Rhinosinusitis and its impact on quality of life in children

Abstract

Rhinitis and rhinosinusitis are common conditions which have a significant burden on healthcare services and can lead to reduced productivity in patients across the entire age spectrum. Three disease-specific quality of life tools were analysed in hospital and community settings to explore prevalence, disease characteristics and financial costs to sufferers, and to compare these aspects between cohorts (young children, young adult and adults). These tools were Modified Sino-Nasal Outcome Test-20 (MSNOT-20) questionnaire for adults, MSNOT-20 Young Persons Questionnaire (MSYPQ) for 11–16-year-olds and Sami's Rhinosinusitis Diagnosis and Impact questionnaire for 5–10-year-olds. One of the top three symptoms in children aged 5–10 years was cough, which is a much less common symptom in adults. These validated, disease-specific, quality of life questionnaires provide a fuller illustration of the patient experience, allowing comprehensive comparative analysis across the ages.

Key words: Rhinitis; Rhinosinusitis; Sinusitis; Quality of life; Questionnaire

Submitted: 6 November 2021; accepted following double-blind peer review: 23 November 2021

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Introduction

It is uncommon for sinusitis to occur without coexisting rhinitis, so the most appropriate term for both is rhinosinusitis (Fokkens, 2020). This is a common disease worldwide, estimated at 10–30% prevalence in western Europe and the United States of America (Settipane, 2001; Cingi et al, 2017).

The anatomy and functionality of the nose and sinuses means that patients often have associated symptoms related to the ear, conjunctiva and lower airways. However, the consequences of these symptoms extend beyond local organs; patients' physical and mental health can also be affected, for example sleep-disordered breathing in children and adolescents is associated with disorder in learning performance, behaviour and attention (Izquierdo-Domínguez et al, 2013). Nasal and sinus symptoms can significantly hamper the process of learning at school, which may also have a knock-on effect on social dynamics and relationships (Church et al, 2016; Cingi et al, 2017).

The negative impact on quality of life cannot be understated and there is no diagnostic tool that can both identify the disease and illustrate its impact on the patient. In adults, reduced productivity and/or absences from work can have a heavy financial impact, as demonstrated by the fact that rhinosinusitis is considered one of the top ten most costly health conditions to American employers (Goetzel et al, 2003). There is a recognised deleterious effect on children's learning, despite effective treatments being available to address these symptoms (Volcheck, 2009; Hellings et al, 2012; Church et al, 2016).

The mainstay of treatment is topical, with poor technique quoted as a cause of therapy failure (Gani et al, 2001). Novel therapies, such as combination antihistamine and steroid nasal sprays, have shown positive results compared to traditional treatments (Sami et al, 2017). Meanwhile disease-modifying allergen-specific immunotherapy may hold new promise for, in particular, patients of allergic aetiology with severe symptoms (Bousquet et al, 2019).

There are limited data on the incidence and impact of rhinosinusitis in 5–10-year-old children, and the first paediatric-specific recommendations for the treatment of rhinitis were only published in 2013 (Roberts et al, 2013). As such, a reliable tool is needed to identify prevalence, diagnose nasal and sinus pathology and the impact it has on children's quality of life (Mir et al, 2012).

How to cite this article:
Ahmed S, Sami AS. Rhinosinusitis and its impact on quality of life in children. Br J Hosp Med. 2022. https://doi.org/10.12968/hmed.2021.0589

To investigate this condition in the UK, the authors devised projects with the following objectives:

1. To identify the prevalence of rhinitis or rhinosinusitis, explore demographic variables, disease-specific analysis and financial costs to sufferers, as well as its impact on various quality of life domains (education, productivity, time off work including burden of healthcare appointments and financial costs incurred). The tool selected should be able to be used in various settings, including in the community and hospital.
2. To use the novel dataset obtained to carry out a wide-ranging comparative analysis of disease characteristics and consequences between young children (5–10-years old), young adults (11–16-years old) and adults.

A series of questionnaires were designed to address these aims, as outlined in various studies (Sami and Scadding, 2014a, b; Sami, 2018; Sami et al, 2018). The questionnaires follow a similar structure, split into three sections: demographic details, a disease-specific section and a quality of life section. The disease-specific section consists of 20 questions, each covering a symptom which the responder rates on a scale of 0 (no problem) to 5 (problem as bad as it can be). These questions are divided into the following subgroups: nasal, paranasal (split into ear and sinus) and sleep. The threshold for diagnosing rhinitis and sinusitis based on subgroup scores had been established by previous studies (Sami et al, 2018).

