

POST-OPERATIVE OUTCOMES OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY USING SINONASAL OUTCOME TEST (SNOT-22) - AN OBSERVATIONAL STUDY

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Abstract

Background: Chronic rhinosinusitis (CRS) is characterized by prolonged irritation of the nasal mucosa lasting 12 weeks or more. Endoscopic sinus surgery (FESS) is the main treatment for inflammatory and infectious paranasal sinus illnesses such as chronic rhinosinusitis. Most chronic rhinosinusitis patients who have FESS surgery report a quality-of-life improvement. The 22-Item Sino Nasal Outcome Test (SNOT-22) (2009) is the most widely used and best sinus-specific QOL instrument. This study examines the physical, functional, and emotional effects of CRS on FESS patients. The aim is to assess post-operative outcomes of Functional endoscopic sinus surgery using Sino nasal outcome test (SNOT-22). **Materials and Methods:** 50 patients who were affected from chronic rhinosinusitis with or without sino-nasal polyposis and underwent Functional endoscopic sinus surgery (FESS) were selected for a retrospective study, attending the Department of ENT, ACSR Government Medical College and Hospital, Nellore, Andhra Pradesh between March 2023 and November 2023. **Result:** The study population was predominantly male (56%) and aged 21-30 years, with hypertension (34%) and diabetes mellitus (24%) being the most common comorbidities, with 48% of participants suffering from these conditions. 30% had nasal polyps. 80% of the participants had allergies. 72% never underwent Endoscopic Sinus Surgery (ESS), while 28% had prior FESS. The preoperative SNOT-22 scores were significantly lower than postoperatively. The average SNOT-22 score in the preoperative period was 51.60 ± 15.53 , while in the postoperative period, it declined to 9.24 ± 5.22 . The mean percentage of relative improvement in the preoperative SNOT-22 scores was 75.36 ± 8.56 , 86.66 ± 18.56 , 83.76 ± 10.96 , 93.11 ± 9.79 , and 93.22 ± 9.79 for Nasal, Ear / Facial, Sleep, Function, and Emotion domains, respectively. The mean percentage of overall improvement in the preoperative SNOT-22 score was 82.08 ± 6.87 , ranging from 60% to 93.8%. **Conclusion:** The mean age of the study population was 37.80 ± 13.70 years, ranging from 17 to 58 years. Most of the study participants were in the age group of 21 to 30 years, 26% were in the age group of above 50 years and 20% were between 41- 50 years. Majority of them are males (56%) and rest 44% were females. The duration of complaints ranged from 3 months to 10 months with a mean of 6.90 months (S.D = 1.91). Almost half of the study participants (48%) were suffering with comorbidities. Hypertension (34%) was the most common noted comorbid illness. And second commonest comorbidity was Diabetes mellitus (24%).

INTRODUCTION

Chronic rhinosinusitis (CRS) is a persistent inflammation of the sinus mucosa, causing symptoms lasting for 12 weeks or longer. The exact cause is unknown but is likely due to multiple general host

factors, local host factors, and environmental factors. Common conditions that predispose patients to CRS include allergic and non-allergic rhinitis, nasal polyps, and occasionally anatomic factors like a deviated nasal septum.^[1]

According to estimates, 134 million people in India have CRS, which includes at least two symptoms:

nasal obstruction (81-95%), facial congestion/pressure/fullness (70-85%), discolored nasal discharge (51-33%), and hyposmia/anosmia (61-69%). CRS has a higher impact on everyday functioning and health-related quality of life than other debilitating conditions such as coronary heart disease or chronic lung disease, posing a high-cost burden to society and affected patients. It can be managed either by medical or surgical methods. Medical modalities of therapy include nasal steroids in high doses, saline nasal irrigation, long-term antibiotic therapy, and systemic steroids. Historically, established surgical techniques advocated for CRS include Antral lavage, Caldwell Luc procedure, intranasal polypectomy, external ortrans-antral ethmoidectomy, and external frontal sinus surgery based on the sinuses involved.^[2]

The nasal telescope, developed in the 1950s, has greatly transformed the evaluation and treatment of CRS. It provides a view of the structures in the nose and paranasal sinus passages and is used in operating rooms and may be carried out as an outpatient procedure while local anesthesia is being used.^[3]

Functional endoscopic sinus surgery (FESS) is the standard procedure for treating inflammatory and infectious paranasal sinus diseases, including CRS, only when all other non-surgical options do not respond. FESS is advised to treat CRS to clear away any anatomical impediments to adequate mucosal drainage.^[4]

Numerous assessment tools have been developed to measure the Quality of Life (QOL) in patients with chronic rhinosinusitis, including the 22-Item Sino Nasal Outcome Test (SNOT-22) (2009). Each item quantifies symptoms severity from 0 (no problem) to 5 (worst symptom), with higher scores indicating worse quality of life.^[5] This study aims to study the postoperative outcomes of patients undergoing FESS in terms of physical problems, functional limitations, and emotional consequences of CRS and compare the QOL among these patients before and after undergoing FESS.

