Received: 10 August 2019 | Revised: 19 December 2019 | Accepted: 10 May 2020

DOI: 10.1111/coa.13573

WILEY

CORRESPONDENCE: OUR EXPERIENCE

An effective decision-making aid for patients with tinnitus: A retrospective review of 205 patients

1 | BACKGROUND

Tinnitus is the perception of sound in the absence of an external source. It is becoming increasingly common, affects 10.2%-14.2% of the adult population in the United Kingdom (UK) and has a peak incidence of 11.4 per 10 000 person-years in those aged 60-69 years.[1]

Tinnitus therapies are cost-effective but due to its commonality, the UK National Health Service (NHS) pays £750 million for tinnitus services annually.[2] However, this is less than its estimated £2.7 billion yearly financial burden to the UK economy.[2] The services offered for patients with tinnitus vary across the UK. Accessing specialist services can be difficult because patients may not be referred by primary or secondary care which drives patient dissatisfaction and is costly.

To address the concerns of tinnitus service accessibility and quality, UK and non-UK organisations have published best practice guidelines.[3,4] However, they are rarely designed to direct treatment decisions for individual patients and often lack a clear triage pathway so are impractical for every day clinical use. With continually increasing pressures in the UK NHS, it is imperative to introduce novel processes that improve efficiency and quality of care for patients with tinnitus.

Triage provides a uniform approach to utilising precious resources in an efficient and cost-effective manner assigned according to patient need. In 2015 at the Norfolk and Norwich University Hospitals NHS Foundation Trust, a decision-making aid based on current evidence and guidance was implemented to provide appropriate and effective management to patients with tinnitus. In this study, we aimed to evaluate the effectiveness of this triage pathway in enhancing patient care.

2 | MATERIALS AND METHODS

2.1 | Ethical considerations

Ethical approval was not required. All data were fully anonymised.

2.2 | The tinnitus triage pathway

The decision-making aid was developed by a multidisciplinary team of individuals from ear, nose and throat (ENT), audiology and hearing therapy departments. The pathway assigns individuals to one of three outcomes (advice and direction to self-management resources, group therapy and individualised tinnitus therapy (ITTx)) based on three criteria: the presence of red flag symptoms, hearing assessed as per pure tone audiogram (PTA) and Tinnitus Handicap Inventory (THI)questionnaire score[5] (Figure 1).

THI cut-off points between 36 and 38 and 56 and 58 were made because these values define the transition between mild, moderate and severe tinnitus, respectively. Red flag symptoms included those outlined by the British Tinnitus Association (BTA) (https://www.tinnitus.org.uk/guidance-for-gps). Hearing levels were measured by PTA using frequencies between 250Hz and 2000Hz. We defined "normal hearing" as <25 decibels (dB), hearing loss within the dark grey area as >25dB and the black drawn line, and hearing loss outside the dark grey area as any hearing loss in the white area above 250Hz and separated by the drawn line. All hearing loss >120dB was considered outside the dark grey area. Based on the results of the three parameters, individuals were allocated to a specific pathway.

It is crucial that the extent of hearing loss is considered when managing patients with tinnitus because different extents of hearing loss require different hearing aids. The black drawn line in Figure 1 separating the dark grey area was specifically drawn because patients with hearing loss outside the dark grey area may have such severe hearing loss that they would not be able to follow the educational video presented to patients at their hearing therapy appointments. Such patients require an impression of their ear which would be made into a patient-specific mould and attached to a hearing aid. In contrast, those with hearing loss within the dark grey area will be able to hear sufficiently to follow the video presentation and are suitable for a thin tube hearing aid.

2.3 | Interventions

2.3.1 | Written information and British Tinnitus Association details

Patients considered to have mild tinnitus are provided with written information from their clinician and signposted to self-management

BTA guidelines, information leaflets (https://www.tinnitus.org.uk/what-can-i-do-about-it)and online resources (www.takeontinnitus.co.uk).