Methods

Table 1 compares the questionnaires. This article focuses on the questionnaire for use with children which was developed by using and modifying the Modified Sino-Nasal Outcome Test-20 (MSNOT-20) (adult) and MSNOT-20 Young Persons Questionnaire (MSYPQ) (young persons) questionnaires.

For each project, consent and ethical considerations were sought and obtained.

Table 1. Comparison of questionnaires used

Questionnaire	Cohort	Setting	Location	Details
Modified Sino-Nasal Outcome Test-20 (MSNOT-20)	Adult	Large community-based project	Farnborough, UK	The Sino-Nasal Outcome test was modified to produce the MSNOT-20 (Sami et al, 2018). The questionnaire was posted to 2000 recipients selected through stratified randomisation, following a successful pilot project (establishing it as a validated disease-specific tool). A second phase was carried out 6 months later to test repeatability, there was face-to-face refilling of questionnaire and clinical examination of the patient. Through statistical analysis, repeatability was assessed and results compared with other health-related quality-of-life tool
MSNOT-20 Young Persons Questionnaire (MSYPQ)	Young adult	Three large secondary schools	London, UK	The MSNOT-20 was adapted for use with 11–16-year-olds as the MSYPQ which was used in three large schools in east London in a combination of face-to-face and postal surveys, with a total of 213 students. Data collection with subsequent statistical analysis and comparison to the adult cohort was carried out (Sami and Scadding, 2014a,b)
Sami's Rhinosinusitis Diagnosis and Impact (RDI)	Children	Paediatric ear, nose and throat outpatients	London, UK	The MSNOT-20 and MSYPQ questionnaires had proven themselves as validated, disease-specific quality-of-life tools, so were modified to develop a tool to assess nasal and sinus disease in the 5–10-year old age group (Appendix 1). Following a successful pilot project (establishing it as a validated disease-specific tool), it was used in a paediatric outpatient cohort at University Hospital Lewisham, London. Patients were randomly selected; every third patient from new referrals were enrolled at the time of their first appointment to ear, nose and throat outpatients (running until the end of the month of the 50th study participant). The child and their attending guardian jointly completed the Sami's RDI questionnaire before assessment of the patient (including collateral history) (Sami, 2018)