MATERIALS AND METHODS

A sample of 50 who are affected from chronic rhinosinusitis with or without sino-nasal polyposis and scheduled to undergo Functional endoscopic sinus surgery (FESS) patients who attended the allergy clinic in the department of Otorhinolaryngology, ACSR GOVT Medical College, Nellore, Andhra Pradesh were considered for a retrospective, observational, descriptive study during period of MARCH' 2023 to NOVEMBER' 2023. Institution ethics committee approval was obtained before commencing the study. Ethics committee approved consent form and proforma were used.

Inclusion Criteria

Age above 18 years 2. Chronic rhinosinusitis cases that have undergone medical treatment and were

found to be resistant to at least six weeks of medical treatment, including the administration of a broad-spectrum systemic antibiotic from an allergy clinic for two weeks and a minimum seven-day course of systemic corticosteroid. 3. Patients who accepted to give consent to participate in the study.

Exclusion Criteria

1. Septal deviation without sinusitis
2. Invasive fungal disease
3. Lack of minimum 3-month follow-up after ESS
4. Patients who chose medical therapy over sinus surgery
5. Systemic granulomatous diseases (e.g., tuberculosis, rhinosporidiosis)
6. Cystic fibrosis
7. Ciliary dyskinesia
8. Preoperative SNOT-22 score 0-9.

The study involved participants completing a SNOT 22 questionnaire using a 0-5 scale, with 24-hour assistance provided. A rigid nasal endoscopy was performed to assess the nasal cavity before and after surgery. Post-operatively, participants were asked to fill the questionnaire and undergo a repeat office endoscopy. The percentage of relative improvement for each preoperative SNOT-22 was calculated using a formula. The proportion of patients achieving a SNOT-22 MCID of at least nine-point improvement and the percentage of relative improvement for each preoperative SNOT-22 group were also calculated. The study aimed to evaluate the effectiveness of nasal surgery.

The Sino Nasal Outcome Test-22 (SNOT-22) is a validated, visual analogue scoring-based standard questionnaire used to assess nasal symptoms. It is grouped into five main domains: Nasal, Ear and Facial, Sleep, Function, and Emotion. The questionnaire has 22 symptoms assessed in order of increasing severity, graded 1 to 5, with a maximum score of 110. The symptoms are classified into mild, moderate, and severe, with 'Mild' ranging from 8-20 inclusive, 'moderate' from 20-50, and 'severe' from 50. A score of less than 8 is considered normal. The questionnaire is completed both pre- operatively and post-operatively.

Statistical Analysis is done by using Microsoft Excel worksheet 2013 and SPSS software for descriptive statistical analysis. Categorical variables were represented as proportions/percentages, and quantitative variables as Mean with SD or Median with IQR. The Shapiro Wilk test was used to determine normality, and Wilcoxon test was used to compare paired samples. P value < 0.05 was considered statistical significance.

RESULTS

The present study was conducted among a convenient sample of 50 patients who attended the allergy clinic in the department of Otorhinolaryngology, who are affected with persistent rhinosinusitis with or without

sino-nasal polyposis and scheduled to undergo Functional endoscopic sinus surgery (FESS).

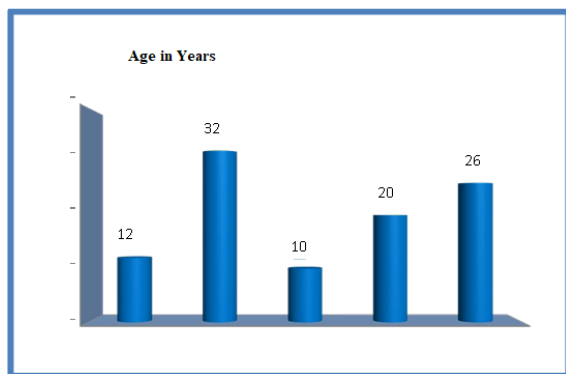


Figure 1: Age distribution of the study participants

The mean age of the study population was 37.80 ± 13.70 years, ranging from 17 to 58 years. As shown in Table 1, most of the study participants were in the age group of 21 to 30 years, 26% were in the age group of above 50 years and 20% were between 41-50 years [Table 1].

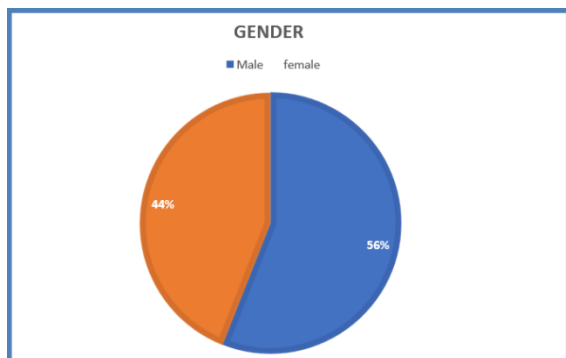


Figure 2:

Of the total 50 study participants, majority of them are males (56%) and rest 44% were females [Table 4]: Distribution of the study population according to comorbidities

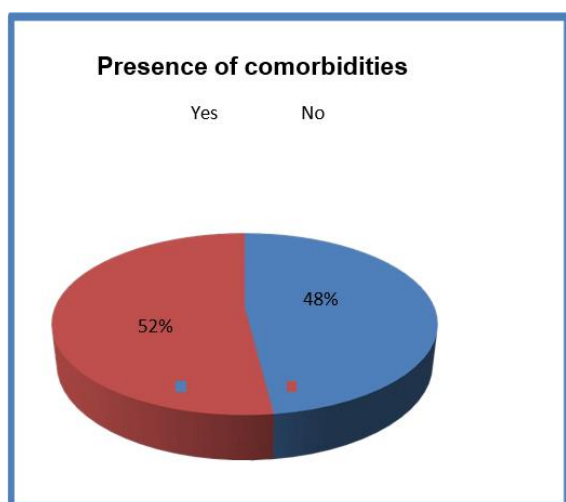


Figure 3:

