

Original Article

Assessment of Improvement After Endoscopic Sinus Surgery by Sino-Nasal Outcome Test (SNOT-22) in Patients with Chronic Rhino-sinusitis with and without Polyp

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ABSTRACT

Introduction: Chronic Rhinosinusitis is one of the leading causes of disability and economic burden. Endoscopic Sinus Surgery plays a very important role in the management of Chronic Rhinosinusitis. Sino-Nasal Outcome Test (SNOT-22) is the most widely used tool for assessment of improvement following Endoscopic Sinus Surgery in patients with Chronic Rhinosinusitis. It can help understand the effects and outcomes of sinus surgery with a greater focus on the patient's perspective.

Aim of the study: The study aimed to find out the post-surgical (Endoscopic Sinus Surgery) improvement in

patients with CRS. **Methods:** This prospective observational study was conducted at the Department of ENT and Head-Neck Surgery, Combined Military Hospital, Dhaka, Bangladesh. The study duration was from 1st July 2019 to 30th June 2020 for 1 year. A total of 100 patients were randomly selected from those who had Chronic Rhino-Sinusitis (CRS) with or without the presence of Polyps. **Result:** Mean age of the patient was 37.02±9.768 years. The majority (39%) were found between 30-40 years of age. The mean age is consistent with other studies. Female patients (62%) were predominant in this study. Male: Female patient ratio was 1:1.6. Majority (76%) of the patients were from an urban area with Housewife (50%) being the most common occupation. 36% of them were educated to the level of at least HSC, 59% were SSC qualified and only 1% were illiterate. 57% of cases were diagnosed as a case of Chronic Rhinosinusitis with polyp and the rest were as Chronic Rhinosinusitis without polyp (43%). Quality of life according to SNOT-22 parameters had significant improvement at both 1-month and 3-month follow-ups. **Conclusion:** Endoscopic Sinus Surgery plays a very important role in the management of

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Chronic Rhinosinusitis. Sino-Nasal Outcome Test (SNOT-22) is the most widely used tool for assessment of improvement following Endoscopic Sinus Surgery in patients with Chronic Rhinosinusitis. Overall there was significant improvement in patients in this study. Almost all parameters of SNOT-22 also showed significant changes. There are also almost similar improvements in patients of CRS with and without polyp.

Keywords: Sinus, Chronic Rhinosinusitis (CRS), Surgery, Outcome, SNOT-22

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INTRODUCTION

Chronic rhinosinusitis (CRS) is a prevalent and debilitating disorder that affects at least 11% of the world's population^[1] and imposes a considerable economic cost on healthcare systems, individuals, and the economy due to lost productivity at work. It is a disease characterized by chronic inflammation of the nose and paranasal sinuses with a high prevalence all over the world. In Bangladesh, it is a very common condition dealt with by Otolaryngologists. It is one of the top reasons for prescribing antibiotics and for reduced worker productivity.^{[3]-[5]} As a disease entity in the UK its prevalence is greater than ischemic heart disease (3.7%), diabetes (4%), chronic obstructive pulmonary disease (1.5%), heart failure (<1%) and stroke (<1%).^[6] Chronic RS (CRS) cases can be divided into two primary groups, those in which nasal polyps are present (CRSwNPs), and those in which they are not present (CRSsNPs). The term chronic rhinosinusitis encompasses all inflammatory processes, infectious or not, affecting the nasal cavity mucosa, producing symptoms that last for over 12 weeks.^{[7],[8]} Based on endoscopic results, it is phenotypically separated into instances with polyps (CRSwNPs) and those without (CRSsNPs).^[9] The European position paper on rhino sinusitis and nasal polyps (EPOS) criteria are used to make the

diagnosis.^{[9],[10]} In addition to nasal endoscopy and/or CT scan, the American Academy of Otorhinolaryngology criteria, the presence of two or more significant symptoms, such as nasal obstruction/congestion/block, anterior or posterior rhinorrhea, hyposmia/anosmia, and facial pain/pressure, lasting for more than 12 weeks, is used to make the CRS diagnosis.^[11] Patients suffering from CRS spend more time at home and their productivity is reduced. They might even require multidisciplinary or psychiatric consultation. So unarguably Quality of Life (QOL) is very important in patients suffering from CRS.^[12] Studies that examine outcomes after CRS have evolved greatly over the last several decades, both in sheer quantity and in methodologic rigour. A recent bibliometric analysis of CRS publications over the last 30 years demonstrated a 600% increase in the number of studies, a shift from retrospective to prospective design, greater use of validated outcome metrics, and an increased proportion of randomized clinical trials (RCTs).^[13] Sino-Nasal Outcome Test (SNOT-22) is one such method developed by Washington University as a questionnaire-based tool to measure the outcome of CRS treatment. In this study, SNOT-22 has been used both pre and post-operatively to compare the outcome of Endoscopic Sinus Surgery

(ESS) using prospectively collected data in a single surgeon series. Patients were reviewed preoperatively, 1 month and 3 months following ESS. It included a total of 100 patients who had presented with CRS in the Otolaryngology Department of Combined Military Hospital (CMH), Dhaka. The objective of the study was to find out the post-surgical (Endoscopic Sinus Surgery) improvement in patients with CRS by SNOT-22.

