A Study of SNOT 22 Scores in Adults with no Sinonasal Disease

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Abstract: *Objective:* To identify a normal SNOT-22 score in subjects not known to be suffering from rhino-sinusitis in India.

Study design: Analysis of SNOT 22 scores in participants with no sinonasal disease.

Setting: Tertiary care hospital in Central India.

Participants: 230 participants from medical institution.

Results: Results were obtained from 97 men and 133 women with a mean age of 21 (range 18-24). SNOT scores ranged from 0–35 with a mean score of 8.09. The mode was 0 and the median score 7.

Conclusion: Due to the skewed nature of the data, the median score (7) is taken as the normal SNOT 22 score. It is recommended that in a clinical situation a SNOT 22 score of 7 be used as a guide for ''normal'', and that caution be exercised when suggesting treatment to patients with a score below 7. It appears feasible that this test be applied pre and post operatively for appropriate selection and judging the outcome respectively.

Keywords: SNOT-22, SNOT, Chronic rhinosinusitis (CRS).

BACKGROUND

Chronic rhino sinusitis (CRS) is a common medical condition of a multi-factorial origin that can severely affect the quality of life (QoL). It poses a considerable burden to health care providers and the patients. In this respect, it is comparable to diabetes and heart disease [1, 2].

Affecting 15% of the grown-up US population; it is the most common chronic disease in the US [3]. The Indian National Institute of Allergy and Infectious Diseases' (NIAID) estimates 134 million Indians- CRS. Treatment is often symptomatic and may lead to repeated surgeries and lifelong nasal steroids.

Often there is difference between occurrence of symptoms and development of disease. Not all the symptoms can be precisely defined by the patients. Hence a need arises for a quantifiable scale for nasal symptoms as is the VAS (visual analog scale) for pain. The European position paper on rhinosinusitis and nasal polyps recommends the subjective assessment of symptoms using validated questionnaires [4]. A correct diagnosis and staging for treatment is very much the need of the hour. Research on QoL is gaining more weight within otolaryngology. The use of a reliable outcome measure is a must in such research. Hence a need arises for a simple, reliable, system-specific standardized outcome measure that can help us explore CRS in a more uniform way, measure patient's QoL and prevent inappropriate surgery. This has led to the development of a number of CRS-specific assessment tools that are as follows:

SF36: Medical Outcomes Study Short-Form 36- Item Health Survey. Hays *et al* Boston, 1992.

RSOM-31: RhinoSinusitis Outcome Measurement Piccirilo *et al*. Missouri. 1995.

RSUI: Rhinitis Symptom Utility Index. Bethesda, USA 1998

RQLQ: Rhinitis Quality of Life Questionnaire Juniper Ef *et al*. Canada. 1999.

SNOT-16: Sino-Nasal Outcome Test. Anderson. USA. 1999.

SNOT-1: Sino-Nasal Outcome Test. Fahmy, Surrey, UK. 2000

SN-5: Sinus and Nasal Quality of Life Survey (pediatrics). David kay *et al*. Colarado. 2001

SNOT-11: Sino-Nasal Outcome Test. Fahmy, Surrey, UK. 2000

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SNOT-20: Sino-Nasal Outcome Test. Piccirilo. Missouri. 2002

SNAQ-11: SinoNasal Assessment Questionnaire, Surrey. UK 2002.

NOSE: Nasal Obstruction Symptom Evaluation. AAO-HNS. 2004

CQ7: Congestion Quantifier seven-item test. Bethesda, USA. 2007

SNOT-20 GAV: Sino-Nasal Outcome Test-20 German. 2008

CQ5: Congestion Quantifier five-item test. London. 2010

SNOT-20 and SNOT-22 are validated patient-reported measures of symptom severity and health-related QoL in sinonasal conditions [5, 6]. SNOT-22 (2009) is a modified version of SNOT-20 and RSOM-31.The SNOT-22 is the latest version of the SNOT Questionnaires and is based on the SNOT 20, but with the removal of the importance rating and the addition of two questions related to symptoms of nasal blockage and loss of sense of smell. SNOT-22 covers the physical problems, functional limitations and also the emotional consequences of patients suffering from CRS [7]. The SNOT-22 has already been adopted by many clinicians both for the assessment of CRS and also for evaluating the outcome of treatment of nasal polyposis [8] and in nasal septal surgery [9]. *Morley AD, Sharp HR et al.* [10] analysed indices on reliability, validity and responsiveness and concluded that SNOT can be applied as a tool for QoL. *Hopkins C, Gillett S, Slack R, Lund VJ, Browne JP* [11] concluded that SNOT significantly discriminated between healthy and

Sino-Nasal Outcome Test-22 Questionnaire v4

Below you will find a list of symptoms and social/emotional consequences of your nasal disorder. We would like to know more about these problems and would appreciate you answering the following question to the best of your ability. There are no right or wrong answers, and only you can provide us with this information. Please rate your problems, as they have been over the past two weeks. Thank you for your participation.