As shown in [Table 4], almost half of the study participants (48%) were suffering with comorbidities. Among those who were suffering, Hypertension (34%) was the most common noted comorbid illness. And second commonest comorbidity was Diabetes mellitus. It was present in 24% patients. 10% patients had Bronchial asthma. [Table 5]

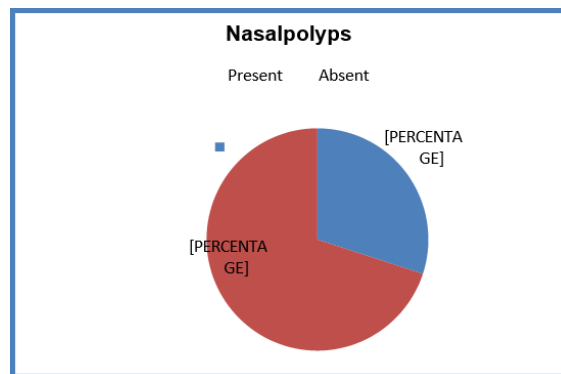


Figure 4: Prevalence of Nasal polyps in the study participants

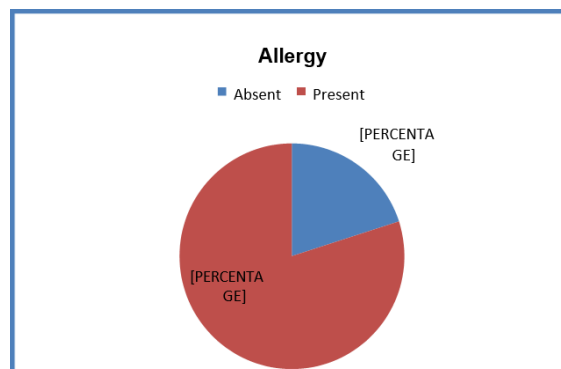


Figure 5: Prevalence of allergy in the study participants

A total of 80% patients had complaints suggestive of associated allergy, like sneezing or urticaria.

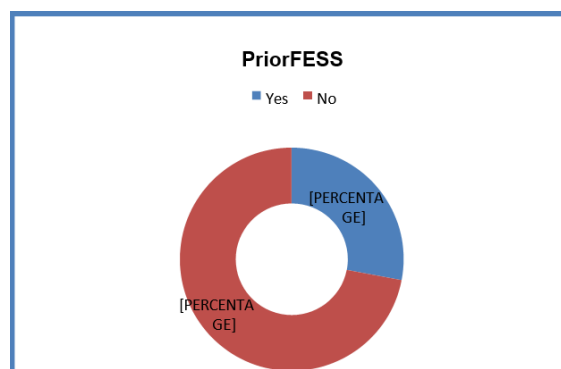


Figure 6: Distribution of the study participants based on prior FESS

As shown in the table 6, Majority (72%) of the study participants never underwent FESS, while remaining 28% had prior FESS. All the study participants were asked to fill the SNOT 22 questionnaire themselves during their clinical visit to allergy clinic both preoperatively and postoperatively after undergoing

FESS. Regarding the symptoms, the study participants answered all of the questions and graded them based on 0–5 scale. The symptoms in the SNOT 22 have been classified into mild, moderate and severe (MMS), with ‘Mild’ being defined as 8-20 inclusive, ‘moderate’ as >20-50 and ‘severe’ as >50. A score of less than 8 is considered normal.

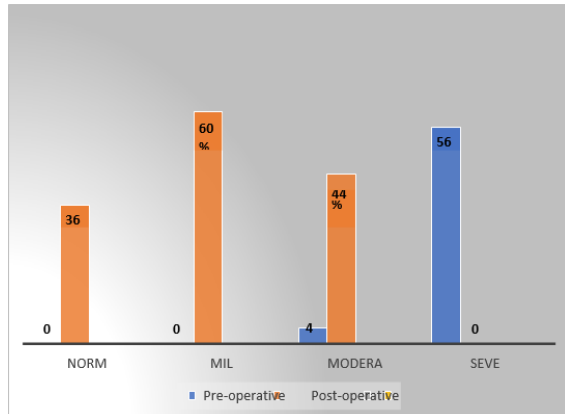


Figure 7:

In the present study, it was observed that among 50 study participants, 44% patients had moderate and 56% patients had severe SNOT-22 Score pre-operatively. After Endoscopic Sinus Surgery (ESS), 36% patients have become normal, 60% patients had mild and 4% patients had moderate SNOT-22 score [Figure 9].