2.3.2 | Group tinnitus therapy

A group therapy session involves information giving, in the form of an interactive presentation lasting for one hour, delivered by a hearing therapist. Eight patients are in each group. The purpose is to provide patients with a basic understanding of tinnitus, useful management advice, an opportunity to meet other affected persons, and if appropriate, further specialist treatment options (relaxation, sleep advice, individualised hearing therapy). Group therapy provides the benefit of managing multiple patients at once which reduces waiting times and is time-efficient and cost-efficient.

2.3.3 | Individualised tinnitus therapy

Patients with "red flags" and/or severe tinnitus are referred to ITTx. Patients are assessed to determine the extent of impairment, disability and handicap using questionnaires. In addition to the information provided during group therapy sessions, ITTx allows a one-hour, one-to-one session, whereby the hearing therapist provides a more bespoke interaction with the patient. The provision of more specialist psychological, well-being (relaxation and sleep advice) and device-based therapies (hearing aids and sound generators) is explored.

2.3.4 | Audiology

A hearing aid assessment is provided for patients with hearing loss. A low THI and less substantial hearing loss warranted referral for tinnitus therapy before audiology. Those with significant hearing loss were immediately referred to audiology.

2.4 | Effectiveness of the triage pathway

To determine whether the pathway is effective, we defined "successful triage" as individuals that had been triaged, managed and not re-referred into the system during the proceeding 12 months. Therefore, appropriate designation was assessed by considering no movement from the advice pathway or group therapy pathway to a superior pathway upon re-referral.

We assumed that the gold-standard pathway for patients with tinnitus was for audiological input and ITTx as per national guidance.[6-8] We defined a "triage failure" where an inferior treatment pathway results in a re-referral and re-provision for audiological input and ITTx.

To acquire a numerical estimation of success, we cross-referenced referrals to our service using hospital databases. The total number of referrals for individuals with tinnitus from their primary care services during 2017 (1 January 2017 to 31 December 2017) was determined. We then identified individuals previously seen at our services within12 months. Those who had previously received an intervention to manage their tinnitus and then re-referred within 12 months had their original clinical records scrutinised to determine whether re-referral was due to a failure of our pathway.

Key points

- Tinnitus is a common condition associated with a reduced quality of life.
- Due to modern UK healthcare demands, it is essential to develop novel methods for delivering care to patients with tinnitus in a timely and cost-effective manner.
- A decision-making aid based on current evidence and guidance was implemented which assigns individuals to different treatment pathways based on individual requirements.
- In 2017, 205 patients were referred to our services. Of these, only 1 patient was re-referred into our services due to failure of the pathway(0.5% of referrals).
- A decision-making aid which delegates therapies based on patient need can improve the efficiency and cost-effectiveness of care for patients with tinnitus in the United Kingdom National Health Service.

3 | RESULTS

In total, 205 patients were referred to our service from their primary care services between 1 January 2017 and 31 December 2017. Eleven were re-referred to the service within 12 months of their first referral; their clinical records were reviewed. Only one was re-referred to a superior treatment group (0.5% of referrals). Re-referral for the other ten patients was for reasons other than the pathway (Figure 2). Four were re-referred because they initially declined further treatment, three because they failed to attend their offered appointments, two were re-referred having already received maximal input (ITTx) and one because treatment of the presumed cause of their tinnitus was only temporary (wax removal).

One patient was deemed to be a triage failure. This was a 32-year-old lady who presented with normal hearing. The THI score, as recorded in the letter to the patient's general practitioner (GP), was 54. Whilst the patient had an extensive and complex medical history, there were no specific risk factors considered to be "red flag" tinnitus symptoms. Upon reviewing the clinical notes, the authors discovered that the total THI score had been miscalculated; the score was 64 rather than 54. Despite this, the reason for escalation from group therapy to ITTx, as reported by the hearing therapist leading the group therapy session, was due to patient preference.

Guidelines for ENT referral to Tinnitus Therapy Clinics

- Sticky Label -

Name of referring doctor

.....

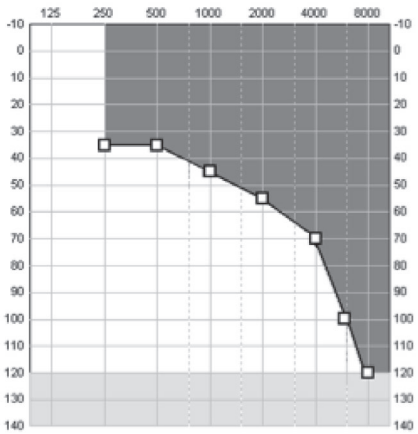
Date

.....

