AJA

Research Forum

The Application of Intervention Coding Methodology to Describe the Tinnitus E-Programme, an Internet-Delivered Self-Help Intervention for Tinnitus

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Purpose: This article describes the Tinnitus E-Programme, a previously untested Internet-delivered self-help intervention for tinnitus.
Method: Intervention coding methodology was applied to describe the intervention components, techniques, and mode of delivery.
Results: The intervention consists of 5 self-management intervention components, 5 behavior change techniques, and 3 modes of Internet delivery, which aim to promote relaxation behavior and reduce tinnitus distress.
Conclusions: The intervention coding provided a reliable method for reporting Internet-delivered self-help interventions. It will be used to facilitate our understanding of the intervention's potential mechanisms of change and will guide future evaluation work.

Tinnitus (ringing in the ears) affects 10%–15% of the adult population (Davis & El Refaie, 2000). Most people experiencing tinnitus do not find it bothersome and their everyday lives are relatively unaffected. However, for others, tinnitus can be debilitating, causing high levels of emotional distress and a significantly reduced quality of life (Langguth, 2011).

In the absence of a cure, recommended management strategies aim to address underlying hearing loss (e.g., provision of hearing aids), or reduce the tinnitus percept (i.e., sound devices) or associated distress, depression, or anxiety. To be specific, psychological approaches have focused on reducing physiological arousal (e.g., through relaxation) and other stresses, and changing the emotional meaning of tinnitus (McKenna, 2004). For example, cognitive behavior therapy (CBT) has demonstrably led to reduced tinnitus distress, depression, and improved quality of life in people with tinnitus (Hesser, Weise, Westin, & Andersson, 2011; Hoare, Kowalkowski, Kang, & Hall, 2011; Martinez-Devesa, Perera, Theodoulou, & Waddell, 2010). In England, the psychological support offered in National Health Service (NHS) audiology departments is variable, and few have regular access to clinical psychologists (Hoare, Gander, Collins, Smith, & Hall, 2012). Self-help interventions, in which individuals work through a set of therapeutic materials with minimal or no guidance from a therapist, have been suggested as an accessible and potentially cost-effective form of tinnitus management.

Self-help interventions can offer additional benefits over traditional face-to-face psychological therapy. Individuals can work through therapeutic materials in their own homes, at their own pace, so such interventions are an alternative option for those unwilling or unable to access traditional psychotherapeutic interventions. Internet-delivered health interventions can reach a vast audience and can incorporate interactive functions (e.g., e-mail, peer-to-peer discussion forums, and tailored content). They have been shown to lead to improvements in health behavior, disease control, and psychological distress (Beatty & Lambert, 2013; Macea, Gajos, Calil, & Fregni, 2010; Webb, Joseph, Yardley, & Michie, 2010). In the tinnitus field, evaluations of the effects of Internet-delivered CBT interventions on tinnitus distress have shown promise (Andersson, Strömgren, Ström, & Lyttkens, 2002; Nyenhuis, Zastrutzki, Weise, Jäger, & Kröner-Herwig, 2013). These Internet-delivered interventions have also shown comparable outcomes to traditional

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Editor and Associate Editor: Larry Humes
Received December 19, 2014
Revision received March 16, 2015
Accepted March 22, 2015
DOI: 10.1044/2015_AJA-14-0089

Disclosure: *The authors have declared that no competing interests existed at the time of publication.*

face-to-face therapy (Jasper et al., 2014; Kaldo et al., 2008[1]) and other types of Internet-delivered therapy, such as acceptance and commitment therapy (Hesser et al., 2012).

