

## Quality of Life in Patients with Chronic Rhinosinusitis Before and After Functional Endoscopic Sinus Surgery at Tertiary Hospital, Tanzania

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### Abstract

**Introduction:** Chronic-rhino sinusitis is an inflammatory disorder of the Para nasal sinuses and linings of the nasal passages that lasts for 12 weeks or longer. Functional endoscopic sinus surgery (FESS) is a minimally invasive technique used to restore sinus ventilation and normal function hence it is the mainstay surgical treatment for chronic-rhino sinusitis. This disease affects the quality of life of patients but it has been reported that, FESS provides significant improvement on the QOL of patients. This study aim to assess whether Functional Endoscopic Sinus Surgery provides a better QOL in patients with CRS with or without polyposis in a tertiary Hospital, Tanzania. Also, it aims to determine the predictive factors influencing the QOL of these patients.

**Objective:** To assess the quality of life of patients with chronic rhino-sinusitis with or without polyposis before and after FESS.

**Methodology:** This is a hospital based before and after study where by patients diagnosed with CRS with or without polyposis planned for FESS were recruited. The SNOT-22 test was used to evaluate QOL. Data was collected before the surgery and 1 month after the surgery and analyzed using SPSS version 20.0 software.

**Result:** 48 patients were enrolled in this study, 19 (39.6%) were male and 29 (60.4%) were female. The age range was 5 - 79 years with the mean age of 35 years. There was a statistically significant reduction between the preoperative and postoperative score attained on SNOT-22. ( $Z = -6.032, p = 0.000$ ) The mean score of the preoperative score was 40.81 and the mean score of the postoperative score was 5.38. In this study there were 6 patients who had a history (past or present) of smoking, 6 patients who had Asthma and 11 patients with a previous history of FESS. Only a history of prior sinus surgery predicted poor quality of life after FESS.

**Conclusion:** Functional Endoscopic Sinus Surgery is associated with increase in the quality of life of patients with CRS.

**Keywords:** Quality of Life; Functional Endoscopic Sinus Surgery; Rhinosinusitis; Polyposis; SNOT 22

### Abbreviations

CRS: Chronic rhino-sinusitis; ENT: Ear, Nose and Throat; FESS: Functional Endoscopic Sinus Surgery; HIV: Human Immunodeficiency Virus; IQR: Interquartile Range; MUHAS: Muhimbili University of Health and Allied Sciences; ORL: Otorhinolaryngology; QOL: Quality of Life; SNOT-22: Sino Nasal Outcome Test 22; SPSS: Statistical Package for Social Sciences

### Introduction

#### Background

Chronic rhino-sinusitis (CRS) is a condition characterized by the occurrence of two or more of the following signs and symptoms; nasal discharge or post-nasal drip, nasal obstruction, nasal congestion, facial pain, pressure or fullness and decreased sense of smell

for a duration of 12 or more weeks with objective findings on either computed tomography or nasal endoscopy [1].

It is further divided into two: CRS with polyps and CRS without polyps.

Nasal polyps are benign mucosal lesions that originate from the mucosa of the nasal cavity or mucosa of the sinuses around the nose. The cause of polyps is unknown however they are associated with allergies, asthma and infections of the nose and sinuses [2].

CRS with polyps is frequently characterized by reduced sense of smell (hyposmia) while CRS without polyps is characterized with facial pain, pressure or fullness [3].

First line therapy for treatment of CRS is aimed at reducing underlying inflammation and facilitating clearance of the para-nasal sinuses. Antibiotics, topical steroids, systemic steroids, and nasal saline irrigation are mainstays of treatment. Also, key to medical management is treatment of underlying disease processes, such as environmental allergies. Unfortunately, many patients are refractory to this treatment and ultimately require functional endoscopic sinus surgery (FESS) to achieve improved symptom control and quality of life [4].

Surgical interventions are considered when symptomatic chronic rhino-sinusitis is refractory to appropriate medical therapy. Functional endoscopic sinus surgery (FESS) is the treatment of choice as it restores function and patency of the sinus to provide normal ventilation and drainage.

One immeasurable result of any disease such as rhino-sinusitis is the impact of quality of life. Recent efforts to evaluate the impact of disease on quality of life and the outcome of disease have clarified the importance of such impacts [5].

Generally, CRS is reported to have effects on daily activities such as work and sleep, and people's day-to-day life. Its tremendous effects are not only reported to be physiological but also psychological.

Quality of life is a term integrating several aspects such as physical, psychological, social, economical and emotional dimensions. The disturbance in any one of these aspects will in turn affect QOL significantly. Researchers have shown interest in assessing QOL by developing QOL related questionnaires such as SNOT-22 that

is deemed as the most suitable and reliable disease specific questionnaire designed for use in chronic rhino-sinusitis patients. It is a patient-reported outcome measure of symptom severity and quality of life in patients with Sino nasal diseases [6].

