

## Audit

# Reducing waiting times for sleep apnoea hypopnoea syndrome and snoring using a questionnaire and home oximetry: results of a second audit cycle

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### Abstract

As a result of a previous audit on the management of sleep apnoea hypopnoea syndrome (SAHS) which showed long waiting times that were primarily due to unnecessary interspecialty referrals, a change in practice was adopted. All referrals are now sent a questionnaire about symptoms suggestive of SAHS, the Epworth Sleepiness Scale score and their body mass index (BMI) which when returned are categorized into having a high, intermediate or low risk of SAHS. Those patients with a high probability have home overnight oximetry and those with intermediate probability have video oximetry. Those with a low probability are referred directly to ENT. We audited the first 100 patients referred. All were General Practitioner referrals to either ENT or respiratory medicine. Only two patients had a low probability score and were seen directly in ENT. Following sleep study analysis, 10 patients were referred directly to ENT with no respiratory medicine follow-up and nine were discharged back to the General Practitioner with no apnoea or snoring. Eighty-one patients were followed up by respiratory medicine. Of these, 49 received a trial of nasal continuous positive airway pressure (nCPAP) and six were referred to ENT. Therefore the majority justified an investigation to exclude SAHS in the first instance and an unnecessary initial ENT appointment was avoided. We have reduced the average waiting times to sleep study by approximately 90 days and to nCPAP trial by 32 days, mostly due to decreased delays in interspecialty referrals. We have also demonstrated a greater than 50 per cent reduction in ENT clinic visits, a small increase in the number of sleep studies but no increase in respiratory clinic workload.

**Key words:** Snoring; Sleep Apnoea Syndromes; Oximetry; Risk Assessment; Medical Audit

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### Introduction

Sleep apnoea hypopnoea syndrome (SAHS) is common, with four to eight per cent of middle-aged men affected by obstructive sleep apnoea<sup>1–3</sup> and approximately 20 per cent affected by habitual snoring.<sup>4</sup> In the Nottingham Health District it was found that the initial referral of patients with suspected SAHS by General Practitioners was to a variety of specialties, such as respiratory medicine, ENT and neurology. It would be expected that this diversity of service delivery would lead to delays in treatment, inter-referral between specialties leading to an increase in outpatient workload. Indeed, an audit of the service provided in the Nottingham Health District has confirmed this,<sup>5</sup> as in only 25 out of 119 patients (21 per cent) was ENT found to have a role in management. The frequent inter-specialty referrals produced a mean delay of 16 weeks. This

audit has led to the introduction of a new method of managing the initial referral. To ensure this new strategy has led to a reduction in waiting times and clinic workload, the service was re-audited. The results are presented here.

### Methods

After the formulation of the new algorithm for the management of respiratory sleep disorders had been agreed and introduced into practice, the first 100 consecutive patients referred either to ENT or respiratory medicine were audited. All patients were sent a questionnaire which having been completed and returned was the basis to determine further management. This questionnaire included a standard Epworth Sleepiness Scale (ESS)<sup>6</sup> (Table I); this scores daytime sleepiness in seven every day situations to derive an overall score from zero to 21.

The mean score (SD) for normal controls was 5.9 (2.2). Included in the questionnaire are questions on snoring (every night yes/no), sleeping in a separate room from one's partner (yes/no/not applicable), cessation of breathing during sleep (yes/no), alcohol consumption, height and weight.

Using this questionnaire, patients were categorized into a high, intermediate or low risk category with regard to the likelihood of them having SAHS. Patients having a high probability on the basis of their questionnaire underwent overnight home oximetry and those with an intermediate risk had video oximetry<sup>7</sup> (Visilab). Video oximetry included a video recording of the patient whilst sleeping and a measurement of sound, movement, oxygen saturation and heart rate.

The data collected allowed us to determine the amount of time taken for patients to receive the appropriate investigation and treatment. Comparison of these figures with those of the previous audit<sup>5</sup> allowed us to evaluate the effectiveness of this management strategy.

## Results

All 100 patients were referred by their General Practitioner. Only one patient scored a low probability of SAHS on the questionnaire and was referred directly to ENT. One patient failed to collect the oximeter for home oximetry, his questionnaire suggested he was at high risk of SAHS. One patient was deemed unsuitable for inclusion into the protocol as the patient was a child, and therefore was referred directly to ENT. Following normal sleep analysis, either home oximetry or video oximetry, 10 patients were referred directly to ENT with no respiratory medicine follow-up. The reason for this was that they were diagnosed as suffering from snoring uncomplicated by sleep apnoea. Nine patients were discharged back to their General Practitioner with no clinic appointment. These were patients who had no risk of sleep apnoea and no significant problem with snoring.