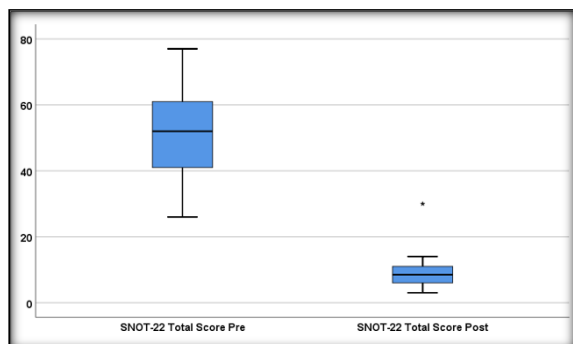


Figure 8: Box plot showing the distribution of total SNOT-22 score in the pre-operative and post-operative period.

Table 10 shows the change in Sino-Nasal Outcome Test 22 scores for the patients with chronic rhinosinusitis after summation of the individual item scores in the SNOT-22 preoperatively and postoperatively. The total average SNOT-22 score in the preoperative period was observed to be 51.60 ± 15.53 , while in the postoperative period total score was remarkably declined to 9.24 ± 5.22 . Wilcoxon test was used to compare the paired samples and this difference was found to be statistically significant with a P value of <0.001 . For the analyses, SNOT-22 questions are grouped into 5 main domains: they are Nasal, Ear and Facial, Sleep, Function and Emotion. The nasal related symptoms were compared separately both preoperatively and postoperatively,

and all of them had a significant decrease after conduction of FESS. This difference was found to be statistically significant with a P value of <0.001 .

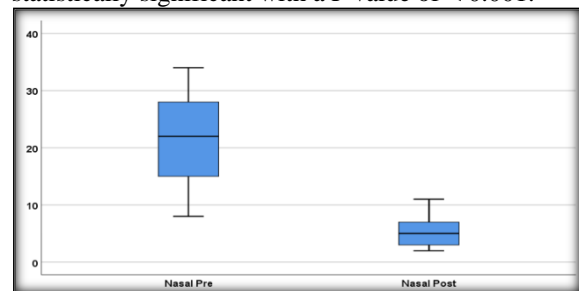


Figure 9: Box plot showing the distribution of nasal related SNOT-22 score in the pre-operative and post-operative period.

After summation of the individual item scores in the specific nasal related SNOT-22 questions preoperatively and postoperatively separately, the mean scores were compared. In the preoperative period, the score was 22.04 ± 6.82 , and it was reduced to 5.40 ± 2.51 after FESS, this difference was found to be statistically significant with a P value of <0.001 .

The Ear / Facial related symptoms were compared individually both preoperatively and postoperatively, and all of them had a significant decrease after conduction of FESS. This difference was found to be statistically significant with a P value of <0.001 .

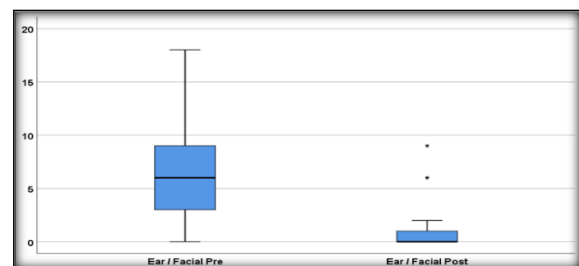


Figure 10: Box plot showing the distribution of Ear/Facial related SNOT-22 score in the pre-operative and post-operative period

After summation of the individual item scores in the specific Ear/Facial related SNOT-22 questions preoperatively and postoperatively separately, the mean scores were compared. In the preoperative period, the score was 7.02 ± 4.48 , and it was reduced to 1.20 ± 2.18 after FESS, this difference was found to be statistically significant with a P value of <0.001 .

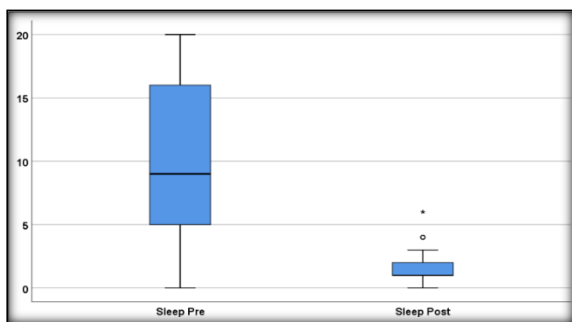


Figure 11: Box plot showing the distribution of Sleep related SNOT-22 score in the pre- operative and post-operative period

The Sleep related symptoms were compared individually both preoperatively and postoperatively, and all of them had a significant decrease after conduction of FESS. This difference was found to be statistically significant with a P value of < 0.001.

After summation of the individual item scores in the specific Sleep related SNOT-22 questions preoperatively and postoperatively separately, the mean scores were compared. In the preoperative period, the score was 10.16 ± 6.28 , and it was reduced to 1.56 ± 1.36 after FESS, this difference was found to be statistically significant with a P value of < 0.001.

The Function related symptoms were compared individually both preoperatively and postoperatively, and all of them had a significant decrease after conduction of FESS. This difference was found to be statistically significant with a P value of < 0.001.