In a UK context, unguided Internet-delivered interventions, which are followed independently by the user without any contact with a therapist, are consistent with a local model of care in which access to psychology services is extremely limited. Unguided interventions tend to have smaller effect sizes compared with therapist-guided self-help interventions (Baumeister, Reichler, Munzinger, & Lin, 2014; Spek et al., 2007), although in tinnitus studies the evidence is mixed (Nyenhuis et al., 2013). At the population level, larger effect sizes may be observed by virtue of the accessibility of unguided interventions to individuals unable or unwilling to access therapist-guided interventions (Ebert et al., 2014). Internet-delivered interventions are often associated with high dropout and nonusage attrition, however (Eysenbach, 2005), especially if the intervention is unguided (Baumeister et al., 2014), but again, for tinnitus there is mixed evidence. Some guided and unguided Internet-delivered tinnitus intervention studies have reported attrition rates comparable to those found in face-to-face group therapy studies (Jasper et al., 2014; Nyenhuis, Zastrutzki, Jäger, & Kröner-Herwig, 2013).

The first and third authors are currently conducting a systematic review of the techniques and effects of unguided self-help interventions for tinnitus (Greenwell, Sereda, Coulson, El Refaie, & Hoare, 2014). Only two studies have been identified that assessed the effectiveness of unguided Internet-delivered interventions (Kaldo et al., 2013; Nyenhuis et al., 2013). Both studies demonstrated a significant reduction in tinnitus distress associated with the intervention. However, there were too few studies to draw confident conclusions regarding the effectiveness of such interventions for tinnitus. Moreover, neither intervention is accessible to a UK population, with most research on this topic being carried out in Sweden or Germany. It is important to develop and evaluate interventions that are consistent with local models of tinnitus care (e.g., Department of Health, 2009).

The Tinnitus E-Programme (TEP; www.webcitation.org/6UFO5dN38) was developed in the United Kingdom and is currently available for free (www.tinnituseprogramme.org). However, this intervention has not yet been formally evaluated in any way. Here, we apply established intervention coding methodology to describe the intervention components, techniques, and mode of delivery. The application of such methodology will provide reliable reporting to facilitate evaluation replication and the identification of the active components of an intervention that are essential for understanding its potential mechanisms of change (i.e., the underlying psychological processes that bring about changes in outcome; Michie & Abraham, 2003). For example, if an intervention uses educational techniques (e.g., providing information about tinnitus), one could hypothesize that a successful intervention using these techniques should lead to a change in an individual's knowledge or attitude. Another example is the use of techniques that encourage people with tinnitus to pursue life activities regardless of their tinnitus. This may facilitate acceptance of tinnitus, which has been identified as a key mediator of success in Internet-delivered CBT and acceptance and commitment therapy (Hesser, Westin, & Andersson, 2014). This description will be used to guide future intervention optimization and evaluation work by the research team (first author, third author).

The Tinnitus E-Programme

The TEP was developed by a hearing therapist/psychotherapist (second author) and was based on her NHS group course (The Tinnitus Management Group Course). It was initially intended as a resource for health professionals but can also be used independently by people with tinnitus. The TEP is designed to be predominantly user led, but users do have the option to contact a therapist (second author) if they have queries about the TEP.

The program consists of education about tinnitus, psychoeducation (i.e., education about the role of psychological mechanisms in tinnitus), and relaxation and attentional-focus exercises. It is delivered using a set of resources, mainly downloadable information sheets and digital audio files originating from the Tinnitus Management Group Course. Users are encouraged to join and participate in the online support group provided. Content of the TEP is delivered in six weekly modules, followed by a 4-week maintenance period during which users can revisit the resources they have used and practice the learned tinnitus management skills (Table 1). The TEP can be viewed online or via mobile phone devices, and resources can be downloaded and used outside of the program. Although a recommended program structure is given, users have free choice regarding which components they access and in what order they access and use them. The express aim of the program is to reduce tinnitus distress; however, the precise mechanisms by which this change should occur have not yet been established.

The TEP website is currently visited by approximately 1,000 people per month, demonstrating a level of interest and visibility. Users do not need to register to gain access to the TEP but are encouraged to do so to provide feedback on the program and submit their outcome measure scores (see Intervention Components section later in this article). Since its launch in June 2009, 185 users have registered their email addresses with the TEP, and there are 144 registered users of the online support group.