METHODS

This prospective observational study was conducted at the Department of ENT and Head-Neck Surgery, Combined Military Hospital, Dhaka, Bangladesh. The study duration was from 1st July 2019 to 30th June 2020 for 1 year. A total of 100 patients were randomly selected from those who had Chronic Rhino-Sinusitis (CRS) with or without the presence of Polyps. The initial sample size was 150, but following the inclusion and exclusion criteria and lost patients at follow-up, the final sample size was 100. Chronic Rhinosinusitis was defined as prolonged rhinosinusitis for over 3 months. Patients aged 18-60 years having CRS with or without polyp and also wanted to participate in the study were included. All malignant cases were excluded from the study. Sino-Nasal Outcome Test (SNOT-22) was done among all participants, and the responses were collected in the pre-prepared questionnaire, along with other necessary variables. Informed written consent was obtained from each of the participants before their data collection, and ethical approval was obtained from the ethical review committee of the study hospital. Following data collection entered into a spreadsheet of Microsoft Excel 2010 data entry platform. The entered data was then assessed for completeness, accuracy and consistency before analysis was commenced. Data

analysis was carried out by using SPSS version 20. Exploratory data analysis was carried out to describe the study population where categorical variables were summarized using frequency tables while continuous variables were summarized using measures of central tendency and dispersion such as mean, median, percentiles and standard deviation. Significance was determined with a 95% confidence interval (P-Value <0.05)

RESULTS

Table 1: Distribution of the participants by physical characteristics (N=100)

Characteristics	n	%
Age range		
18-30 years	31	31%
31-40 years	39	39%
41-50 years	18	18%
51-60 years	12	12%
Gender		
Male	38	38%
Female	62	62%
Occupation		
Govt. Service	30	30%
Non Govt. Services	8	8%
Businessmen	2	2%
Farmer	5	5%
Housewife	50	50%
Student	3	3%
Unemployed	2	2%
Residence		
Urban	76	76%
Rural	24	24%
Marital Status		
Married	74	74%
Unmarried	22	22%
Widower	3	3%
Widow	1	1%

Among the participants, the majority of the participants (39%) belonged to the

age group of 31-40 years, followed by 31% belonging to the youngest age group of 20-30 years. The mean age of the participants was 37.02±9.768 years. Female prevalence was observed in this study, with a male: female ratio at 1:1.6. Majority of the respondents (50%) were housewives, followed by 30% govt. service workers and 8% non-govt. service workers. 76% of the participants were from urban areas, while only 24% were from rural localities. 74% were married, and 22% were unmarried.

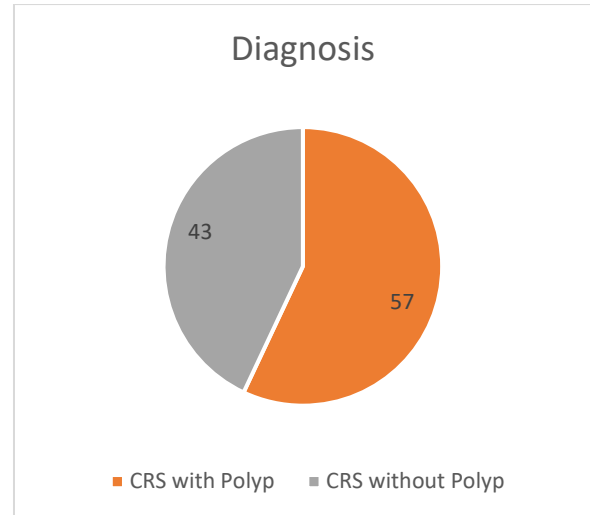


Figure 1: Distribution of the participants by diagnosis (N=100) Among the participants with CRS, the presence of polyps was observed in 57%, while 43% did not have polyps.

