Thoughts about Suicide and Self-Harm in Patients with Tinnitus and Hyperacusis

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Abstract

Background: There are conflicting reports with regard to the relationship between suicidal ideations and tinnitus and hyperacusis. Audiology departments play a major role in offering therapy and support for patients experiencing tinnitus and hyperacusis. If suicidal and self-harm ideations among patients seen in audiology clinics are high, then it would be important to screen for them to make onward referrals to mental health services.

Purpose: The aim of this study was to assess the prevalence of and factors related to suicidal and self-harm ideations in patients with tinnitus and hyperacusis seen at an audiology outpatient service.

Research Design: This study was a part of a service evaluation survey using a correlational design.

Study Sample: All patients who sought help concerning their tinnitus or hyperacusis from an audiology clinic of the National Health Service in the United Kingdom in a 1-yr period were asked to complete the survey questionnaires (n = 402).

Data Collection and Analysis: The focus of this article is on analysis of the patients' responses about suicidal and self-harm ideations as measured via the Patient Health Questionnaire, item 9, and their associated factors.

Results: A total of 150/402 of patients answered the question about suicidal and self-harm ideations. Of these, 13% indicated that they had suicidal or self-harm ideations in the past 2 weeks. Suicidal and self-harm ideations were moderately correlated with scores on the anxiety and depression subscales of the hospital anxiety and depression scale. Suicidal and self-harm ideations decreased with increasing age. There were small statistically significant correlations between suicidal and self-harm ideations and tinnitus handicap, hyperacusis handicap, insomnia, and scores on the visual analog scale (VAS) of effect of tinnitus on life. The correlations between suicidal and self-harm ideations and gender, pure-tone average of the worse and better ears, uncomfortable loudness levels of the worse ears, and VAS of tinnitus loudness and annoyance were not statistically significant. A regression model showed that abnormal depression scores increased the chance of suicidal and self-harm ideations by a factor of 6.2 (95% confidence interval = 1.13–34.1, $p = 0.036$).

Conclusions: Audiologists offering tinnitus and hyperacusis rehabilitation should screen for suicidal and self-harm ideations among patients, especially for those with comorbid depression, and make onward referral to appropriate services when needed.

Key Words: hyperacusis, self-harm, suicide, tinnitus

Abbreviations: CI = confidence interval; GP = general practitioner; HADS = Hospital Anxiety and Depression Scale; HQ = Hyperacusis Questionnaire; ISI = Insomnia Severity Index; NHS = National Health Service; PTA = pure-tone average; RSCH = Royal Surrey County Hospital; SD = standard deviation; THI = Tinnitus Handicap Inventory; THTSC = Tinnitus and Hyperacusis Therapy Specialist Clinic; ULL = uncomfortable loudness level; VAS = Visual Analog Scale

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INTRODUCTION

Tinnitus is the sensation of sound without any external sound source. Hyperacusis is intolerance of everyday sounds that causes significant distress and impairment in social, occupational, recreational, and other day-to-day activities (Aazh et al, 2016). The sounds may be perceived as uncomfortably loud, unpleasant, frightening, or painful (Tyler et al, 2014). There are several reports suggesting a high prevalence of psychological disturbances in patients suffering from tinnitus and hyperacusis (Andersson et al, 2004; Jüris et al, 2013; Pinto et al, 2014; Schecklmann et al, 2014; Pattyn et al, 2015; Aazh and Allott, 2016; Paulin et al, 2016). However, there are conflicting reports with regard to the relationship between suicide and tinnitus and hyperacusis. Tyler and Baker (1983) asked 97 members of a tinnitus support group to make a list of the difficulties that they were experiencing as a result of their tinnitus. Of these, 6.9% of the patients reported that they had considered suicide as a result of their tinnitus. Jacobson and McCaslin (2001) conducted a review study assessing 12 articles published between 1966 and 2001. Contrary to previous reports, their review suggested that there is no clear evidence supporting a cause and effect relationship between tinnitus and suicide. Recently, in a national survey in Korea (n = 17,466), Seo et al (2016) reported that 20.9% and 1.2% of participants with tinnitus reported suicidal thoughts and attempts, respectively. This was significantly higher than the prevalence of 12.2% and 0.6% for suicidal thoughts and attempts, respectively, for participants with no tinnitus ($p < 0.001$) (Seo et al, 2016).