1. **Tinnitus Handicap Inventory Score**

2. **Red flag symptoms?** **Yes** *or* **No**
   Please circle Yes or No*
   **Please attach a copy of your GP letter*
   Examples include psychiatric history and atypical tinnitus

3. **Normal Hearing**
   or
   Hearing loss within grey area
   or
   Hearing loss outside grey area
   Please refer to the diagram to the right and then circle the most appropriate response



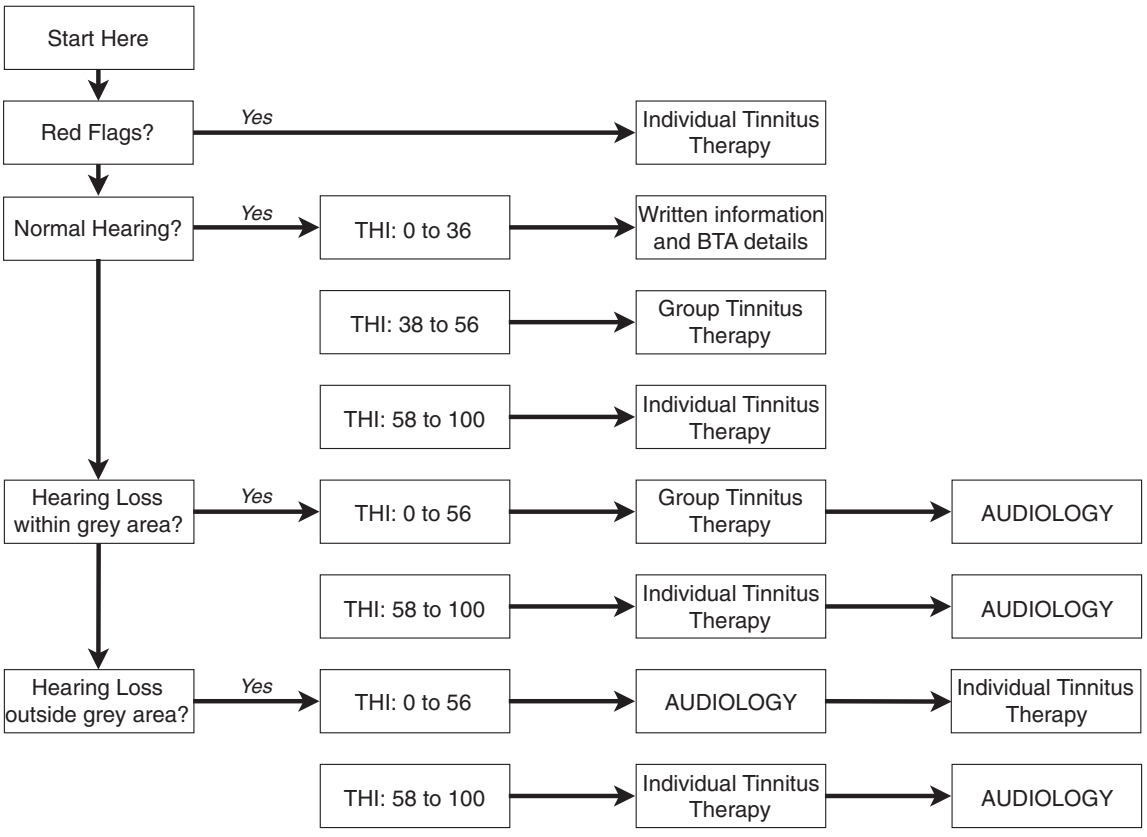


FIGURE 1 Decision-making aid developed at the Norfolk and Norwich University Hospital which assigns individuals with tinnitus to different treatment pathways based on their THI, red flag symptoms and hearing loss according to PTA. Abbreviations: PTA: pure tone audiometry and THI: Tinnitus Handicap Index