Table 2: SNOT-22 Score during different periods of follow-up (N=100)

SNOT-22 Score	Pre Operative	1st Month Post Operative	3rd Month Post Operative
Highest value	101	78	50
Lowest value	19	6	5
Mean	55.39	34.24	21.4
SD	22.61	19.67	11.9

Mean SNOT-22 scores at pre-operative, 1-month post-operative and 3-month post-operative follow-up were 55.39, 34.24 and 21.4 respectively. The highest

value at pre-operative check-up was 101, at 1 month follow up it was 78 and at 3 months it was 50

Table 3: Comparison of Pre-Operative Mean SNOT Scores at Different Follow-ups (N=100)

SNOT-22 Score	Mean difference	95% CI of the difference		P Value*
		Lower	Upper	
Pre Operative Vs. 1st Month	21.15	18.85	23.45	<0.01

Pre Operative Vs. 3rd Month	33.99	30.58	37.4	<0.01
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Mean SNOT-22 scores of pre-operative findings were compared with 1st-month and 3rd-month follow-ups. The mean difference was 21.15 in 1st month, with

statistical significance, and in the 3rd month, the difference was highly significant with a 33.99 to mean difference with pre-operative

Table 4: Comparison of each parameters of SNOT-22 between pre-operative and 1st month post-operative follows up (N=100)

SNOT-22 Parameter	Mean Difference	95% CI of the difference		P Value
		Lower	Upper	
Need to blow nose	2.3	0.79	3.81	0.0073
Nasal Blockage	1.9	0.34	3.46	0.0224
Sneezing	1.9	0.76	3.04	0.0044
Runny nose	0.9	-0.38	2.18	0.1467
Cough	1.5	0.27	2.73	0.022
Post-nasal discharge	2	0.74	3.26	0.0059
Thick nasal discharge	0.9	-0.66	2.46	0.2247
Ear fullness	1.4	-0.31	1.71	0.153
Dizziness	0.7	-0.37	1.77	0.1727
Ear pain	1.2	0.04	2.36	0.0438
Facial pain/pressure	0.7	-0.2	1.6	0.1108
Decreased Sense of Smell/Taste	0.9	-0.02	1.82	0.0443
Difficulty falling asleep	0.6	-0.17	1.37	0.1114
Wake up at night	0.4	-0.44	1.24	0.3092
Lack of a good night's sleep	0.9	0.19	1.61	0.0187
Wake up tired	1.2	0.2	2.2	0.0239
Fatigue	0.9	-0.08	1.88	0.0476
Reduced productivity	1.1	0.12	2.08	0.0318
Reduced concentration	1	-0.07	2.07	0.0429
Frustrated/restless/irritable	0.5	-0.27	1.27	0.1773
Sad	1.1	-0.39	2.59	0.1286
Embarrassed	2.8	1.64	3.96	0.0004

The mean values of different SNOT-22 parameters at 1-month follow-up after surgery were compared with pre-operative values, and a significant decrease was observed in parameters such as needing to blow nose, nasal

blockage, sneezing, cough, post-nasal discharge, ear pain, decreased sense of smell/taste, lack of a good night's sleep, fatigue, waking up tired, reduced productivity and concentration, as well as feeling embarrassed.

Table 5: Comparison of each parameter of SNOT-22 between pre-operative and 3rd-month post-operative follow-up (N=100)

SNOT-22 Score	Mean Difference	95% CI of the difference		P Value
		Lower	Upper	
Need to blow nose	2.4	0.88	3.92	0.0059
Nasal Blockage	2.8	1.5	4.1	0.0009
Sneezing	2.2	0.99	3.41	0.0026
Runny nose	1.2	0.04	2.36	0.0438
Cough	2.3	1.13	3.47	0.0016
Post-nasal discharge	2.5	1.27	3.73	0.0013
Thick nasal discharge	1.5	0.06	2.94	0.0429
Ear fullness	1.4	0.38	2.42	0.0128
Dizziness	0.8	-0.31	1.91	0.1369
Ear pain	2.1	1.01	3.19	0.0018
Facial pain/pressure	1.4	0.43	2.37	0.0095
Decreased Sense of Smell/Taste	2.1	1.18	3.02	0.0006
Difficulty falling asleep	1.2	0.39	2.01	0.0086
Wake up at night	0.6	-0.8	2	0.3572
Lack of a good night's sleep	1.5	0.73	2.27	0.0017
Wake up tired	1.3	0.04	2.56	0.045
Fatigue	1.4	0.38	2.42	0.0128
Reduced productivity	1.3	0.23	2.37	0.0224
Reduced concentration	1.3	0.29	1.31	0.0176
Frustrated/restless/irritable	0.5	-0.27	1.27	0.1773
Sad	1.8	0.42	3.18	0.0163
Embarrassed	3.1	2.01	4.19	0.0001

The mean values of different SNOT-22 parameters at 3-month follow-up after surgery were compared with pre-operative values. Here it was observed

that almost all parameters excluding dizziness, waking up at night and restlessness had a significant decrease from pre-operative values.