It is important to investigate suicidal ideations, as they are associated with suicidal behavior, even though only a small proportion of those with suicidal ideations actually attempt suicide (Kessler et al, 1999; Suominen et al, 2004). There is no recent report about the prevalence of and factors related to suicidal and self-harm ideations among patients with tinnitus and hyperacusis seen in UK National Health Service (NHS) audiology outpatient services. Audiology departments play a major role in offering therapy and support for patients experiencing tinnitus and hyperacusis (Thompson et al, 2016). In the United Kingdom, 82% of the patients with tinnitus follow a referral path to Audiology, either via their general practitioners (GPs) or ear–nose–throat specialists, for management and therapy (Gander et al, 2011). If suicidal and self-harm ideations among patients with tinnitus and hyperacusis seen in audiology services are high, then it would be important to screen for them to make onward referrals to mental health services (McKenna et al, 1991; Department of Health, 2009).

The aim of this study was to assess the prevalence of and factors related to suicidal and self-harm ideations in patients with tinnitus and hyperacusis seen at an NHS audiology outpatient service.

METHODS

Study Design

The present study was a part of a service evaluation survey with correlational design conducted at the Tinnitus and Hyperacusis Therapy Specialist Clinic (THTSC), Royal Surrey County Hospital (RSCH), Guildford, UK. All patients seen in a 1-yr period were asked to complete the survey questionnaires. They were informed that their participation was completely voluntary and some patients did not complete all of the questionnaires. The focus of this article is on analyzing patients' responses with regard to suicidal and self-harm ideations and their related factors. Other items of the survey are reported elsewhere (Aazh and Moore, 2017).

Patients' demographic data and the outcomes of their latest audiological investigations and their routine self-report questionnaires (those gathered for evaluation of their tinnitus, hyperacusis, and mental state) were imported from their electronic records held at the Audiology department.

Study Population

The total number of patients who attended the THTSC from March 15, 2015, to March 15, 2016, was 402. All patients were referred via their GPs. The average age of the patients was 57 yr (standard deviation [SD] = 14.5 yr, range = 16–95 yr). There were 210/402 males. The mean pure-tone average (PTA) audiometric threshold at the frequencies 0.25, 0.5, 1, 2, and 4 kHz was 25 dB (SD = 19 dB) for the right ears and 25 dB (SD = 18 dB) for the left ears. The mean uncomfortable loudness levels (ULLs) at the frequencies 0.25, 0.5, 1, 2, 4, and 8 kHz were 83 dB HL (SD = 14 dB) for the right ears and 83 dB HL (SD = 15 dB) for the left ears.

Measurement Instruments

Suicide and Self-Harm Ideations

Patients were asked a question about suicidal ideations taken from the Patient Health Questionnaire (Kroenke et al, 2001), item 9. The question was "Over the last 2 weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?" The answers were "Not at all" (0 point), "Several days" (1 point), "More than half the days" (2 points), and "Nearly every day" (3 points).

Audiological Measurements

Pure-tone audiometry was conducted based on the procedure described by the British Society of Audiology (BSA, 2004). ULLs were measured based on the British Society of Audiology–recommended procedure (BSA, 2011). The average ULL at 0.25, 0.5, 1, 2, 4, and 8 kHz in the ear with the lowest ULLs was considered as indicting abnormal sound tolerance if it was <80 dB HL. Such low ULLs might indicate hyperacusis (Khalfa et al, 2002; Sherlock and Formby, 2005).

Assessment of Tinnitus and Hyperacusis Handicap

The Tinnitus Handicap Inventory (THI; Newman et al, 1996) was used to assess the impact of tinnitus on the patient's life. The THI has 25 items, and response choices are "no" (0 points), "sometimes" (2 points), and "yes" (4 points). The overall score ranges from 0 to 100. Scores from 0 to 16 indicate no handicap, scores from 18 to 36 indicate mild handicap, scores from 38 to 56 indicate moderate handicap, and scores from 58 to 100 indicate severe handicap (Newman et al, 1996).