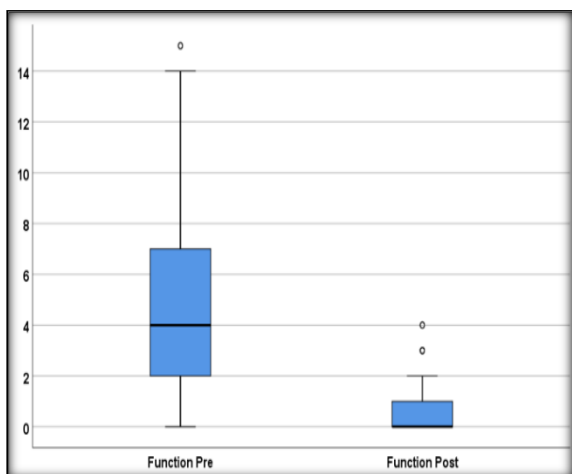


Figure 12: Box plot showing the distribution of Function related SNOT-22 score in the pre- operative and post-operative period

After summation of the individual item scores in the specific Function related SNOT- 22 questions preoperatively and postoperatively separately, the mean scores were compared. In the preoperative period, the score was 5.58 ± 4.40 , and it was reduced to 0.60 ± 1.11 after FESS, this difference was found

to be statistically significant with a P value of < 0.001.

The Emotion related symptoms were compared individually both preoperatively and postoperatively, and all of them had a significant decrease after conduction of FESS. This difference was found to be statistically significant with a P value of < 0.001.

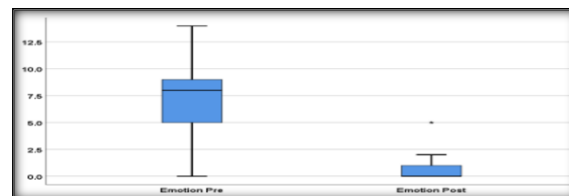


Figure 13: Box plot showing the distribution of Emotion related SNOT-22 score in the pre- operative and post-operative period

After summation of the individual item scores in the specific Emotion related SNOT- 22 questions preoperatively and postoperatively separately, the mean scores were compared. In the preoperative period, the score was 6.8 ± 3.56 , and it was reduced to 0.48 ± 1.09 after FESS, this difference was found to be statistically significant with a P value of < 0.001.

On calculating all the domains in the SNOT-22 questionnaire, the average difference in the scores from preoperative to postoperative period was found to be 42.24 ± 12.97 (Mean \pm SD). Minimal clinically important difference (MCID) has been defined as achieving a SNOT-22 MCID of at least nine-point improvement on comparison of pre- and post-operative scores.

As shown in table 22, all the study participants have shown atleast nine and above points improvement in the SNOT-22 scores after FESS. Hence, there was 100% Minimal clinically important difference (MCID) in the present study, proving the effectiveness of the endoscopic sinus surgery and patient satisfaction in reference to the treatment received.

The percentage of relative improvement for each preoperative SNOT-22 question was calculated using the formula of: $[(\text{Mean postoperative score}) - (\text{Mean preoperative score}) / \text{Mean preoperative score}] \times 100$. As already mentioned for the analyses, SNOT-22 questions are grouped into 5 main domains: they are Nasal, Ear and Facial, Sleep, Function and Emotion. The mean percentage of relative improvement in the preoperative SNOT-22 score was 75.36 ± 8.56 , 86.66 ± 18.56 , 83.76 ± 10.96 , 93.11 ± 9.79 and 93.22 ± 9.79 for Nasal, Ear / Facial, Sleep, Function and Emotion domains, respectively. The emotion domain had the maximum improvement and nasal domain had the least relative improvement in the preoperative score. In the current study, the mean percentage of overall improvement in the preoperative SNOT-22 score was found to be 82.08 ± 6.87 , ranging from 60 to 93.8%.

Table 1: Age distribution of the study participants

Age (in years)	Frequency	Percent
<20	6	12
21-30	16	32
31-40	5	10
41-50	10	20
>50	13	26
Total	50	100

Table 2:

Gender	Frequency	Percent
Male	28	56
Female	22	44
Total	50	100

Table 3:

Co-morbidities	Frequency	Percent
Present	24	48
Absent	26	52
Total	50	100

Table 4:

Co-morbidities	Frequency	Percent
Hypertension	17	34
Diabetes	12	24
Asthma	5	10

Table 5: Prevalence of Nasal polyps in the study participants

Nasal polyps	Frequency	Percent
Present	15	30
Absent	35	70
Total	50	100

Table 6: Prevalence of allergy in the study participants

Allergy	Frequency	Percent
Present	40	80
Absent	10	20
Total	50	100

Table 7: Distribution of the study participants based on prior FESS

Prior FESS	Frequency	Percent
Yes	14	28
No	36	72
Total	50	100

Table 8: Comparison of symptoms in the SNOT-22 between pre-operative and post-operative period

SNOT-22	Pre-operative		Post-operative	
	Frequency	Percent	Frequency	Percent
Normal	0	0	18	36.0
Mild	0	0	30	60.0
Moderate	22	44.0	2	4.0
Severe	28	56.0	0	0.0
Total	50	100.0	50	100.0

Table 9: Comparison of the nasal related symptoms in the pre-operative and post-operative period

