

## Sino-nasal assessment questionnaire: a specific outcome measure for rhinosinusitis, but what is the range in the asymptomatic population?

F YOUNIS, S DUVVI, T WALKER, B NIRMAL KUMAR

### Abstract

The sino-nasal assessment questionnaire is a system used for scoring the symptoms of chronic rhinosinusitis. However, the range of scores for this questionnaire in the healthy adult population is unknown. We aimed to establish this by recruiting 100 healthy volunteers and comparing their sino-nasal assessment questionnaire scores with those of 100 individuals who had undergone sinus surgery for rhinosinusitis. The difference in mean scores in the symptomatic group (44.62) and the asymptomatic group (8.46) was statistically significant. However, there was substantial overlap between the scores of the two groups. Factors such as age, gender and smoking did not have a statistically significant impact on the eventual score in the asymptomatic group. We believe that symptom scores can only be used effectively when the range in the asymptomatic population is known. This is so that disease severity can be gauged in the context of the normal population and post-operative improvements can be forecast.

**Key words:** Outcome Measures; Sinusitis

### Introduction

Chronic rhinosinusitis is a significant health problem and is thought to afflict up to 15 per cent of the population.<sup>1</sup> It constitutes a vast proportion of the otolaryngology clinic workload. The management of chronic rhinosinusitis centres on achieving a subjective improvement in patient symptoms. Management may take the form of medical therapy or surgery in patients who fail to improve with conservative treatment.

In an era of evidence-based medicine, it is imperative that clinicians justify or recommend interventions on the basis of results. The now widely held belief in focusing interventions on improvement of patients' subjective symptoms has led to the advent of numerous outcome measures. Naturally, the majority of these have taken the form of subjective patient symptom scores. This is particularly so for those rhinosinusitis treatment outcomes for which objective testing is not feasible in an out-patient clinic setting, such as nasomucociliary function, olfaction and nasal airway resistance (measurable by ciliary beat frequency, qualitative olfactometry and anterior rhinomanometry, respectively).

Many rhinosinusitis symptom scores exist, including: the sino-nasal outcome test-20, the rhinosinusitis disability index, the sino-nasal assessment questionnaire, the rhinosinusitis symptom inventory and the

sino-nasal outcome test-22, to name but a few.<sup>2</sup> The ideal symptom score must be validated, robust and specific to rhinosinusitis.

It is the practice of our otolaryngology department to use the sino-nasal assessment questionnaire score. This questionnaire comprises 11 questions, with answers graded between zero and five to correspond to the severity of symptoms. The first three questions (dealing with nasal obstruction, nasal congestion and facial pain) are individually weighted, as they deal with significant and specific sino-nasal symptoms. The scores for each item are added together to produce a maximum score of 80.<sup>3</sup> The simplicity of the sino-nasal assessment questionnaire has the predictable benefit of achieving greater compliance, compared with the more extensive, and thus less specific, sinonasal outcome test-20 and General Nasal Patient Inventory symptom scores.<sup>4–5</sup> However, the sino-nasal assessment questionnaire is limited by the fact that it is subject to variation amongst individuals. Patients who are less tolerant of symptoms may generate a sino-nasal assessment questionnaire score which is out of proportion to the magnitude of their disease process.

We have used the sino-nasal assessment questionnaire for more than five years to determine the efficacy of our rhinosinusitis interventions, by measuring scores before and after treatment.

However, to date, this questionnaire's baseline scores in an asymptomatic adult population are unknown. These baseline scores are important to ascertain as they can be used to gauge the severity of an individual patient's symptoms; they can also demonstrate the extent of improvement that can be anticipated following surgery. That is, it would be unreasonable to expect a post-operative score of zero if the average score in the asymptomatic population was 10.

We therefore set out to establish the range of sino-nasal assessment questionnaire scores in a healthy adult population, intending to apply this knowledge to our patients.