The Hyperacusis Questionnaire (HQ; Khalfa et al, 2002) was used to assess the effect of hyperacusis on the patient's life. The HQ has 14 items and the response choices are "no" (0 points), "yes, a little" (1 point), "yes, quite a lot" (2 points), and "yes, a lot" (3 points). The overall score ranges from 0 to 42. Scores above 26 indicates strong auditory hypersensitivity (Meeus et al, 2010).

The Visual Analog Scale (VAS; Maxwell, 1978) was used to assess tinnitus loudness, annoyance, and effect on life. VAS scores are ratings on a scale from 0 to 10. The VAS score for the loudness of tinnitus was obtained by asking the patient to rate the loudness of tinnitus during their waking hours over the last month. (It was explained that 0 corresponds to no tinnitus being heard and 10 is the loudest sound that they can imagine.) The VAS score for annoyance induced by the tinnitus was obtained by asking the patient to rate their subjective perception of annoyance on average during the last month. (It was explained that 0 corresponds to no annoyance and 10 is the most annoying thing that can possibly happen.) The VAS score for the impact of tinnitus on their life was obtained by asking the patient to rate the effect of tinnitus on their life during the last month. (It was explained that 0 corresponds to no effect and 10 is an extreme effect.)

Assessment of Insomnia

The Insomnia Severity Index (ISI; Bastien et al, 2001) was used to assess insomnia. The ISI comprises seven items that assess the severity of sleep difficulties and their effect on the patient's life. Each item is rated on a scale from 0 to 4 and the total score ranges from 0 to 28. Scores from 0 to 7 indicate no clinically significant insomnia, scores from 8 to 14 indicate slight insomnia, scores from 15 to 21 indicate moderate insomnia, and scores from 22 to 28 indicate severe insomnia (Bastien et al, 2001).

Assessment of Anxiety and Depression Symptoms

The Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983) was used. The HADS consists of 14 items, each rated from 0 to 3 according to the severity experienced. Eight items require reversed scoring, after which depression (HADS-D) and anxiety (HADS-A) subscale totals can be obtained. The total score for each subscale ranges from 0 to 21. Scores from 0 to 7 are classified as normal, scores from 8 to 10 are classified as borderline abnormal, and scores from 11 to 21 are classified as abnormal (Zigmond and Snaith, 1983).

Ethical Approval

This study was initially registered as a service evaluation with the Clinical Audit, Patient Safety & Quality department at RSCH. Further analysis of the data was approved by the South West Cornwall and Plymouth Research Ethics Committee and the R&D department at the RSCH.

Data Analysis

The data were anonymized before statistical analysis. Spearman correlations were calculated between responses to the question about suicidal and self-harm ideations and the other measures. The p value required for statistical significance was set at $p < 0.05$. The STATA program (version 13; StataCorp LLC, College Station, TX) was used for statistical analyses. The analyses were restricted to patients for whom there were complete data on all variables required for a particular analysis. The number of patients included in each analysis (n) is reported.

Cohen's guide for evaluating the strength of a correlation, r, was used. Values of r equal to 0.10, 0.30, and 0.50 were considered as indicating weak, medium, and strong relationships, respectively (Cohen, 1988). Multinomial logistic regression was used to assess the relative risk ratio of suicidal and self-harm ideations in patients with different severities of other symptoms.

RESULTS

Participants

Of the 402 patients, 150 completed the survey questionnaire, including the question about suicidal and self-harm ideations, a response rate of 37%. As their

participation in the survey was completely voluntary, nonresponders were not asked to give a reason why they did not complete any specific questionnaire. The main reason given by those nonresponders who volunteered a reason was lack of time. As shown in Table 1, with one exception, there were no significant differences between the responders and nonresponders in scores for the routine questionnaires, age, PTA of the better and worse ear, and ULLs of the ear with smaller ULL values. The mean VAS score for tinnitus loudness was slightly higher for responders (mean = 6.5) than for nonresponders (mean = 6.0, $p = 0.04$). Fifty-two percent (78/150) of the responders were male, the same percentage as for the nonresponders.