Nasal related symptoms	Preoperative				Postoperative				P-value
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	
Need to blow nose	3.7	1.3	4.0	2.0	1.1	0.7	1.0	1.0	<0.001
Sneezing	3.6	1.6	4.0	3.0	1.4	0.7	2.0	1.0	<0.001
Runny nose	2.6	1.9	3.0	4.0	0.9	0.6	1.0	0.3	<0.001
Nasal obstruction	3.9	1.6	5.0	2.0	0.9	0.9	1.0	2.0	<0.001
Loss of smell or taste	1.9	1.9	2.0	3.3	0.3	0.5	0.0	1.0	<0.001
Cough	1.7	1.8	2.0	3.0	0.4	0.7	0.0	1.0	<0.001
Post nasal discharge	2.6	1.6	3.0	2.0	0.2	0.4	0.0	0.0	<0.001
Thick nasal discharge	2.0	1.6	2.0	3.0	0.2	0.5	0.0	0.0	<0.001

Table 10: Comparison of the overall nasal related SNOT-22 score in the pre- operative and post-operative period

Nasal related symptoms	Mean	SD	Median	IQR	P-value
Preoperative	22.04	6.82	22.00	13.00	<0.001
Postoperative	5.40	2.51	5.00	4.00	

Table 11: Comparison of the Ear/Facial related symptoms in the pre-operative and post-operative period

Ear / Facial related symptoms	Preoperative				Postoperative				P- value
	Mean	SD	Media n	IQR	Mea n	SD	Media n	IQR	
Ear fullness	1.8	1.6	2.0	3.0	0.1	0.6	0.0	0.0	<0.001
Dizziness	1.2	1.9	0.0	3.0	0.2	0.5	0.0	0.0	<0.001
Ear pain	1.1	1.6	0.0	2.0	0.3	0.6	0.0	0.0	<0.001
Facial pain/pressure	2.9	1.5	3.0	2.0	0.6	0.9	0.0	1.0	<0.001

Table 12: Comparison of the overall Ear / Facial related SNOT-22 score in the pre- operative and post- operative period

Ear / Facial related symptoms	Mean	SD	Median	IQR	P-value
Preoperative	7.02	4.48	6.00	6.00	<0.001
Postoperative	1.20	2.18	0.00	1.00	

Table 13: Comparison of the Sleep related symptoms in the pre-operative and post- operative period

Sleep related symptoms	Preoperative				Postoperative				P-value
	Mean	SD	Median	IQR	Mean	SD	Media n	IQR	
Difficulty falling asleep	2.8	2.1	3.0	5.0	0.7	0.8	1.0	1.0	<0.001
Waking up at night	2.8	1.8	3.0	3.0	0.3	0.6	0.0	1.0	<0.001
Lack of good night's sleep	2.5	2.2	3.0	5.0	0.4	0.7	0.0	1.0	<0.001
Waking up tired	2.1	1.9	2.0	3.0	0.1	0.4	0.0	0.0	<0.001

Table 14: Comparison of the overall Sleep related SNOT-22 score in the pre-operative and post-operative period

Sleep related symptoms	Mean	SD	Median	IQR	P-value
Preoperative	10.16	6.28	9.00	11.00	<0.001
Postoperative	1.56	1.36	1.00	1.00	

Table 15: Comparison of the Function related symptoms in the pre-operative and post-operative period

Function related symptoms	Preoperative				Postoperative				P value
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	
Fatigue	1.9	1.6	2.0	3.0	0.3	0.6	0.0	0.0	<0.001
Reduced productivity	1.8	1.9	2.0	3.3	0.2	0.5	0.0	0.0	<0.001
Reduced concentration	1.9	1.7	2.0	3.0	0.2	0.5	0.0	0.0	<0.001

Table 16: Comparison of the overall Function related SNOT-22 score in the pre- operative and post-operative period

Function related symptoms	Mean	SD	Median	IQR	P-value
Preoperative	5.58	4.40	4.00	5.25	<0.001
Postoperative	0.60	1.11	0.00	1.00	

Table 17: Comparison of the Emotion related symptoms in the pre-operative and post operative period

Emotion related symptoms	Preoperative				Postoperative				P value
	Mean	SD	Median	IQR	Mean	SD	Median	IQR	
Frustrated/restless/irritable	2.0	1.6	2.5	3.0	0.1	0.3	0.0	0.0	<0.001
Sad	2.5	1.6	3.0	1.3	0.2	0.6	0.0	0.0	<0.001
Embarrassed	2.3	1.9	2.0	4.0	0.2	0.6	0.0	0.0	<0.001

Table 18: Comparison of the overall Emotion related SNOT-22 score in the pre- operative and post-operative period

Emotion related symptoms	Mean	SD	Median	IQR	P-value
Preoperative	6.80	3.56	8.00	4.50	<0.001
Postoperative	0.48	1.09	0.00	1.00	

Table 19: Descriptive statistics of the SNOT-22 score difference in the pre-operative and post-operative period

Variable	Minimum	Maximum	Mean	SD	Median	IQR
SNOT-22 Difference	21	65	42.24	12.97	45.00	21.25

Table 20: Distribution of the SNOT-22 score difference in the pre-operative and post- operative period

SNOT-22 difference	Frequency	Percent
Less than 9 points	0	0
9 and above points	50	100
Total	50	100

Table 21: Percentage of relative improvement in the preoperative SNOT-22 score

% Of Relative Improvement	Mean	SD	Median	IQR
Nasal	75.36	8.56	74.54	10.51
Ear / Facial	86.66	18.56	95.83	20.00
Sleep	83.76	10.96	83.33	13.13
Function	93.11	9.79	100.00	16.67
Emotion	93.22	12.28	100.00	11.11