Considering how severe the problem is when you experience it and how frequently it happens, please rate each item below on how 'bad' it is by circling the number that corresponds with how you feel using this scale →	No problem	Very mild problem	Mild or slight problem	Moderate problem	Severe problem	Problem as bad as it can be
1. Need to blow nose	0	1	2	3	4	5
2. Sneezing	0	1	2	3	4	5
3. Runny nose	0	1	2	3	4	5
4. Cough	0	1	2	3	4	5
5. Post nasal discharge (dripping at the back of your nose)	0	1	2	3	4	5
6. Thick nasal discharge	0	1	2	3	4	5
7. Ear fullness	0	1	2	3	4	5
8. Dizziness	0	1	2	3	4	5
9. Ear pain/pressure	0	1	2	3	4	5
10. Facial pain/pressure	0	1	2	3	4	5
11. Difficulty falling asleep	0	1	2	3	4	5
12. Waking up at night	0	1	2	3	4	5
13. Lack of a good night's sleep	0	1	2	3	4	5
14. Waking up tired	0	1	2	3	4	5
15. Fatigue during the day	0	1	2	3	4	5
16. Reduced productivity	0	1	2	3	4	5
17. Reduced concentration	0	1	2	3	4	5
18. Frustrated/restless/irritable	0	1	2	3	4	5
19. Sad	0	1	2	3	4	5
20. Embarrassed	0	1	2	3	4	5
21. Sense of taste/smell	0	1	2	3	4	5
22. Blockage/congestion of nose	0	1	2	3	4	5
TOTAL:	____	____	____	____	____	

Figure 1: SNOT 22 Questionnaire.

the diseased and further identified differences in sub-groups of CRS. *Pannu KK et al.* [12] evaluated of benefits nasal septal surgery on nasal symptoms and general health and proved SNOT-22 score as a useful and reliable tool in nasal septal surgery (20.67 to 10.48). It is vital that inappropriate surgeries in patients with CRS are avoided and it has been suggested that the SNOT 22 may provide a robust tool for the subjective assessment of patients' symptoms.

AIM

- To identify a normal SNOT-22 score in subjects not known to be suffering with Rhinosinusitis.
- To establish a 'normal' value for the SNOT 22 within the general population.
- To establish a reference point to identify those who may benefit from treatment.

METHOD

After informed consent, 238 medical students spread over three batches from a medical college in central India were selected as subjects. Subjects agreeing to take part were asked to complete the SNOT-22 questionnaire. An information sheet was provided and participation was voluntary. The information sheet included questions on age and asked if respondents had ever been diagnosed with CRS, or if they were currently using nasal medication. All completed forms were collated and results analysed. Those who positively indicated a history of rhinosinusitis, nasal polyps or taking medication for rhinosinusitis were excluded from the analysis. Forms were graded with a numerical score for each response ranging from 0 for 'no symptoms', to 5 for 'as bad as things could be'. The SNOT-22 total score can range from 0 to 110 Figure **1**.

RESULTS

All analysis was performed on spss v 16.0. Two-hundred and thirty eight forms were received out of which 8 were excluded. Hence a total 230 completed forms were included in the study, comprising 97 males and 133 females. The mean age of respondents was 21years (range 18-24). The SNOT scores ranged from 0 to 35 with a mean score of 8.07 Figure **2**.

The median score was 7 and the modal score was 0, with 32 (13.9%) of the respondents reporting this score. *(Skewness 1.357, Std. Error of Skewness. 160, Kurtosis 1.768. Std. Error of Kurtosis. 320).*

The normal SNOT 22 score is taken as median rather than the mean value because of the skewed nature of the data. A similar study carried out by Gillett. S *et al* in 2009 [13] showed results comparable with the present study (Table **1**).