The impact of disease with regard to quality of life and social economically before and after surgery differ according to nature of disease and type of surgery [7].

Endoscopic sinus surgery in patients with CRS is associated with statistically significant improvements in disease outcome with no gender or age difference [8].

Functional Endoscopic Sinus Surgery is very efficient in controlling symptoms in CRS without polyposis, however more studies are needed in CRS with polyposis [9].

Quality of life measures should be routinely assessed especially in chronic conditions in order to evaluate the management of these conditions. There are some documented factors associated with QOL of patients with CRS undergoing FESS such as social demographic factors (age, sex), systemic diseases (hypertension, heart diseases, gastro-esophageal reflux disease) and behavioral factors such as smoking status.

### Predictive factors

Cigarette smoking has been identified over the years to be a risk factor for CRS however it is still not well understood if cigarette smoking history has an effect on the QOL outcome of patients with CRS with or without polyposis after FESS. Similarly, there is contradicting information on the effect of number of prior sinus surgeries done and presence of asthma history on the QOL of these patients after FESS.

Patients who had never undergone functional endoscopic sinus surgery (FESS) prior to their presentation at the University of Virginia in a study done at the department of Otolaryngology; University of Virginia Health System, were observed to have significantly better QOL than those who had previously undergone one or more surgeries (n = 40 for 0 surgeries with 63.4% improvement), (n = 31 for one prior surgery with 48.4% improvement) and (n = 33 for greater than one prior surgeries with 54.5% improvement) [4].

Age, history of allergic rhinitis, severity of dysosmia, history of nasosinusitis surgery, and long-term use of nasal decongestant

were the risk factors, whereas comprehensive therapy after surgery was a protective factor [10].

Among the predictive factors examined by a prospective cohort study done in Morocco, history of prior sinus surgery predicted less improvement in QOL after FESS [11].

The satisfaction for and effectiveness of endoscopic nasal and sinus surgeries on the patients' quality of life should be taken into account in relation to the nature of the disease and predictive factors [12].

Subjective improvement of about 94% was documented, with improvement in specific symptoms such as headache, nasal congestion, change in sense of smell, nasal discharge and recurrent infections ranging from 52% to 97%, these findings should be associated with predictive factors [13].

Functional endoscopic sinus surgery seems to improve the quality of life to most of patients, however the predictive factors should be put into account [14].

In term of smoking effect, in a study done in South Western Uganda, almost 20% of the study participants had a history of ever smoking (whether past or current) and this was associated with a 2.5 fold increase in the odds of having a poor QOL compared to those that had never smoked before [1].

Tobacco smoke exposure either through active smoking or passive exposure to secondhand smoke, contributes to CRS. It has been reported that these patients have increased symptoms of rhinorrhea, nasal congestion and headache and a less favorable response to FESS.

## Materials and Methods

### Study design

This is a before and after non-experimental study design (a is true), conducted at ORL clinic in Muhimbili National hospital. It is a quantitative approach and a questionnaire based study. It is a follow up study whereby patients were interviewed before surgery and 1 month after surgery.

### Study area

The study was conducted in Muhimbili National Hospital at the Otolaryngology department. Muhimbili National Hospital is the National Referral Hospital, Research Center and University Teaching Hospital attending 1000 to 1200 outpatients per day and admitting 1000 to 1200 inpatients per week. It also receives patients from all

regions of the country. It has 29 departments and 107 units [15].

The ENT department has a total of 5 units namely: Rhinology, Otolaryngology, Head and neck surgeries, Audiology and Speech and Language therapy. Each unit attends to patients at the outpatient clinics. Consecutively, they have 2 inpatient wards for males and females.

### Study population

The study was conducted among patients attending ENT clinic at Muhimbili National hospital who have CRS with or without polyposis, were further planned for and underwent FESS.

All subjects who were recruited should have undergone medical treatment for CRS and have failure of response to maximum medical treatment.

### Inclusion criteria

All patients of CRS, with or without polyposis, before and after FESS, at the respective clinic during the time of study who gave consent.

### Exclusion criteria

- Patients were excluded if presented with other Sino nasal pathologies other than CRS.
- Patients who were not fit for surgery were also excluded.
- Also, those who refused to participate were not included.

### Sampling technique

Patients were recruited from a non-probability convenience sampling technique.

### Study sample

All patients with CRS with or without polyposis attending MNH clinic planned for FESS were consecutively recruited from September 2019 to March 2020.