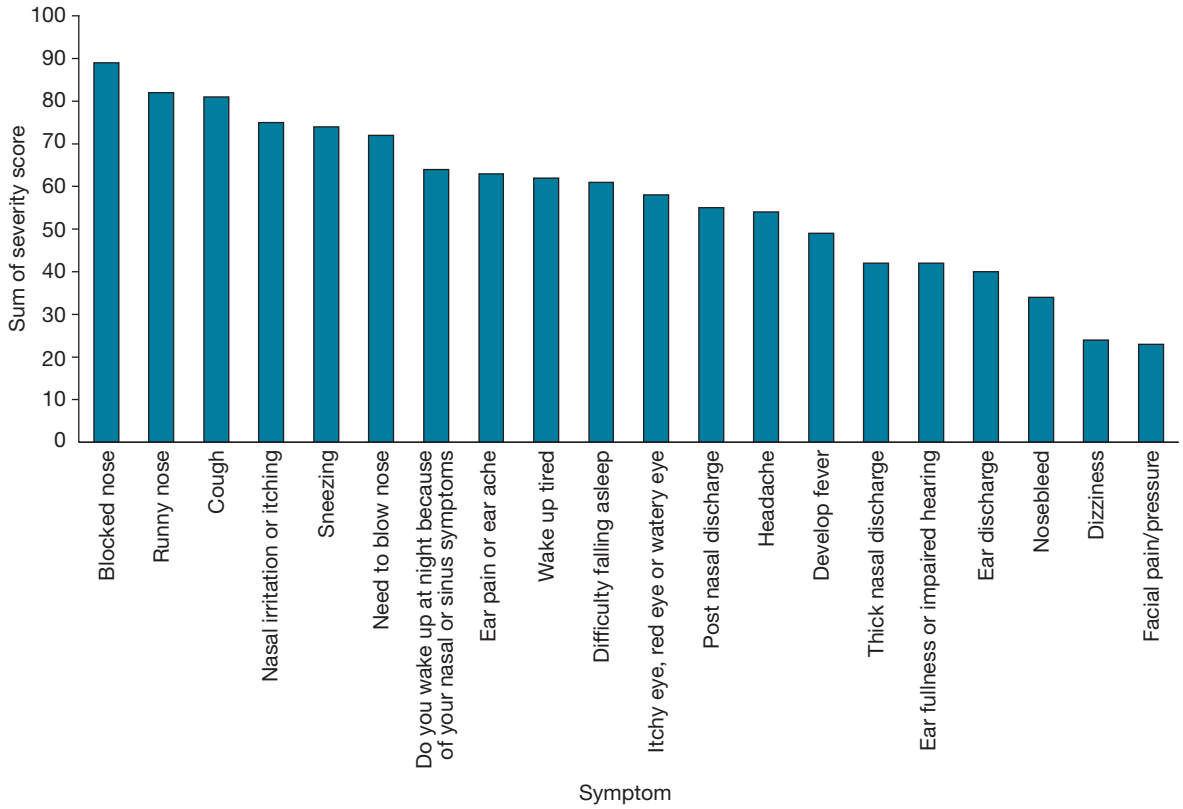

Figure 1. Symptom severity reported by the cohort.

Results

In the children's project, a total of 52 cases were enrolled, with equal gender representation, aged between 5 and 10 years. Over one third (37%) were white British, a similar amount (38%) identified as black/black British (African/Caribbean), 19% were Asian/Asian British (6% Chinese and the rest from Pakistan, India, Bangladesh or Sri Lanka). Only one child was born preterm. A total of 32 of the cohort were breast-fed, 25 of these for the first 6 months of their lives. Analysis did not reveal a significant difference in disease pattern between the genders or related to the breastfeeding history.

The sum of the severity score allocated to each symptom for the entire cohort is shown in Figure 1. Blocked nose was the top symptom of complaint, while cough was third. Subgroup analysis revealed that rhinitis was present in 52% of the cohort (27/52) and rhinosinusitis in 27% (14/52), confirmed by clinical assessment at the time.

Thirty-five per cent of patients had an abnormal sleep score (18/52). Correlation through Spearman's rank coefficient showed the strongest association between nasal subgroup and total disease severity score (0.87). The sleep subgroup correlated better with the nasal subgroup (0.66) than paranasal (0.61). Concurrent atopic conditions were prevalent in significant numbers; a history of eczema in 38% of the cohort, asthma in 15%, food allergy in 12% (split evenly between seafood, milk and egg), nut allergy in 6% and drug allergy in 2%. Family history for atopic conditions was also significant; 38% had eczema in the patient's immediate family, asthma in 46%, food allergy in 12%, nut allergy 4%, drug allergy 4% and 8% had a history of nasal and sinus disease in the immediate family.

Duration of symptoms were reported by 42 participants (Figure 2); most patients had experienced symptoms for between 1 and 5 years. Fifteen patients quantified spending on treatment beyond the NHS free prescriptions; of these, 40% (6/15) spent more than £5 but less than £20 per month, 60% (9/15) spent less than £5 per month. Twenty-nine patients used treatment before the index appointment. Figure 3 shows the pattern of use. Overall, 16% found that treatment had no effect on their symptoms. Sixteen patients (of 40 respondents) had to take time off school (from 1–28 days in the last year) (Figure 4).