Based on the scores for the THI, 11% of the responders (16/144) had no tinnitus handicap, 22% (32/144) had a mild tinnitus handicap, 29% (42/144) had a moderate tinnitus handicap, and 55% (54/144) had a severe tinnitus handicap.

For the responders, the mean ULL over the frequencies 0.25, 0.5, 1, 2, 4, and 8 kHz averaged 84 dB HL (SD = 14 dB) for right and left ears. Based on the ear of each patient with lower ULLs, 31% (29/95) of responders were considered as having abnormally low ULLs, which might be an indication of hyperacusis.

Based on the scores for the HQ, 26% (37/145) of responders experienced significant hyperacusis handicap. Twenty-two percent (14/65) had both abnormally reduced ULLs and significant hyperacusis handicap based on the HQ.

For the anxiety subscale of the HADS, 38% (56/147) of responders had normal scores, 21% (31/147) had borderline abnormal scores, and 41% (60/147) had abnormal scores. Based on the scores for the depression subscale of the HADS, 64% (94/146) had normal scores, 20% (29/146) had borderline abnormal scores, and 16% (23/146) had abnormal scores.

Based on scores for the ISI, 27% (38/142) of responders did not have insomnia, 30% (42/142) had subthreshold insomnia, 30% (42/142) had clinical insomnia, and 14% (20/142) had severe insomnia.

Suicidal and Self-Harm Ideations and Their Related Factors

As shown in Table 2, 87% of the responders did not have suicidal or self-harm ideations and 13% of the responders reported that they had suicidal or self-harm ideations in the past 2 weeks.

As shown in Table 3, suicidal and self-harm ideations were moderately correlated with scores on the anxiety and depression subscales of the HADS. There was a small negative correlation between suicidal and self-harm ideations and age (Table 3). In other words, suicidal and self-harm ideations decreased with increasing age for patients with tinnitus and hyperacusis.

There were small significant correlations between suicidal and self-harm ideations and tinnitus handicap, hyperacusis handicap, insomnia, and VAS scores for the effect of tinnitus on life (Table 3). The correlations between suicidal and self-harm ideations and gender, PTA of the worse and better ears, ULLs of the worse ears, and VAS scores for tinnitus loudness and annoyance were not significant.

Table 1. Comparison of the Means and SDs of Age, PTA, and Scores on the Self-Report Questionnaires for the Responders and Nonresponders

	Number of Responders	Mean (SD) for Responders	Number of Nonresponders	Mean (SD) for Nonresponders	*p*
Age (yr)	150	59 (15)	252	56 (14)	0.056
PTA of better ear (dB HL)	139	20 (12)	225	21 (16)	0.64
PTA of worse ear (dB HL)	139	30 (21)	224	29 (21)	0.67
Average ULL of the ear with lower ULL (dB HL)	95	82 (15)	123	82 (15)	0.83
THI (range = 0–100)	144	49 (23)	242	46.4 (24)	0.24
HQ (range = 0–42)	145	18.5 (9)	233	16.5 (10)	0.051
VAS of tinnitus loudness (range = 0–10)	144	6.5 (2)	231	6.0 (2)	**0.04**
VAS of tinnitus annoyance (range = 0–10)	144	6.5 (2)	231	6.2 (3)	0.23
VAS of effect of tinnitus on life (range = 0–10)	144	5.6 (2.5)	231	5.1 (2.7)	0.1
ISI (range = 0–28)	142	13 (7)	220	12 (7)	0.38
HADS: anxiety domain (range = 0–21)	147	9.4 (4.9)	241	8.7 (4.7)	0.21
HADS: depression domain (range = 0–21)	146	6.4 (4.1)	241	5.9 (4.6)	0.33

Note: The significant *p* value is indicated in bold font.

Table 2. Summary of Patients' Responses with Regard to Suicidal and Self-Harm Ideations (n = 150)

Over the Last 2 Weeks, How Often Have You Been Bothered by Thoughts That You Would Be Better off Dead or Hurting Yourself in Some Way?	
Response	n (%)
Not at all	131 (87.3)
Several days	12 (8)
More than half the days	5 (3.3)
Nearly every day	2 (1.4)

The categories of tinnitus handicap, insomnia, depression and anxiety, and the presence or absence of hyperacusis handicap were included in a multinomial logistic regression for suicidal and self-harm ideations. The model outcomes, shown in Table 4, indicated that abnormal depression scores increased the chance of suicidal and self-harm ideations by a factor of 6.2 (95% CI = 1.13–34.1, $p = 0.036$). Other factors were not significant in predicting suicidal and self-harm ideations.