Table 22: Descriptive statistics of the percentage of relative improvement in the preoperative SNOT-22 score

Variable	Minimum	Maximum	Mean	SD	Median	IQR
Percentage of Improvement	60.0	93.8	82.08	6.87	83.45	7.75

DISCUSSION

Chronic rhinosinusitis significantly impacts quality of life and economic burden, affecting physical and emotional health. Diagnosis relies on symptoms and endoscopic findings. Surgical intervention, such as functional endoscopic sinus surgery (FESS), is considered if symptoms persist or complications arise. This study aimed to evaluate the post-operative outcomes of Functional endoscopic sinus surgery (FESS) on rhinosinusitis patients, including symptoms, social/emotional consequences, and quality of life, using the Sino-nasal Outcome Test-22 (SNOT-22) before and after FESS.^[6]

The study reveals that out of 50 chronically ill patients with sinusitis with or without sino-nasal polyposis, the majority were aged 21-30 years, with 26% over 50.2% being 41-50 years old. This aligns with previous research, which found a mean age of 36.5 years in chronic disease groups. However, DeConde AS et al and Mascarenhas JG found a higher mean age, with participants in the fourth and fifth decades being around 51.0±15 years old and 46.24±13.72 years.

Males predominated. Females (56% versus 44%) in the current study. Other studies support this Singla G et al had 70% men and 30% girls. their Punjab investigation and Bharath M et al, from Bengaluru showed In their Bengaluru sample, 73% were male and 27% female. Another similar study in West Bengal by Chakrabarti A et al and In Charlottesville, Kennedy JL et al,^[8] found that men outnumbered women. females. This may be attributable to male CRS predominance or higher Hospital male attendance.^[7]

A study found that nearly 50% of research participants had comorbidities, with hypertension being the most common (34%). Diabetes was the second most prevalent (24%), and 10% had asthma. Other studies found asthma in 17.6%, 23.5%, and 11.8% of patients, while 28.3% of Nashville patients had asthma, and 40% of Charlottesville patients had asthma.

30% of research participants had nasal Similar to our work, 30% of study participants had nasal polyps. Like our investigation, Yancey KL et al, found nasal polyps in 35.7% of people. In contrast, Krishnaswami B et al found 57% nasal polyps. About 80% of individuals exhibited allergy symptoms including sneezing or urticaria. Only 49% of Charlottesville

study participants had allergies, according to Kennedy JL et al. The majority (72%) of study participants never had FESS. 28% had FESS experience. While Krishnaswami B et al reported 45 of 51 people never had FESS and 2 and 4 did. Patients had FESS once or more times. Former FESS rates are greater in other studies, as in the study.^[8]

By Kennedy JL et al, 30% had FESS once and 32% twice. For multiple times. Yancey KL et al claimed 43.4% of study participants previously FESSed.

The MMS categorization showed 44% of patients have moderate and 56% had severe pre-operative SNOT-22 scores. After endoscopic sinus surgery (ESS), 36% of patients appear normal, 60% patients had mild and 4% moderate SNOT-22 scores. The Chakrabarti study After endoscopic sinus surgery (ESS), 19.4% of patients had normal, 55.6% mild, 19.4% moderate, and 5.6% had severe at 6 weeks, 55.6% had normal, 19.4% had mild, 19.4% moderate, and 5.6% severe at 12 previous study by Bharath M et al. found that at 3 months Postoperatively, 43% had mild, 35% moderate, and 3% moderate. severe, 20% had no disease, and 23% had no disease 6 months postoperatively. mild, 7% moderate, and 70% normal. Symptoms improved significantly after 6 months, indicating Moderate-to-severe illness patients benefit from FESS. Preoperative total average SNOT-22 score.^[9]

The preoperative period showed 51.60 ± 15.53, while the postoperative period showed entire the score significantly decreased to 9.24 ± 5.22, indicating a significant difference. A P value of < 0.001 indicates statistical significance. Results were consistent as reported by further studies showing that SNOT-20 or SNOT-22 surveys, Statistics showed considerable score improvements between evaluations before and after surgery.

In Soler ZM et al.'s systematic review and meta-analysis, of 40 separate research published from 2008 to 2016, Charleston reported all Mean SNOT-22 scores changed significantly in the studies.

Changes in baseline and postoperative time points (P < 0.001) ranged from 12.7 to 44.8, average follow-up 10.6 months. Five key domains of SNOT-22 questions are analyzed.

All domains have nasal, ear-facial, sleep, function, and emotion. exhibited statistically significant decrease after FESS when individually pre- and post-op, difference was and all of them decreased significantly after FESS. (P < 0.001).

The mean percentage of overall improvement in this study was the preoperative SNOT-22 score was 82.08 ± 6.87 , ranging from 60 to 93.8%. Max relative improvement was this mean percentage.

nasal and emotion domains improved least comparing to preop score. The improvement was much greater than in prior research. conducted in India and elsewhere. Laababsi R et al⁴³ from Morocco found that 88.9% of Unilateral CRSsNP (CRS with or without nasal) patients polyposis) and 76.2% of Bilateral CRSsNP patients met MCID. Improvement of 9 points after FESS. The Singla G et al. 44 study discovered that patients with SNOT-22 scores over 30 had almost 90% chance of MCID, and 43.3% improved relative to its preoperative SNOT-22 scores. Nashville's Yancey KL et al reported 73.7 percent of the sample showed clinically meaningful improvements in A postoperative illness burden of MCID ≥ 8.9 , compared to Older patients had the lowest MCID rate. Total SNOT-22 score (66% vs. 69% and 83% for young and middle-aged individuals, However, this difference was not statistically significant research findings may be attributed to geographic and demographic factors. disparities across research populations and significant aged 37.80 ± 13.70 years, spanning 17-58 years, and the majority of the study. participants were 21-30 years old, 26% over 50.