Following sleep study analysis, 81 patients were seen in the Department of Respiratory Medicine. One of these patients was referred to ENT, with a normal video oximetry. Forty-nine patients received a trial of nasal continuous positive airway pressure (nCPAP); three patients given a trial of nCPAP were referred to ENT. There was one patient with unilateral nasal obstruction, one patient for assessment with a view to tonsillectomy and one patient without sleep apnoea who wanted a trial of nCPAP before ENT referral. The remaining 31 patients were referred back to their General Practitioner. This was a mixed group. They comprised patients who were given advice about weight reduction, patients who refused trial of nCPAP and patients who failed to attend further investigation or follow-up appointments. In two of these patients, an ENT referral was suggested. In total, six patients were referred to ENT following sleep study. The average waiting times are summarized in Table II.

## Discussion

SAHS illustrates the problems encountered when the management of a disease requires input from different specialties. The potential number of hospital visits may be higher than required and delays in investigation and treatment may occur. Our previous audit allowed the formulation of a management algorithm and prompted the setting up of a co-ordinated approach between ENT and respiratory medicine. The use of a questionnaire to assess the risk of obstructive sleep apnoea is a method shown to have some validity<sup>5,7,8</sup> although we recognize that the 'gold standard' is polysomnography. Our practice mirrors the conclusions made by Lim and Curry<sup>8</sup> who have shown that using a combination of a questionnaire about symptoms suggestive of SAHS, the Epworth Sleepiness Scale Score and the body mass index (BMI) they achieved a sensitivity of identifying non-apnoeic snorers of 93.4 per cent validated by polysomnography. This audit has shown that the vast majority of patients

TABLE I  
THE EPWORTH SLEEPINESS SCALE

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired? This question refers to your usual way of life in recent months. Even if you have not done some of these things recently, please try to work out how they would have affected you. Use the following scale to choose the most appropriate number for each situation:

0 = would never doze                      1 = slight chance of dozing  
2 = moderate chance of dozing        3 = high chance of dozing

Situation	Chance of dozing
Sitting and reading	—
Watching television	—
Sitting inactive in a public place (e.g. at the cinema or a meeting)	—
As a passenger in a car for an hour without a break	—
Lying down to rest in the afternoon when circumstances permit	—
Sitting and talking to someone	—
In a car, while stopped for a few minutes in traffic	—

If you have not found yourself in one or more of the above situations, please use a zero (0) score, rather than leaving the question blank.

TABLE II  
DIFFERENCES IN AVERAGE WAITING TIMES FOR BEFORE 1ST AUDIT AND AFTER (2ND AUDIT) INTRODUCTION OF NEW GUIDELINES FOR THE INITIAL ASSESSMENT OF SAHS

	Number of patients	Mean (SD) waiting time in days
GP to respiratory physician (1st audit)	72	67.2 (42.7)
Referral receipt to sleep study (1st audit)	95	121.1 (72.8)
Seen by respiratory physician to sleep study (1st audit)	95	28.0 (18.2)
Referral receipt to nCPAP (1st audit)	31	132.2 (86.1)
Respiratory physician to ENT surgeon (1st audit)	13	114.1 (58.8)
GP to ENT surgeon (1st audit)	45	75.6 (66.5)
ENT surgeon to respiratory physician (1st audit)	36	106.4 (42)
Questionnaire to home oximetry (2nd audit)	81	21.5 (22.5)
Questionnaire to video oximetry (2nd audit)	20	48.8 (50.2)
Sleep study to respiratory outpatient appointment (OPA) (2nd audit)	81	60.0 (35.0)
Respiratory OPA to nCPAP (2nd audit)	49	33.7 (34.2)
Questionnaire to nCPAP (2nd audit)	49	100.6 (53.7)
Test to ENT OPA (2nd audit)	6	125.3 (99.6)

referred by general practitioners have at least an intermediate probability of SAHS and the majority need some form of sleep study. They would therefore not benefit from initial referral to ENT. In 80 per cent of our patients the only investigations required to make a diagnosis were the questionnaire and overnight oximetry.

Comparing this audit with our previous audit we found that the average waiting times to have a sleep study were reduced by 90 days, and to nCPAP trial by 32 days. The majority of time saved was due to a decrease in inter-speciality referral.

The impact on our service of the introduction of this algorithm was to reduce ENT clinic visits by 50 per cent. In the previous audit of 119 consecutive patients, out of 59 patients seen by ENT only 29 required an ENT intervention.<sup>5</sup> This is compared to the current audit of 100 patients, of which 16 were referred to ENT. It has produced a small increase in the number of sleep studies performed but has had no effect on the respiratory clinic workload.

This audit has highlighted the usefulness of employing a focused, co-ordinated approach to the management of a relatively complex problem. Using audit as an assessment tool we have demonstrated the benefits of changing our practice. This co-ordinated approach to the management of SAHS is not widespread in the UK, but we feel it should be adopted in order to conserve NHS resources and cut down on patient waiting times and unproductive outpatient appointments.

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