### Data collection methods and tools

Data was collected using a semi-structured questionnaire and the SNOT 22 tool. The semi-structured questionnaire contains two parts: the demographic characteristics part and the part with predictive factors.

The SNOT 22 tool used is a Swahili translated version of the Washington University in St. Louis, Missouri SNOT-22 [16].

Sino Nasal Outcome Test-22 (SNOT 22) is a validated 22-item questionnaire with the distribution of symptoms into discrete do-

mains (rhinologic, extra-nasal rhinologic, ear/facial, psychological and sleep dysfunction).

**Data analysis**

Data were analyzed depending on each specific objective by using SPSS version 20.0 software. SNOT 22 was scored by using Likert scale where 0 = No problem, 1 = Very mild problem, 2 = Mild problem, 3 = Moderate problem, 4 = Severe problem and 5 = as bad as it can be. Total score range is from 0 to 110.

The Wilcoxon signed-rank test was used to determine the differences between pre and postoperative QOL outcomes. Patients who had less than 7 total postoperative scores were labeled as having good quality and those with more than 7 were labeled as having poor quality. Multiple logistic regression was used to determine the predictive factors influencing the quality of life of the patients.

**Ethical consideration**

Ethical clearance to conduct the study was obtained from Muhimbili University of health and allied science Ethical Review Board. Verbal informed consent was obtained from the participants after the purpose and nature of study was explained. Participation was entirely voluntary and patients had the right to withdraw from the study at anytime.

The identity of the participants (name, address and phone numbers) were not disclosed to ensure privacy and confidentiality.

**Result**

**Age and sex pattern of patients with CRS**

During the study period, 48 patients underwent Functional Endoscopic Sinus Surgery (FESS). All subjects were followed up for 1 month after FESS and no sample loss was observed. Of these 48 patients, 19 (39.6%) were male and 29 (60.4%) were female. The age range was 5 - 79 years with the mean age of 35years. The peak value observed was of 10% for the age group of patients between the ages of 41 - 50. The age groups of 11 - 20 and 21 - 30 with a proportion of 9% followed this respectively. There were 6 patients who had a history (past or present) of smoking, 6 patients who had Asthma and 11 patients with a previous history of FESS. These baseline demographic results are shown in table 1 below.

**Quality of life of patients with CRS after FESS**

A Wilcoxon signed-rank test showed that there was a statistically significant reduction between the preoperative and postoperative score attained on SNOT-22.

(Z = -6.032, p = 0.000) The mean preoperative score was 40.81 and the mean postoperative score was 5.38. FESS significantly re-

duced the mean score of the 5 domains in the SNOT-22 questionnaire as seen in table 2 below. The domain that was observed to have greater reduction in the mean change was the “rhinologic symptoms” domain with the mean change being 11.67 and that with the lowest mean change was the “ear/facial symptoms” domain with mean change of 3.56.

Characteristics	Frequency (Percentage)
<b>Sex (%)</b>	
Male	19 (39.6)
Female	29 (60.4)
<b>Age</b>	
0 - 10	3 (6.3)
11 - 20	9 (18.8)
21 - 30	9 (18.8)
31 - 40	7 (14.6)
41 - 50	10 (20.8)
51 - 60	7 (14.6)
Above 60	3 (6.3)
<b>Smoking History</b>	
Yes	6 (12.5)
No	42 (87.5)
<b>History of Asthma</b>	
Yes	6 (12.5)
No	42 (87.5)
<b>History of prior sinus surgery</b>	
Yes	11 (22.9)
No	37 (77.1)

**Table 1:** Characteristics of study participants.

Disease specific QOL	Preoperative Mean (SD)	Postoperative Mean (SD)	Mean Change	P-value
SNOT 22 Overall	40.81 (15.30)	5.38 (7.23)	35.43 (8.07)	< 0.005
Rhinologic Symptoms	13.04 (5.19)	1.37 (2.21)	11.67 (2.98)	< 0.005
Extra-nasal symptoms	5.62 (2.76)	0.94 (1.63)	4.68 (1.13)	< 0.005
Ear/Facial symptoms	4.75 (3.92)	1.19 (1.47)	3.56 (2.45)	< 0.005
Sleep dysfunction	6.46 (5.80)	0.73 (2.23)	5.73 (3.57)	< 0.005
Psychological dysfunction	10.94 (6.64)	1.14 (2.90)	9.80 (3.74)	< 0.005

**Table 2:** Mean change in QOL after FESS.

### Factors influencing quality of life of patients

Table 3 age and sex were not predictors of poor quality of life as seen in table 3 below but a history of smoking whether past or present, a history of asthma and a history of prior sinus surgery were all seen to predict poor quality of life after FESS.