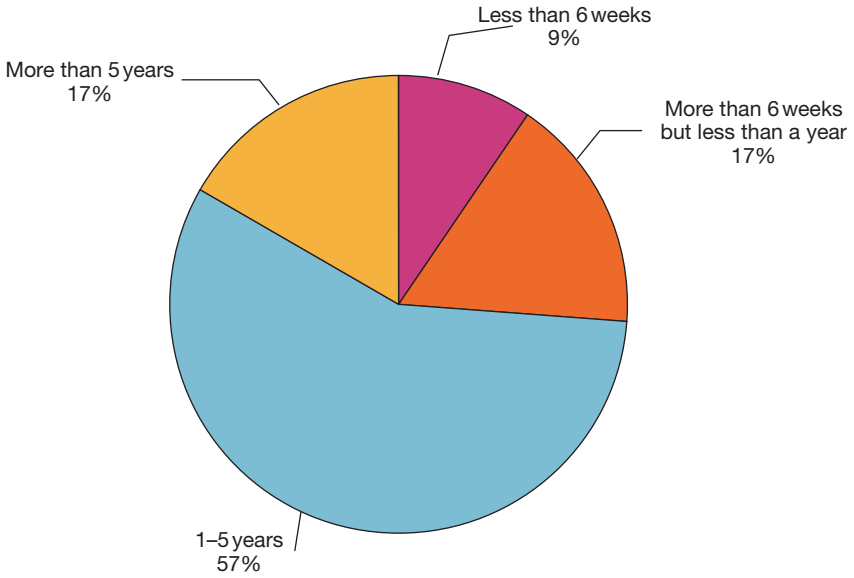

Figure 2. Duration of symptoms.

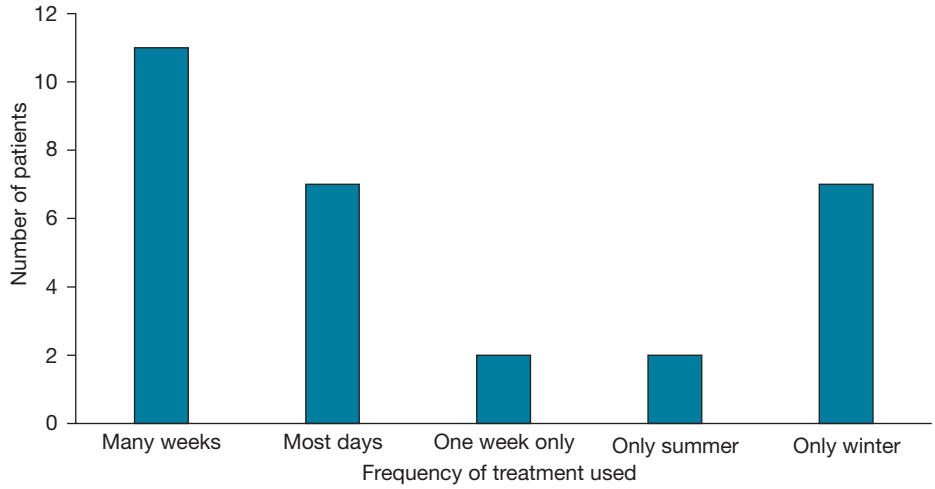

Figure 3. Frequency of treatment.

Four of the child respondents (8%) from the entire cohort were unsatisfied with the shape of their nose (an uncommonly explored yet significant psychological element to a diseased organ from the child's perspective).

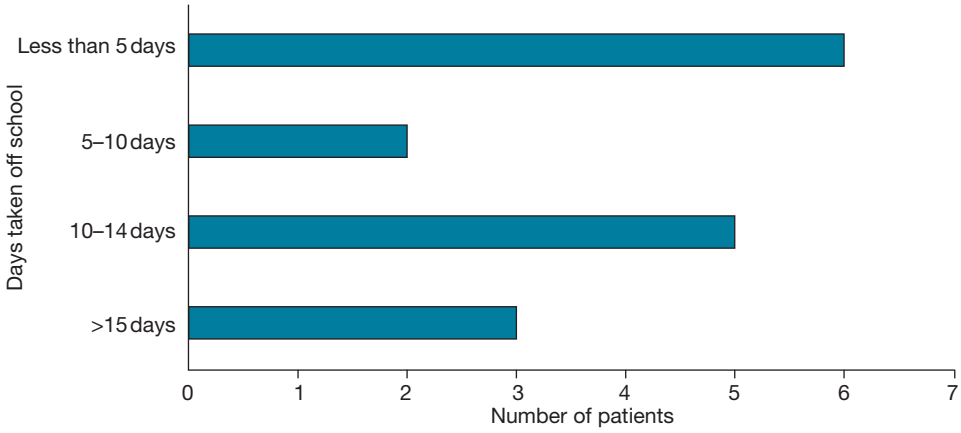

Figure 4. Number of days taken off school as a result of nasal or sinus symptoms in the last year.

These results showed a disease incidence of 52% suffering from rhinitis and 27% suffering from rhinosinusitis, whereas this was 38% and 25% respectively in the adult study (Sami et al, 2018) and 32% and 12% in the young adult cohort (Sami and Scadding, 2014b).