### Materials and methods

One hundred and twenty-three consecutive individuals were interviewed between 1 December 2005 and 31 January 2006 for participation in this study. The eventual cohort of 100 individuals was recruited from hospital staff, visitors and relatives accompanying patients to appointments in the otolaryngology out-patients department. All individuals suffering with or receiving treatment for chronic rhinosinusitis were excluded. This meant that all patients with a presumptive diagnosis of chronic rhinosinusitis and those with treated rhinosinusitis were excluded, as their inclusion would not be representative of an asymptomatic general population. However, asymptomatic smokers were included.

Each participant was asked to complete a sino-nasal assessment questionnaire, using a standardised interview technique. The questionnaire was approved by the patient advisory liaison service prior to its use in the hospital. The scores of a further cohort of 100 individuals who had undergone surgery for chronic rhinosinusitis were obtained from the rhinology database of the senior author (BNK). The pre-operative sino-nasal assessment questionnaire scores of this group were compared with those of the asymptomatic group.

### Results and analysis

We interviewed 123 individuals with a view to recruitment into the study. Of these, 100 satisfied the study criteria and were recruited into the asymptomatic group. The group comprised 36 males and 64 females, of whom 24 were smokers and 76 non-smokers. A comparable cohort of 100 people suffering with chronic rhinosinusitis was also recruited. These individuals were taken from a database of patients who had undergone endoscopic sinus surgery for chronic rhinosinusitis between January 2002 and December 2005. This rhinosinusitis group comprised 21 males and 79 females.

Patients who had undergone surgery for other nasal conditions such as polyps were excluded.

The mean of the sino-nasal assessment questionnaire scores for the asymptomatic group (8.46) was compared with that for the rhinosinusitis group (44.62), using the Mann-Whitney statistical test. The difference was statistically significant, with a  $p$  value of  $<0.0001$  (Table I). Despite this considerable disparity, there was, however, a substantial

TABLE I

PATIENT CHARACTERISTICS AND MEAN SINO-NASAL ASSESSMENT QUESTIONNAIRE SCORES IN RHINOSINUSITIS AND ASYMPTOMATIC SUBJECTS

	Rhino-sinusitis*	Asymptomatic*
M:F ratio	21:79	36:64
Mean pre-operative score (group A)	44.62	–
Mean baseline score (group C)	–	8.46

\* $n = 100$ .  $p < 0.0001$ , comparing groups A (rhinosinusitis) and C (asymptomatic) by non-parametric (Mann-Whitney) test. M = male; F = female; – = average score for the rhinosinusitis group is the pre-operative score and not the baseline score, similarly the average score for the asymptomatic group is the baseline score and not the pre-operative score

overlap in the middle ranges. That is, the range of scores in the asymptomatic group (0–36) and the rhinosinusitis group (23–69) did not appear to be divided by a critical score, values beyond which could be deemed to correspond with troublesome rhinosinusitis. Rather, there was a range of scores between 23 and 36 at which an individual may just as easily be symptom free as be sufficiently troubled by chronic rhinosinusitis to warrant sinus surgery.

In the asymptomatic group, we stratified the sino-nasal assessment questionnaire scores by age, gender and smoking. This was in an attempt to establish whether or not the sino-nasal assessment questionnaire scores in the asymptomatic group were higher in either sex or whether scores increased with advancing age or in smokers. Our results demonstrate that the difference in mean score in males (9.17) compared with females (8.06) was not statistically significant (Mann-Whitney test;  $p = 0.4611$ ). The same applies to age, for which no clear influence on sino-nasal assessment questionnaire score could be demonstrated. The difference between smokers (10.66) and non-smokers (8.06) was also not statistically significant, using the Mann-Whitney test ( $p = 1.089$ ).