20% were 41-50. This matches past research. declared age incidence, Krishnaswami B et al compared mean age of According to Chakrabarti A et al, the study participants were aged 35.4 ± 14.2 years mean age 36.5 years, range 16-60 years in chronic disease group sinusitis with chronic rhinitis and polyps, 29.7 years, 16-58. Years with chronic sinusitis and rhinitis without polyps.

However, DeConde AS et al and Mascarenhas JG 46 found a higher mean age. Participants in the fourth and fifth decades were around 51.0 ± 15 years old and 46.24 ± 13.72 years.

Males predominated. Females (56% versus 44%) in the current study. Other studies support this. Singla G et al had 70% men and 30% girls.

In Charlottesville, Kennedy JL et al found that men outnumbered women. females. This may be attributable to male CRS predominance or higher Hospital male attendance.^[10]

CONCLUSION

In the prospective observational study conducted among 50 patients suffering from chronic rhinosinusitis with or without sino-nasal polyposis and scheduled to undergo Functional endoscopic sinus surgery (FESS) in the Department of Otorhinolaryngology, Maharajah's Institute of Medical Sciences, Nellimarla, Vizianagaram district, Andhra Pradesh, the key findings of the present study are as follows:

The mean age of the study population was 37.80 ± 13.70 years, ranging from 17 to 58 years. Most of the

study participants were in the age group of 21 to 30 years, 26% were in the age group of above 50 years and 20% were between 41- 50 years. Majority of them are males (56%) and rest 44% were females. The duration of complaints ranged from 3 months to 10 months with a mean of 6.90 months (S.D = 1.91). Almost half of the study participants (48%) were suffering with comorbidities. Hypertension (34%) was the most common noted comorbid illness. And second commonest comorbidity was Diabetes mellitus (24%).

Among the study participants, 30% individuals were found to have nasal polyps. A total of 80% patients had complaints suggestive of associated allergy, like sneezing or urticaria.

Majority (72%) of the study participants never underwent FESS, while remaining 28% had prior FESS.

Preoperatively, 44% patients had moderate and 56% patients had severe SNOT- 22 scores.

After Endoscopic Sinus Surgery (ESS), 36% patients have become normal, 60% patients had mild and 4% patients had moderate SNOT-22 score.

The total average SNOT-22 score in the preoperative period was observed to be 51.60 ± 15.53 , while in the postoperative period total score was remarkably declined to 9.24 ± 5.22 . Wilcoxon test was used to compare the paired samples and this difference was found to be statistically significant with a P value of < 0.001 .

In the preoperative period, the individual item scores in the specific nasal related SNOT-22 questions score were 22.04 ± 6.82 , and it was reduced to 5.40 ± 2.51 after FESS, this difference was found to be statistically significant with a P value of < 0.001 .

Ear/Facial related SNOT-22 questions scores were found to be 7.02 ± 4.48 preoperatively, and it was reduced to 1.20 ± 2.18 after FESS, this difference was found to be statistically significant with a P value of < 0.001 .

In the preoperative period, the individual item scores in the specific sleep related SNOT-22 questions, the score was 10.16 ± 6.28 , and it was reduced to 1.56 ± 1.36 after FESS, this difference was found to be statistically significant with a P value of < 0.001 .

Function related SNOT-22 questions scores were found to be 5.58 ± 4.40 preoperatively, and it was reduced to 0.60 ± 1.11 after FESS, this difference was found to be statistically significant with a P value of < 0.001 .

In the preoperative period, the individual item scores in the specific emotion related SNOT-22 questions, the score was 6.8 ± 3.56 , and it was reduced to 0.5948 ± 1.09 after FESS, this difference was found to be statistically significant with a P value of < 0.001 .

On calculating all the domains in the SNOT-22 questionnaire, the average difference in the scores from preoperative to postoperative period was found to be 42.24 ± 12.97 (Mean \pm SD).

All the study participants have shown atleast nine and above points improvement in the SNOT-22 scores after FESS. Hence, there was 100% Minimal

clinically important difference (MCID) in the present study, proving the effectiveness of the endoscopic sinus surgery and patient satisfaction in reference to the treatment received.

The mean percentage of relative improvement in the preoperative SNOT-22 score was 75.36 ± 8.56 , 86.66 ± 18.56 , 83.76 ± 10.96 , 93.11 ± 9.79 and 93.22 ± 9.79 for Nasal, Ear / Facial, Sleep, Function and Emotion domains, respectively. The emotion domain had the maximum improvement and nasal domain had the least relative improvement in the preoperative score. In the current study, the mean percentage of overall improvement in the preoperative SNOT-22 score was found to be 82.08 ± 6.87 , ranging from 60% to 93.8%.

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