Over one third of children had an abnormal sleep score, which correlated strongest with the nasal subgroup. This was a similar finding in the young adult study, where it also strongly correlated with sinus and social subgroups and with the individual question of cough (Sami and Scadding, 2014b). In the adult study, an impaired sleep score was present in just under 40% of subjects (Sami et al, 2018).

Cough was the third highest reported symptoms in the children study, similar to findings from the young adult cohort (Sami and Scadding, 2014b) where it was the most significant symptom reported, unlike the adult study (Sami et al, 2018).

Many children were missing significant periods of school as a result of their condition, up to 1 month in the preceding year in severe cases. In the young adult study (Sami and Scadding, 2014b) a similar trend showed that just over 1 in 10 students took time off school. This seems to persist into adulthood where sufferers had to take time off work as a result of their symptoms.

Unsurprisingly, associated atopic conditions were common, especially eczema and asthma. Previous studies (Sami and Scadding, 2014b; Sami et al, 2018) found that those with a family history of atopic conditions had more severe disease.

It is important to recognise the significant financial cost incurred by patients and their carers despite 'free' prescriptions. In the adult study (Sami et al, 2018), just under 1 in 50 people were spending £20 or more a month on treatment.

Discussion

This study demonstrates the prevalence and considerable impact that nasal and sinus disease has on patients. In paediatric rhinitis, the cornerstone of diagnosis is the clinical history (Roberts et al, 2013) and the Sami's RDI questionnaire is able to diagnose and evaluate the condition in multiple domains. This condition has a detrimental impact on aspects such as (but not limited to) sleep, education and finances.

The Sami's RDI questionnaire was developed by adapting the MSYPQ with the addition of questions about the child's birth history (including whether the child was born at term and the mode of delivery) and whether they were breastfed. These are significant as perinatal variables and, along with family history, can impact on the prevalence of atopic conditions (Gerlich et al, 2018). There is limited evidence regarding the differences between child and guardian reporting in health-related quality of life instruments. Upton et al (2008) systematically reviewed the literature over a 10-year period and determined that parents of children with health conditions tended to underestimate child health-related quality of life. Parental bias was minimised by joint completion of questionnaires and by incorporating previously validated research (MSNOT-20 and MSYPQ) to augment the ability of questions to identify symptom prevalence. Although the current study was not large enough to establish any significant correlation at this time, breastmilk is known to have a beneficial effect on immunological function, although evidence has not demonstrated any strong protective role against development of allergic rhinitis (Jelding-Dannemand et al, 2015).

In the disease-specific section of the Sami's RDI questionnaire, questions on productivity, concentration, fatigue, frustration, embarrassment and sleep were removed and replaced with questions regarding fever, itching in the nose, headache, eye symptoms, nosebleeds and ear discharge, as these symptoms are more commonly seen in this age group.

Clinical experience with children with nasal and sinus disease had found that subjective dissatisfaction with the shape of the nose was not uncommon, hence the inclusion of this question. Of this cohort, 8% were dissatisfied with the shape of their nose. While this was not compared to the views of individuals who do not have nasal or sinus disease, it may highlight a psychological consequence of organ dysfunction as viewed from the child's perspective. This may warrant further exploration of views and any long-term implications it may have.

Comparison of the studies found that some symptoms persist across the age spectrum, eg sleep impairment and its relationship with the nasal subgroup, while others are more common in one age group than the other, eg cough seen in younger patients more than

adults. Such insights can help tailor treatments to individual patients. The genetic association with atopic conditions is seen across all age ranges; first, the presence of a family history of atopy in the cohort of children and worse disease in adults with a family history of atopy. Second, the presence of multiple atopic conditions in the index case, eg presence of a combination of rhinitis, food allergy and/or eczema. Early recognition of nasal and sinus symptoms, in the context of atopic history, may help to identify or explore the possibility of food or common airborne allergens on initial assessment (Barnes, 2000; Wang, 2005).

The financial burden of this condition is also considerable; the children's study showed that 40% had to spend between £5 and £20 per month despite NHS prescriptions for children being free, while the large community-based study in adults found just under 1 in 50 patients had to spend more than £20 per month. As patients in the children's study had been experiencing their symptoms, in most cases, for 1–5 years before seeing a specialist, this is a significant financial cost.