DISCUSSION

Among responders, suicidal and self-harm ideations were reported by 13% of patients. This is higher than the 9.8% prevalence of suicidal ideations reported for the general population in Britain (Casey et al, 2008). However, in the general population survey, Casey et al (2008) used item 9 of the Beck Depression Inventory (Beck et al, 1961) to assess suicidal ideations, and this differs from the question used here. As for our question, the participants of Casey et al were asked to answer the question based on how they felt during the past 2 weeks. However, they had to choose from: "I don't have thoughts of killing myself," "I have thoughts of killing myself but I would not carry this out," I would like to kill myself," and "I would kill myself if I had a chance." This contrasts with our question, which asked about how often suicidal or self-harm ideations were experienced. This makes the prevalence values somewhat difficult to compare. Nevertheless, those treating patients for tinnitus and/or hyperacusis should bear in mind that a significant proportion will have ideations about suicide or self-harm. Similar to our study, Casey et al (2008) reported that gender was not significantly associated with suicidal ideations. This was the case despite the finding that, in the general population, men have a higher rate of suicide completion but women have a higher rate of suicide attempts (Gaynes et al, 2004). Also similar to our study, Casey et al (2008) reported that the risk of suicidal ideations increased with increasing depression score and decreased with increasing age. This is important as it highlights the need for screening for suicidal ideations in patients seen at audiology clinics for tinnitus and hyperacusis rehabilitation who also suffer from depression, which can be identified with the use of the HADS.

Table 3. Correlation between Scores for Suicidal and Self-Harm Ideations and Age, Gender, PTA over the Frequencies 0.25, 0.5, 1, 2, and 4 kHz for Better Ears and Worse Ears, Average ULLs at 0.25, 0.5, 1, 2, 4, and 8 kHz for the Ear with the Lowest ULLs (Worst Ear), THI, HQ, ISI, Anxiety and Depression Subscales of HADS, and VAS of Tinnitus Loudness, Annoyance, and Effect on Life

	n	Correlation Coefficient (*r*)	*p*
Age	144	−0.19	**0.02**
Gender	144	−0.08	0.36
PTA of the better ear	133	−0.02	0.79
PTA of the worse ear	133	−0.1	0.25
Average ULL in the ear with lower ULL	90	0.007	0.94
THI score	138	0.21	**0.01**
HQ score	139	0.18	**0.036**
ISI score	137	0.20	**0.02**
VAS score for tinnitus loudness	138	0.12	0.15
VAS score for tinnitus annoyance	138	0.15	0.07
VAS score for effect of tinnitus on life	138	0.24	**0.004**
HADS anxiety score	141	0.35	**< 0.001**
HADS depression score	140	0.31	**0.001**

Note: Significant *p* values are indicated in bold font.

In comparison with studies of populations suffering from tinnitus, the prevalence of suicidal ideations in our study was smaller than the 21% reported by Seo et al (2016) and higher than the 6.9% reported by Tyler and Baker (1983). The discrepancies could be related to the different instruments used to assess suicidal ideations and/or to the characteristics of the study populations. In the present study, patients were asked about their suicidal and self-harm ideations in the past 2 weeks, while Seo et al (2016) asked the patients "In the last 12 months, did you think about committing suicide?" and Tyler and Baker (1983) asked the patients to make a list of the difficulties that they had as a result of their tinnitus, without giving a specific time frame. Our study population consisted of patients who sought help from their GPs concerning their tinnitus and/or hyperacusis and who were referred to an audiology clinic, while Seo et al (2016) used national survey data on the general population in Korea and Tyler and Baker (1983) studied members of a tinnitus support group in the United Kingdom. It is known that the prevalence of suicidal ideations in the general population can vary across countries, for example, 14.6% in Ireland, 7.4% in Wales, and 2.3% in Spain (Casey et al, 2008). In addition, the severity of tinnitus in patients who seek professional help may be different than the severity for the general population. Therefore, the data reported in this study may not be generalizable to other populations. However, the results of