Table 6: Comparison of Pre-Operative Mean SNOT Scores at Different Follow-ups in patients with Chronic Rhinosinusitis with Polyp (n=57)

SNOT-22 Score	Mean difference	95% CI of the difference		P Value*
		Lower	Upper	
Pre Operative Vs. 1st Month	21.61	18.6	24.63	<0.01
Pre Operative	34.58	30.19	38.97	<0.01

Vs. 3rd Month				
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Among the 57 patients who had CRS with the presence of polyps, the mean difference between pre-operative and 1-month follow-up of SNOT-22 score was

highly significant. Similar significance was observed between pre-operative and 3-month follow-up as well.

Table 7: Comparison of Pre-Operative Mean SNOT Scores at Different Follow-ups in patients with Chronic Rhinosinusitis without Polyp (n=43)

SNOT-22 Score	Mean difference	95% CI of the difference		P Value*
		Lower	Upper	
Pre Operative Vs. 1st Month	20.53	16.85	24.22	<0.01
Pre Operative Vs. 3rd Month	33.21	27.64	38.78	<0.01

Overall pre-operative SNOT-22 scoring was compared for the 43 participants who had CRS without polyp, with 1st-month and 3rd-month post-operative follow-ups, and the mean difference was measured. The mean difference between pre-operative and 1st-month follow-up was highly significant, as was the mean difference between pre-operative and 3rd-month follow-up.

DISCUSSION

Chronic rhinosinusitis is a multifactorial morbid condition that has a direct impact on an individual's quality of life. [14] The primary objective of chronic rhinosinusitis care is to eliminate or lessen symptoms, hence improving patients' quality of life. Endoscopic sinus surgery has now been the gold standard surgical intervention for patients who failed to respond to medical therapy.[15],[16] To clearly understand the outcome after such surgeries, clinicians focused on the

subjective assessment of the disease among patients.[17] Several disease-specific questionnaires exist for this purpose, among which, the Sino-nasal outcomes Test (SNOT-22) is the most widely used and validated questionnaire.[18],[19] The assessment of the present study outcomes was also conducted following SNOT-22 parameters. In the present study, the mean age of the participants was 37.02 years, and the male: female ratio was 1:1.6, with 62% female prevalence. This high female prevalence was similar to the findings of another study, but the mean age was higher in that study compared to ours.[20] Chronic Rhinosinusitis (CRS) was divided into two broad categories among patients, CRS with polyps, and CRS without polyps. Among the present study participants, polyps were present in 57% of CRS cases, while the remaining 43% did not have polyps. The quality of life of patients was assessed in the

present study using SNOT-22 scores which were higher in the pre-operative period and then reduced significantly in the post-operative period. Mean pre-operative SNOT-22 scores were found to be 55.39 which were reduced to 34.24 and 21.4 in postoperative 1st and 3rd months respectively. The mean difference of SNOT-22 score pre-operative vs 1st-month post-operative and pre-operative vs 3rd-month post-operative was 21.15 and 33.99 respectively. In both cases, the p-value was less than 0.01 which was statistically significant. These data were also supported by the findings of other studies of similar nature.^{[21]-[23]} Regarding the individual parameter of SNOT-22, change in most of the parameters was statistically significant at 1-month follow-up, while at 3-month follow-up, all but 3 parameters showed significant improvement. These 3 parameters were dizziness, waking up at night and irritability. Among the 100 cases, 57 cases were diagnosed with Chronic Rhinosinusitis with Polyp. The mean difference of SNOT-22 score pre-operative vs 1st month and pre-operative vs 3rd month was 21.61 and 34.58 respectively. In both cases, the p-value was less than 0.01 which was statistically significant. Among the 43 cases that were diagnosed as Chronic Rhinosinusitis with Polyps, the mean difference of SNOT-22 score pre-operative vs 1st month and pre-operative vs 3rd month was 20.53 and 33.21 respectively. In both cases, the difference was statistically significant with a p-value was less than 0.01. The main limitation of the study was that it was conducted in a single centre with small sample size.

CONCLUSION

Endoscopic Sinus Surgery plays a very important role in the management of Chronic Rhinosinusitis. Sino-Nasal

Outcome Test (SNOT-22) is the most widely used tool for assessment of improvement following Endoscopic Sinus Surgery in patients with Chronic Rhinosinusitis. Overall there was a significant improvement in patients in this study. Almost all parameters of SNOT-22 also showed significant changes. There are also almost similar improvements in patients of CRS with and without polyp.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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