Time missed from school and work persists through the ages; the young adults study showed that 1 in 10 students had to take time off school. This is significant in terms of learning and performance in school and exams (Sami and Scadding, 2013; Church et al, 2016). This may be compounded by the timing of exams, which normally fall during hayfever season, bearing in mind the side effects of medications used to treat hayfever. Time taken off sick needs to be put into the context of age-related activities, for example the development and growth lost in the early formative years. Recognising these early allows clinicians to try to prevent or manage any long-term deleterious effects (which could also be picked up in the MSYPQ or MSNOT-20 should the patients present later).

The questionnaires use simple, easy to understand language and have been used in various settings (community or hospital) and types of data gathering (face-to-face with a healthcare professional, independent subject completion). These questionnaires have a clear structure, a standardised format and a smooth, logical flow. Each tool is tailored to their target cohort and contains age-specific, relevant questions to meet the objectives. Their self-explanatory and straightforward terms mean that some children were able to answer the questions themselves.

The ultimate aim is to improve patient care; these questionnaires can help create a blueprint of patient-specific treatment requirements. Addressing these can improve symptoms and quality of life, as well as helping to reduce the long-term consequences, eg the impact on speech and hearing in children with untreated nasal disease. This can lead to dramatic improvement in energy levels in patients and their family with better sleep, alleviating the emotional and financial burden of disease on a patient, and reducing demands on health services (Sami and Scadding, 2014a, b; Sami, 2018; Sami et al, 2018). There would be increased productivity, reduced sick days and patients would be better able to contribute to the economy. These tools can enable a combined and complete care approach which builds a strong partnership between patients and healthcare professionals.

Conclusions

The MSNOT-20, MSYPQ and Sami's RDI are all validated, disease-specific, quality of life questionnaires able to assess nasal and sinus symptoms, including their impact on quality of life, in patients aged 5 years and above. Having one series of disease-specific and quality of life questionnaires (also available in multiple languages) with a uniform layout can allow comparative analysis of the substantial impact of rhinosinusitis over a range of ages and can be reliably used to produce valid results in a variety of settings (postal, face-to-face, single-use, before and after treatment). They provide a fuller illustration of the patient experience, allowing the formulation of a blueprint for an individualised treatment pathway.

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Key points

- There is a family of validated, disease-specific, quality of life questionnaires able to assess symptomatology as well as diagnose nasal and sinus disease, including the impact on quality of life, in patients aged 5 years and above.
- Having one series of disease-specific and quality of life questionnaires (available in multiple languages) with a uniform layout allows comparative analysis of the substantial impact of these conditions across the age spectrum and can be used to produce valid results in a variety of settings (postal, face-to-face, single-use, before and after treatment).
- Compared to other tools, responses to these questionnaires illustrate the wider patient experience, thereby helping to formulate an individualised treatment pathway.

Conflicts of interest

The authors declare that they have no conflicts of interest.

References

Barnes KC. Evidence for common genetic elements in allergic disease. J Allergy Clin Immunol. 2000;106(5):S192–S200. https://doi.org/10.1067/mai.2000.110150

Bousquet J, Pfaar O, Togias A et al. 2019 ARIA care pathways for allergen immunotherapy. Allergy. 2019;74(11):2087–2102. https://doi.org/10.1111/all.13805

Church DS, Church MK, Scadding GK. Allergic rhinitis: impact, diagnosis, treatment and management. Clin Pharm. 2016;8(8). https://doi.org/10.1211/CP.2016.20201509

Cingi C, Gevaert P, Mösges R et al. Multi-morbidities of allergic rhinitis in adults: European Academy of Allergy and Clinical Immunology task force report. Clin Transl Allergy. 2017;7(1):17. https://doi.org/10.1186/s13601-017-0153-z

Fokkens WJ. European position paper on rhinosinusitis and nasal polyps 2020. Rhinology. 2020;58(1):1–464. https://doi.org/10.4193/Rhin20.600

Gani F, Pozzi E, Crivellaro MA et al. The role of patient training in the management of seasonal rhinitis and asthma: clinical implications. Allergy. 2001;56(1):65–68. https://doi.org/10.1034/j.1398-9995.2001.00794.x

Gerlich J, Benecke N, Peters-Weist AS et al. Pregnancy and perinatal conditions and atopic disease prevalence in childhood and adulthood. Allergy. 2018;73(5):1064–1074. https://doi.org/10.1111/all.13372