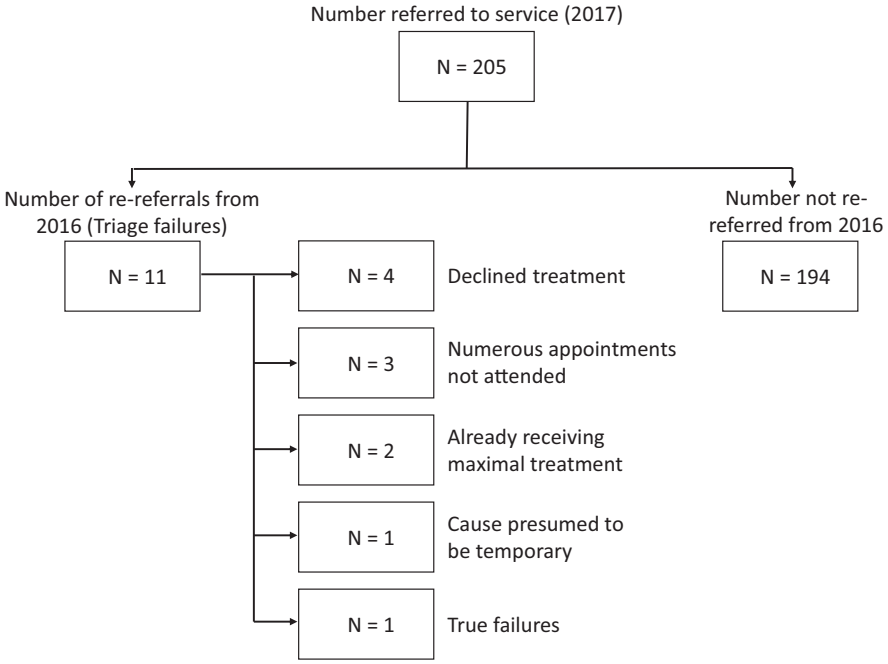


FIGURE 2 A schematic highlighting individuals who were referred to tinnitus services at the Norfolk and Norwich University Hospital. A total of 205 patients were referred to the services in 2017. Of those, 11 were re-referrals from the previous 12 months. Only 1 was a true failure of the decision-making aid. Four were due to the patients declining treatment, 3 did not attend several appointments, 3 were already receiving maximal treatment and 1 whose cause of tinnitus was presumed to be temporary (wax removal)

4 | DISCUSSION

Tinnitus is a common and sometimes chronic condition often associated with a reduced quality of life (QoL). With increasing public demand for health care, rising costs, reduced budgets and shortages in staff numbers, it is imperative that novel processes are introduced to improve the efficiency and quality of health care delivered to patients regardless of external socio-political pressures.

4.1 | Clinical applicability

The decision-making aid developed at the NNUH (Figure 1) assigns specific interventions for patients based on the severity of their tinnitus at their first presentation. Severity is determined using three variables: the presence of red flag symptoms, the patient's hearing and THI score. The evidence used to inform the development of the decision-making aid is consistent with more recent guidelines published after 2015.[6-8]

The triage pathway was specifically designed so individuals with low THI scores, but other complexities, would gain access to bespoke (non-group) input as a priority. To achieve this, red flag symptoms were the first variable that the clinician had to consider. Red flag symptoms were not fixed because this allowed a flexible pathway for the primary care practitioner to direct patients into a specific service at their discretion if particularly concerned.

Patients were investigated for the presence of hearing loss using a PTA. A referral to audiological services for these patients ensures a comprehensive assessment and management with sound therapeutic interventions which can provide short-term and long-term benefit and curtail tinnitus symptoms.

The THI questionnaire is an effective, easily administered, psychometrically robust and repeatable method to examine the impact that tinnitus has on an individual patient's QoL and can reliably inform clinical decisions.[5] Following a hearing assessment, the THI score of all patients was calculated to indicate its severity from the patient's perspective.

Once all variables were determined, patients were assigned to a therapeutic intervention based on clinical need (Figure 1). Our assessment of patient outcomes has identified only one patient that required reassignment to an escalated treatment pathway. It could be argued that this reassignment was a consequence of "user error," but the processes involved during group therapy sessions are such that they provide a safety net to allow escalation of patients who are deemed to benefit from a more individualised approach. Overall, our decision-making aid has achieved substantially fewer re-referrals compared with other published literature.[9] User error is important to appreciate in any decision-making aid and supports the use of instruments that are simple to administer and analyse; this was one reason that the THI was considered superior to other contemporary tinnitus assessment questionnaires.