A preliminary evaluation demonstrated promising findings (Featherstone, 2012), with all 23 participants (16 male, seven female) who completed a tinnitus questionnaire at baseline and after the 10-week program showing reduced tinnitus distress scores. Forty-seven percent of participants reporting mild-to-severe tinnitus distress at pre-intervention were no longer categorized as experiencing any distress after the TEP. Improvements were also found on ratings of depression and anxiety.

[1]The intervention in this study was preceded by clinical contact.

Table 1. Intervention content across the 10-week Tinnitus E-Programme

Intervention weeks	Intervention content
Week 1	• Completion and self-scoring of Tinnitus Handicap Inventory (THI; downloadable questionnaire) • Mechanisms of tinnitus (pdf information) • Three main aspects to the effective management of tinnitus (pdf information) • Mind-calming breathing exercise (pdf instructions) • Prompt users to join and participate in online support group (web page) • Goal setting: Practice the mind-calming breathing exercise at least three times a day throughout the 10-week program (web page)
Week 2	• Effects of stress and how to manage it (pdf information) • Relationship between human performance and physiological arousal (pdf instructions) • Physiological relaxation exercise (pdf instructions) • Guided Relaxation 1 (MP3 audio) • Goal setting: Practice Guided Relaxation 1 for 30 min every day during Week 2 (web page)
Week 3	• The Three Levels of Hearing and its relationship to tinnitus (pdf information) • Significance of sound in relation to behavior toward tinnitus (pdf information) • Role of attention focus and stress that relates to tinnitus distress (pdf information) • Guided Relaxation 2 (MP3 audio) • Goal setting: Practice Guided Relaxation 2 for 30 min every day during Week 3 (web page)
Week 4	• Negative thinking and how it promotes intrusive, distressing tinnitus (pdf information) • How to identify negative thoughts, challenge those thoughts, and change them into positive thoughts (pdf information) • Guided Relaxation 3 (MP3 audio) • Goal setting: Practice Guided Relaxation 3 for 30 min every day during Week 4 (web page)
Week 5	• Behavioral techniques on how to manage tinnitus (British Tinnitus Association; pdf information) • Guided Relaxation 4 (MP3 audio) • Goal setting: Practice Guided Relaxation 4 for 30 min every day during Week 5 (web page)
Week 6	• Prompt users to review information materials from Weeks 1–5 (web page) • Goal setting: Continue practicing the mind-calming breathing exercise for a minimum of three times each day and practicing relaxation for 30 min (by choosing one of the 30-min recordings from Weeks 2–5) each day (web page)
Weeks 7–10 (maintenance period)	• Continue goal setting as per Week 6 (web page) • Complete and self-score the THI at the end of Week 10 (downloadable questionnaire)

Method

The intervention description was developed through: (a) analysis of TEP website content; (b) discussions with the TEP developer (second author); and (c) application of established coding schemes to identify the TEP's modes of internet delivery, components, and techniques. Modes of delivery were coded using a coding scheme developed by Webb et al. (2010). Intervention components (i.e., self-management strategies) were coded using the Practical systematic Review of Self-Management Support (PRISMS) taxonomy of self-management support components (Taylor et al., 2014), and any components associated with behavior change were coded using the behavior change techniques taxonomy (Michie et al., 2013). Coding was carried out independently by the first and second authors, and disagreements were resolved via discussion with the third author.

Results

Mode of Delivery

Three Internet-delivery modes were identified using the Webb et al. (2010) coding scheme. The TEP is delivered using automated functions, including "the use of an enriched information environment" (i.e., supplementary content and links, testimonials, audio) and communicative functions, including "access to an advisor to request advice" (i.e., professional- and lay-moderated discussion forums) and "peer-to-peer access" (i.e., a peer-to-peer discussion forum). Optional components were not coded as they were not deemed to be a mandatory aspect of the TEP. These included downloadable CBT workbooks, which are available to for users to purchase, and the option for users to e-mail the therapist if they have queries.

Intervention Components

Using PRISMS taxonomy, five intervention components were identified: education about condition and management, information about available resources, training/rehearsal for psychological strategies, social support, and monitoring of condition with feedback to the patient.