Goetzel RZ, Hawkins K, Ozminkowski RJ et al. The health and productivity cost burden of the 'top 10' physical and mental health conditions affecting six large U.S. employers in 1999. J Occup Environ Med. 2003;45(1):5–14. https://doi.org/10.1097/00043764-200301000-00007

Hellings PW, Scadding G, Alobid I et al. Executive summary of European task force document on diagnostic tools in rhinology. Rhinology. 2012;50(4):339–352. https://doi.org/10.4193/Rhino11.252

Izquierdo-Domínguez A, Valero AL, Mullol J. Comparative analysis of allergic rhinitis in children and adults. Curr Allergy Asthma Rep. 2013;13(2):142–151. https://doi.org/10.1007/s11882-012-0331-y

Jelding-Dannemand E, Malby Schoos A-M, Bisgaard H. Breast-feeding does not protect against allergic sensitization in early childhood and allergy-associated disease at age 7 years. J Allergy Clin Immun. 2015;136(5):1302–1308. https://doi.org/10.1016/j.jaci.2015.02.023

Mir E, Panjabi C, Shah A. Impact of allergic rhinitis in school going children. Asia Pac Allergy. 2012;2(2):93–100. https://doi.org/10.5415/apallergy.2012.2.2.93

Roberts G, Xatzipsalti M, Borrego LM et al. Paediatric rhinitis: position paper of the European academy of allergy and clinical immunology. Allergy. 2013;68(9):1102–1116. https://doi.org/10.1111/all.12235

Sami AS. Rhinitis in paediatric population paediatric rhinology 2. London: European Rhinologic Society; 2018

Sami AS, Scadding GK. Management of allergic rhinitis in schools. Br J School Nurs. 2013;8(3):119–123. https://doi.org/10.12968/bjsn.2013.8.3.119

Sami AS, Scadding GK. Rhinosinusitis in secondary school children-part 1: pilot study of the MSNOT-20 young person questionnaire (MSYPQ). Rhinology. 2014a;52(3):215–224. https://doi.org/10.4193/Rhin12.011-1

Sami AS, Scadding GK. Rhinosinusitis in secondary school children-part 2: main project analysis of MSNOT-20 young persons questionnaire (MSYPQ). Rhinology. 2014b;52(3):225–230. https://doi.org/10.4193/Rhin12-011-2

Sami AS, Ahmed S, Ahmed N. Response to combination intranasal corticosteroid and intranasal antihistamine in allergic rhinitis, a questionnaire based study in ENT outpatients. Otolaryngol (Sunnyvale). 2017;7(1):294. https://doi.org/10.4172/2161-119X.1000294

Sami AS, Scadding GK, Howarth P. A UK community-based survey on the prevalence of rhinosinusitis. Clin Otolaryngol. 2018;43(1):76–89. https://doi.org/10.1111/coa.12902

Settipane RA. Demographics and epidemiology of allergic and nonallergic rhinitis. Allergy Asthma Proc. 2001;22(4):185–189

Upton P, Lawford J, Eiser C. Parent-child agreement across child health-related quality of life instruments: a review of the literature. Qual Life Res. 2008;17(6):895–913. https://doi.org/10.1007/s11136-008-9350-5

Volcheck GW. Clinical allergy: diagnosis and management. Totowa (NJ): Humana Press; 2009

Wang D-Y. Risk factors of allergic rhinitis: genetic or environmental? Ther Clin Risk Manag. 2005;1(2):115–123. https://doi.org/10.2147/tcrm.1.2.115.62907

Appendix 1. Sami's Rhinosinusitis Diagnosis and Impact questionnaire

Sami's RDI

Sami's Rhinosinusitis Diagnosis and Impact questionnaire

Section 1

ID ☐☐☐☐ Date ☐☐/☐☐/☐☐

Child's name _____

Date of birth ☐☐ ☐☐ ☐☐☐☐

Address _____

_____ Post code _____

1. Gender Male ☐ Female ☐

2. What is your child's ethnic background (please tick)?
   - White - British/Irish ☐
   - White - European ☐
   - Asian/Asian British - South East (Pakistan/India/Bangladesh/Sri Lanka) ☐
   - Asian/Asian British - Far East (China/Japan/Philippines/Korea) ☐
   - Black/Black British (African/Caribbean) ☐
   - Other - Please specify ☐

3. Parents/guardian occupation ☐

4. Please tick the box that best describes the type of accommodation he/she live in:
   - Whole house ☐ Bungalow ☐
   - Purpose built flat ☐ Shared house ☐