4.2 | Cost implications

Of 205 patients seen in 2017, only one failure could be attributed to the triage pathway. Historically, most patients referred into our service would receive ITTx which would be much more costly than providing information and/or therapy in a group environment.

4.3 | Study limitations

All patients were from Norfolk in the UK, receiving care from NHS services and initially referred by their GP. Therefore, patients from outside the region, who sought private health care, who did not seek

help from their GP or who were refused referral by primary care services, would not have been captured. There was no control group for comparison so conclusions relating to the pathway's effectiveness compared with other management strategies can only be speculative. The low re-referral rate may be attributed to patients seeking help from an alternative NHS or private provider following their first referral, or perhaps were dissatisfied with services so refused re-referral. No quantitative measure of patient satisfaction was performed so this cannot be formally assessed.

4.4 | Future considerations

It will be beneficial to perform a prospective, multi-centred audit to examine the triage pathway's implications on patients in different geographical areas and to allow an in-depth analysis of its economic implications on a national scale. A longer length of follow-up would allow an improved understanding of the decision-making aid's long-term implications for patients, provide further insight into their health behaviours and allow patient satisfaction to be assessed in greater detail using robust methodologies. Pathways based on quantitative clinical characteristics could be combined with qualitative decision tools designed for patients[10] to optimise care and patient satisfaction.

ACKNOWLEDGEMENT

We wish to acknowledge Dr John Fitzgerald and Mrs Claire Gatenby for their input in developing the tinnitus triage pathway.

CONFLICTS OF INTEREST

JP is chair of the British Tinnitus Association's Professional Adviser's Committee. DCM has no conflicts of interest.

ETHICS STATEMENT

This study abides by the Declaration of Helsinki. No ethical approval required.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declan C. Murphy[1,2,3]
John S. Phillips[1]

[1]*Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, Norfolk, UK*
[2]*Northumbria Healthcare NHS Foundation Trust, Newcastle upon Tyne, UK*
[3]*Institute of Genetic Medicine, Newcastle University, Newcastle upon Tyne, UK*

Correspondence
Declan C. Murphy, Northumbria Healthcare NHS Foundation Trust, Newcastle upon Tyne, UK.
Email: murphy.declan.1994@gmail.com

ORCID

Declan C. Murphy https://orcid.org/0000-0001-9295-7712

REFERENCES

1. Martinez C, Wallenhorst C, McFerran D, Hall DA. Incidence rates of clinically significant tinnitus: 10-year trend from a cohort study in England. *Ear Hear*. 2015;36(3):e69-75.
2. Stockdale D, McFerran D, Brazier P, et al. An economic evaluation of the healthcare cost of tinnitus management in the UK. *BMC Health Serv Res*. 2017;17(1):577.
3. Department of Health. *Provision of services for adults with tinnitus: a good practice guide*. London: England; 2009.
4. Tunkel DE, Bauer CA, Sun GH, et al. *Clinical Practice Guideline. Otolaryngol Neck Surg*. 2014;151(2_suppl):S1-S40.
5. Newman CW, Sandridge SA, Jacobson GP.Psychometric Adequacy of the Tinnitus Handicap Inventory (THI) for Evaluating Treatment Outcome. Vol 9. 1998.
6. NICE. Management of Tinnitus. 2017.
7. British Tinnitus Association. Tinnitus Guidance for GPs. 2017.
8. Cima RFF, Mazurek B, Haider H, et al. A multidisciplinary European guideline for tinnitus: diagnostics, assessment, and treatment. *HNO*. 2019;67(1):10-42.
9. McFerran D, Hoare DJ, Carr S, Ray J, Stockdale D. Tinnitus services in the United Kingdom: a survey of patient experiences. *BMC Health Serv Res*. 2018;18(1):110.
10. Pryce H, Durand MA, Hall A, et al. The development of a decision aid for tinnitus. *Int J Audiol*. 2018;57(9):714-719.