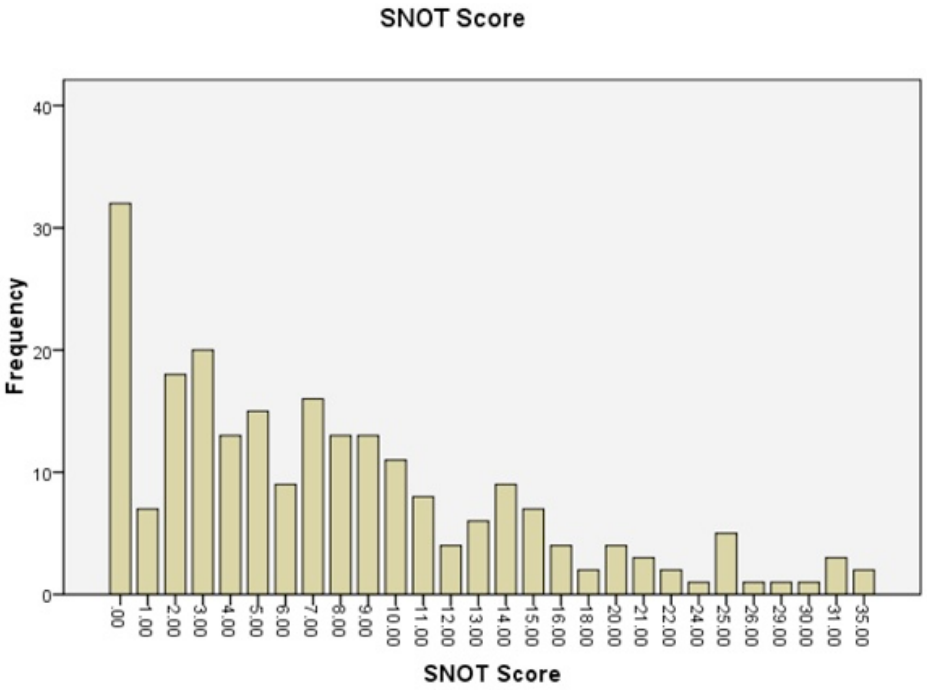

Figure 2: Table of frequency of SNOT scores in 230 subjects (study population).

Table 1: Comparision of Present Study and Gillett S. *et al*.

	Present Study	U.K (2009)
Total	230	116
	(97+133)	(54+62)
Age range	18-24 yrs	19-75 yrs
Mean age	21	40
SNOT range	0-35	0-50
Mean	8.06	9.3
Modal	0	0
Median	7	7

DISCUSSION

Identifying the 'normal' SNOT 22 score is vital if this tool is to be used in day to day clinical setting. Although the most common response was a score of 0, most participants in this study were not symptom free when assessed with the SNOT-22. The median 'normal' score was 7. Conversely, not all patients with a score of >7 require intervention. It is vital that this is considered if the SNOT 22 is to be used as a guide of symptom severity in the pre-treatment patient. A median SNOT 22 score of 7 may be an indication of the prevalence of undiagnosed rhinosinusitis within the population, However it may also be related to some of the generic questions in the SNOT 22 (such as waking at night, fatigue and lack of a good night's sleep). These questions may indicate the presence of other medical conditions or indeed may just show the range within a non-diseased population. The validity of this study hinges on what is considered a normal population. Our study population was uniform with respect to age and sex.

Ethnicity details were not collected for this study. Selecting medical students ensured that they were likely to understand and answer the questionnaire well and have better health related quality of life than the population as a whole. Although subjects with known rhinosinusitis were excluded, there might be some hidden rhinosinusitis. These may therefore potentially skew the results. The addition of objective measures of the presence of rhinosinusitis or nasal polyposis, by nasal endoscopy or CT evaluation is a must for comprehensive management protocol.SNOT-22 questionnaire is quick and easy for the patient. For the researcher, SNOT-22 is a rational, easily applicable tool with a wide range. It may be used both to measure health status and QoL and diagnose and assess the degree and effect of CRS on health status, and of treating patients with CRS. We believe that SNOT-22 may well be used on a regular basis by the clinician to obtain information about the full range of problems associated with rhinosinusitis. If routinely used, it is suggested that the SNOT-22 can measure the effectiveness of treatment, including surgery, and maybe identify patient factors that predict maximum treatment response [9, 14].

In conclusion, we found the median SNOT 22 score in a cohort thought to be free of sinonasal disease to be 7. It is hence recommended that a score of 7 be used a guide for ''normal'', and that care be taken when suggesting treatment on patients with a score below this level.

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