5. Was the child born: Full term ☐ Premature/After dates ☐
6. How was the delivery? Vaginal ☐ C-section ☐

7. Please tick if the child was breast fed and answer the below questions (Otherwise go to Q8) ☐
   a. How long were you breast-fed for? ☐☐ months ☐☐ year(s)
   b. Did the child have nasal and/or sinus problems on breast feeding? Yes ☐ No ☐
   c. Did the nasal and/or sinus problems after stopping breast feeding? Yes ☐ No ☐

8. Has the child ever had an allergy to the below foods?

	Yes	No		Yes	No		Yes	No
Eggs			Milk			Soya		
Nuts			Fish			Banana		
Please specify the nut(s): _____						Wheat		

9. Does the child still develop symptoms due to this allergy? Yes ☐ No ☐

10. Has the child ever suffered from any of the following?

	Yes	No		Yes	No
Asthma			Drug allergy		
Eczema			Nasal /sinus disease		

11. In the childs immediate family (parents/brother/sister) or blood relative(s) is there a history of:

	Yes	No		Yes	No		Yes	No
Asthma			Food allergy			Drug allergy		
Eczema			Nasal /sinus disease			Nut allergy		

Please specify the nut(s): ☐

Sami's RDI

Sami's Rhinosinusitis Diagnosis and Impact questionnaire

Section 2

ID ☐☐☐☐ Date ☐☐/☐☐/☐☐

Below you will find a list of symptoms. Please try and answer the following questions to the best of your ability. Please rate your problems as they have been over the past six months. Please do not hesitate to ask for assistance from the doctor involved in this research project.

0=no problem	1=very mild problem	2=mild or slight problem
3=moderate problem	4=severe problem	5=as bad as it can be

1	Need to blow the nose	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
2	Sneezing	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
3	Runny nose/ watery nasal discharge	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
4	Blocked nose	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
5	Irritation/itching in the nose	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
6	Facial pain and pressure	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
7	Headache	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
8	Thick nasal discharge/yellow-green coloured discharge	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
9	Post nasal discharge/phlegm at the back of the throat	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
10	Cough	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
11	Ear pain/earache	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
12	Ear fullness/impaired hearing	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
13	Ear discharge	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
14	Dizziness	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
15	Do you wake up at night due to nasal/sinus symptoms	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
16	Difficulty falling asleep due to nasal /sinus symptoms	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
17	Wakeup tired	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
18	Develop fever with nasal/sinus symptoms	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
19	Itchy eye/red eye/ watery eye	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
20	Do you get nosebleeds	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Sami's RDI

Sami's Rhinosinusitis Diagnosis and Impact questionnaire

Section 3

ID ☐☐☐☐ Date ☐☐/☐☐/☐☐

1. How long has he/she had these problems for?
   Less than 6 weeks ☐ More than 6 weeks but less than 1 year ☐
   1 to 5 years ☐ More than 5 years ☐

2. Do you ever get treatment for these problems? Yes ☐ No ☐

3. Where do you usually get treatment for their nasal/sinus symptom(s)?
   G.P. ☐ Chemist ☐ Alternative therapy ☐

4. How often in an average year do you visit your GP about these problems? ☐☐

5. What treatment does the child usually get?

6. How often does he/she need to use treatment for this problem in a year?
   Most days ☐ One week only ☐
   Many weeks ☐ Only in the Summer ☐ Only in the Winter ☐

7. How much do you think you spend on treatment for your nasal/ sinus problem?
   Less than £5 per month ☐ More than £5 but less than£20 ☐
   More than £20 per month ☐ Others

8. How many times do you get free prescriptions from the GP in a year? ☐☐

9. Have you ever seen an Ear, Nose and Throat Specialist for the nasal/sinus symptoms?
   Yes ☐ No ☐

10. Has he/she ever had an operation on your Nose/Sinus? Yes ☐ No ☐

11. Does he/she ever have to take time off from school because of Nose/Sinus symptoms?
   Yes ☐ No ☐

12. How many days in the past year has he/she taken off from school because of Nose/Sinus symptoms? ☐☐ days *or* ☐☐ months

13. Has he/she ever had trauma to their nose? Yes ☐ No ☐

14. Is the child satisfied with the shape of their nose? Yes ☐ No ☐