuals with maladaptive characteristics, which enhance various aspects of quality of life.

Conclusion

The results affirm our hypothesis that patients undergoing video modeling education acquire more knowledge about post-endoscopic sinus surgery self-care and experience improved sleep quality and quality of life.

Recommendations

We need to conduct a large, practical trial to assess the effectiveness of this intervention. The current study should be repeated with a larger sample size and in a diverse range of healthcare settings in order to generalize the results.

Study limitations

The intervention took place at a single site with a small sample size and did not evaluate the long-term effects in patients

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