The odds ratio of smokers was 20% higher than non-smokers to have poor quality of life after FESS; similarly, the odds ratio of asthmatic patients was 20% higher than non-asthmatic patients to have poor quality of life after FESS. This however was not statistically significant.

Almost 22% of these study participants had a history of prior sinus surgery and this was associated with a 13% fold increase in the odds of having a poor QOL after FESS compared to those who had no history of sinus surgery. This finding was found to be statistically significant (p-value of 0.025).

Variable	Unadjusted OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
<b>Age</b>	1.0 (0.9 - 1.0)	0.94	-	-
<b>Sex</b>				
Male	0.78 (0.18 - 3.37)	0.741	-	-
Female	1		-	-
<b>Smoking</b>				
Yes	0.167 (0.027 - 1)	0.054	0.2 (0.02 - 1.74)	0.146
No	1		1	
<b>Asthma</b>				
Yes	0.167 (0.027 - 1)	0.054	0.2 (0.02 - 1.74)	0.146
No	1		1	
<b>Prior Surgery</b>				
Yes	0.145 (0.03 - 0.7)	0.017	0.13 (0.02 - 0.78)	0.025
No	1		1	

**Table 3:** Predictors influencing quality of life.

### Discussion

Quality of life assessment allows doctors to understand better how a disease affects patient’s everyday life and improve overall treatment results. There are multiple instruments used to assess this but in this study SNOT-22 instrument was used to assess the quality of life of patients with chronic rhino-sinusitis, with or without polyposis, before and after functional endoscopic sinus surgery.

This questionnaire has been widely used and referred to as the best instrument by many.

In this study, among 48 participants, 29 patients were female and 19 were male and hence female gender was found to be dominant (60.4%). This is comparable with the study conducted at the Federal University of Parana whereby with 34 patients studied, 21 patients were female and 13 were male [9]. The mean age of this study population was 35 years, which was close with other previous studies [5,8,9].

In the pre-operative period the SNOT-22 scores were seen to be higher and then reduced significantly in the early post-operative period. The mean preoperative score was 40.81 and the mean postoperative score was 5.38. FESS significantly reduced the mean score of all items in the SNOT-22 questionnaire in this study. M Junaid., *et al.* [6] also showed significant improvement in the mean scores after FESS from 52.31 in SNOT-22 before surgery to 13.69 1 month after surgery.

In another study, the mean score of the patient’s quality of life was 26.67 before the surgery and 4.82 six months after the surgery [12]. Similarly, M. Musavi., *et al.* [14] who had 59 patients that were followed up for a year showed that the mean preoperative score was 59.38 and the mean postoperative score was 24.01.

Furthermore, all domains of SNOT-22 showed improvement of the QOL after FESS but rhinologic symptoms had the greatest profit with mean change of 35.43. The psychological domain followed this in our study with the mean change of 9.80. This finding is comparable with the results of other studies [11]. When observing the preoperative mean scores rhinologic domain was also seen with the highest findings followed with psychological domain and V. Nyaiteera similarly finds this [1].

This study revealed that prior history of sinus surgery was a predictive factor for the quality of life of these patients after surgery. These findings agree with results from Laabasi., *et al.* who reported that a prior sinus surgery is thought to predict a poor prognosis after FESS [11]. Hence prior sinus surgery can be used as a predictor of quality of life in these patients. This result suggests that the first surgery is extremely important and is the key to the greater improvement of these patients. Multiple surgeries can pose a challenge and increase the risk of complications that will ultimately result in a poor improvement of patients.

As noted in this study, asthma status and smoking history showed no significant relationship with the quality of life of the patients. Tobacco smoking however is considered an important negative prognostic factor for CRS. Many authors including V. Nyaiteera [1] reported that there is an increase in the odds of having a poor QOL in patients with smoking history compared to those that had never smoked before.

However due to having a small number of participants in the study and even fewer patients with history of the predictor factors being evaluated such as having only 6 patients with history of smoking, and only 6 patients with a history of Asthma, it is possible that the findings observed in this study were limited and further studies should be performed that includes a larger participant size.

## Conclusion

FESS is an extremely effective treatment of CRS if done by a skilled surgeon. Patient-based outcome measures, such as the SNOT-22, are helpful tools for quantifying changes in symptoms and can be used to predict extent of post-operative improvement.

Multiple studies worldwide have reported excellent results with overall improvement postoperatively after Functional Endoscopic Surgery in the short term in spite of the generally extensive surgery needed by most of our patients.

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## Conflicts of Interest

I declare no conflict of interest.

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16. Sino-Nasal Outcome Test ( Snot-22 ) Copyright Notice Washington University grants permission to use and reproduce the SNOT-22 as it appears in the PDF available here without modification or editing of any kind solely for end user use in investigating rhin (2006).

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