Education About Condition and Management

The TEP provides several electronic information resources during the 6-week intervention period. The Good Practice Guide (GPG; Department of Health; 2009) recommends information provision and reassurance as a first-line form of self-management support. Through developing an understanding of their tinnitus, individuals can learn to manage and cope with their illness. In their systematic review, Hoare et al. (2011) found that directive counseling (i.e., education/information giving), through providing a self-help book or therapist-led educational sessions, has

significant benefits for people with tinnitus when compared with no intervention or undirected self-help groups.

Information About Available Resources

As well as providing resources, the TEP also signposts people to other helpful resources using website links and book references.

Training/Rehearsal for Psychological Strategies

The TEP provides relaxation skills training through written instructions and digital audio (MP3) of guided relaxation exercises. The GPG recommends relaxation therapy as a tinnitus management strategy. However, the evidence for its effect on tinnitus distress or psychological morbidity is mixed and inconclusive, and its use in English audiology departments is limited (Hoare et al., 2011; Hoare et al., 2012). The specific behavior change techniques used to facilitate relaxation behavior are described below.

The TEP also includes brief cognitive restructuring training whereby users are given information on how to identify and change negative thoughts. Cognitive restructuring is a key part of CBT and is an effective psychological management strategy for people with tinnitus (Martinez-Devesa et al., 2010).

Social Support

Users are asked to join a professional- and lay-moderated online support group at the beginning of the program, through which they can communicate with other users. The discussion board is hosted on an external website, and joining the group must be approved by the moderators. It has been argued that online support groups work through a set of empowerment processes (e.g., exchanging information, encountering emotional support, helping others), by which individuals gain mastery and control over issues affecting their lives (Van Uden-Kraan et al., 2008). Support groups are also recommended in the tinnitus GPG.

Monitoring of Condition With Feedback to the Patient

To monitor any changes in their tinnitus, users are asked to complete and self-score the Tinnitus Handicap Inventory (Newman, Jacobson, & Spitzer, 1996) at the beginning and end of the program. They are encouraged to submit their questionnaire scores to the TEP therapist for intervention evaluation purposes. Through self-monitoring, users can track their progress through the TEP, evaluate its success, and gain insight into how their tinnitus affects them personally. The use of the Tinnitus Handicap Inventory is recommended in the GPG, but it is generally used in practice for diagnostic or outcome assessment (Hoare et al., 2012), rather than as a self-management tool for patients.

Behavior Change Techniques

Practicing relaxation was identified as a behavior change outcome of the TEP. Using the behavior change techniques taxonomy, five techniques to promote relaxation behavior were identified. The identified techniques are provided in parentheses below. Users are presented with downloadable written instructions and digital audio recordings of guided relaxation exercises to develop their relaxation skills and provide opportunities for practicing and rehearsing this skill (Code 4.1: Instruction on how to perform the behavior; Code 8.1: Behavioral practice/rehearsal). The digital audio recordings provide users with new and helpful resources to facilitate relaxation behavior (Code 12.5: Adding objects into the environment). The TEP also sets users several daily relaxation goals to encourage them to practice relaxation in their everyday lives (Code 1.1: Goal setting [behavior]; Code 1.4: Action planning). For example, from Week 1, users are prompted to practice a mind-calming breathing exercise at least three times a day.

Future Directions

Consistent with the Medical Research Council (2008) framework for developing and evaluating complex interventions, an exploratory evaluation of the TEP will be carried out to address some of the key uncertainties in the intervention and maximize its likelihood for success during a definitive efficacy trial. The intervention description presented here will be used to inform a mixed-methods evaluation to explore the acceptability, usability, and potential psychosocial outcomes of the TEP. Addressing these key uncertainties will provide some of the missing evidence base needed to guide future development and evaluation work (e.g., choosing appropriate assessment measures).

Acknowledgements

The first and third authors are funded by the National Institute for Health Research (NIHR) Biomedical Research Unit program; however, the views expressed are those of the authors and not necessarily those of the National Health Service, the NIHR, or the Department of Health.

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