### Discussion

It is imperative that surgeons have the means to demonstrate the efficacy of their interventions. This need has coincided with the advent of disease-specific quality of life questionnaires, which are increasingly becoming validated outcome tools. However, the majority of such questionnaires are based on the patient's subjective assessment of improvement in symptoms. It is generally accepted that, in the absence of a reproducible, objective outcome measure for rhinosinusitis, the efficacy of an intervention can at least be shown by the subjective improvement that it imparts. In this regard, patient symptom scores are undoubtedly useful in establishing post-intervention changes in symptoms and are thus invaluable audit tools.<sup>1</sup> However, despite the undoubted value of these outcome measures, we feel that their use without a baseline reference to the asymptomatic adult population is less than ideal.

Of the many symptom scores which are in existence for chronic rhinosinusitis, only one other system (International Conference on Sinus Disease scoring system) has been assessed in healthy individuals to date.<sup>6</sup> The reason for this may be the assumption that healthy individuals will exhibit a score of zero. However, this assumption is not supported by the findings of our study or those of Walker and White (in their analysis of the International Conference on Sinus Disease symptom scores system).<sup>6</sup> Their findings mirrored those of our study, in that there was a statistically significant difference between the scores of healthy and diseased individuals and the mean score for the healthy individuals was well above zero. Walker and White, too, found that, despite the difference in the mean scores in the two groups, there was considerable overlap in the middle ranges.<sup>6</sup> However, the International Conference on Sinus Disease scoring system is a generic tool and is not specifically designed for sino-nasal conditions.

Having established that the mean sino-nasal assessment questionnaire score in healthy individuals was not necessarily zero, we can only speculate as to why this is the case. One plausible explanation, regarding the sino-nasal assessment questionnaire score, is the fact that non-specific symptoms (such as sleep disturbance and headache) may exist in the population for a number of other reasons and their inclusion in the scoring system may skew the eventual score. The sino-nasal assessment questionnaire score does try to compensate for these confounding factors by weighting the more specific symptoms (such as nasal blockage and nasal congestion (each multiplied by three) and facial pain (multiplied by two)) more highly, so that these symptoms contribute more to the overall score.

In addition, our study did attempt to ascertain the influence of age, gender and smoking on the sino-nasal assessment questionnaire scores for the healthy group. Our results did not demonstrate a statistically significant difference in the scores of individuals of different ages or genders. There was also no statistically significant difference between the scores of smokers and non-smokers, although the mean score of smokers was slightly higher. This is not unexpected when considering the irritant effects of smoking on the nasal mucosa.

We feel that there may be room for improvement in our study, with the potential to recruit a greater number of individuals and also to use an objective measure for establishing normality within the asymptomatic group. Of course, cognitive dissonance is a source of bias which will affect any symptom score after intervention, and this must be taken into account when counselling patients or auditing results, especially in the short term.

However, there is little doubt that this study serves as an important tool in our treatment of chronic rhinosinusitis. Its results will prove useful when considering the severity of an individual's symptoms compared with those of an asymptomatic group and in counselling patients on the limitations of surgery. That is, post-intervention scores are likely to move

closer to the range of the asymptomatic group, rather than to return to zero, as may be expected by patients.

Outcome measures are becoming an integral part of our clinical practice. We believe that they can be used most effectively when compared with the range within the normal population. In this regard, we feel that surgeons using validated outcome measures should strive to establish the range in the normal population, in order to assist their clinical practice.

- **The sino-nasal assessment questionnaire is a useful outcome measure in the management of chronic rhinosinusitis**
- **There was no previous information on the range of this scoring system in the asymptomatic population**
- **The mean score was 8.46 in asymptomatic individuals and 44.62 in symptomatic individuals; the difference was statistically significant**
- **Knowledge of asymptomatic individuals' scores enables the surgeon to gauge symptom severity by comparison, and also facilitates pre-operative patient counselling and reduces unrealistic expectations**

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Address for correspondence:  
Mr F Younis,  
Sunnyhill,  
14 Gorse Road, Blackburn,  
Lancashire BB2 6LY, UK.

Fax: 01942 773317  
E-mail: fizanyounis@hotmail.com

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