Table 4. Multinomial Logistic Regression Model Showing the Relative Risk Ratio (RRR) for Presence or Absence of Any Suicidal and Self-Harm Ideations, Adjusted for Age (n = 118)

	RRR	95% CI	*p*
HQ			
No hyperacusis handicap (<26)	1		
Severe hyperacusis handicap (≥26)	0.52	0.12–2.28	0.4
THI			
No tinnitus handicap (0–16)	—		
Mild tinnitus handicap (18–36)	1		
Moderate tinnitus handicap (38–56)	2.9	0.27–30.5	0.4
Severe tinnitus handicap (58–100)	1.75	0.14–22.3	0.66
Anxiety subscale of HADS			
Normal (0–7)	1		
Borderline abnormal (8–10)	3.64	0.3–43.95	0.3
Abnormal (11–21)	7.14	0.66–76.36	0.1
Depression subscale of HADS			
Normal (0–7)	1		
Borderline abnormal (8–10)	2.4	0.44–13.2	0.31
Abnormal (11–21)	6.2	1.13–34.1	**0.036**
ISI			
No clinically significant insomnia (0–7)	1		
Slight insomnia (8–14)	0.37	0.05–2.6	0.32
Moderate insomnia (15–21)	0.51	0.08–3.2	0.47
Severe insomnia (22–28)	0.44	0.05–3.9	0.46

Notes: The included variables were categories based on scores for the THI, HQ, ISI, and anxiety and depression subscales of the HADS. The significant *p* value is indicated in bold font.

this study are very relevant to audiology clinics that provide therapy and support for patients with tinnitus and hyperacusis.

The response rate was 37%, which is not as high as the average response rate of 55% for surveys conducted by primary health-care services in the NHS (Grol et al, 1999). This indicates a risk of selection bias (Pannucci and Wilkins, 2010). The outcomes of this study may not be representative of the whole sample of patients with tinnitus and hyperacusis seen at the THTSC. Nevertheless, there was no significant difference between responders and nonresponders in any of the measures obtained during their standard evaluation for tinnitus and hyperacusis, except for a marginal difference in the VAS scores for tinnitus loudness (6.5 for responders and 6.0 for nonresponders). Therefore, it seems unlikely that selection bias had a strong influence on the outcomes.

Our results showed small but significant correlations between tinnitus and hyperacusis handicap and suicidal and self-harm ideations. To our knowledge, this finding is new.

CONCLUSIONS

Thirteen percent of patients seeking treatment for tinnitus and/or hyperacusis reported ideations of suicide or self-harm. Scores for suicidal and self-harm ideations decreased with increasing age and increased with increasing scores on the THI, HQ, ISI, VAS for effect of tinnitus on life, HADS anxiety, and HADS depression. The strongest correlations were for HADS anxiety ($r = 0.35$) and HADS depression ($r = 0.31$). A multinomial logistic regression model showed that the relative risk ratio for the presence or absence of suicidal or self-harm ideations was 6.2 (95% CI = 1.13–34.1) for abnormal scores on the depression subscale of the HADS. Clinicians treating patients who seek treatment for tinnitus and/or hyperacusis should be alert for the possibility of suicidal ideations and be prepared to screen for this and refer the patients for specialized psychiatric treatment, especially when a patient gives a high score on the depression subscale of the HADS.

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REFERENCES

Aazh H, Allott R. (2016) Cognitive behavioural therapy in management of hyperacusis: a narrative review and clinical implementation. *Audit Vestib Res* 25:63–74.

Aazh H, Moore BC. (2017) Usefulness of self-report questionnaires for psychological assessment of patients with tinnitus and hyperacusis and patients' views of the questionnaires. *Int J Audiol* 9:1–10.

Aazh H, Moore BCJ, Lammaing K, Cropley M. (2016) Tinnitus and hyperacusis therapy in a UK National Health Service audiology department: patients' evaluations of the effectiveness of treatments. *Int J Audiol* 55(9):514–522.

Andersson G, Carlbring P, Kaldo V, Ström L. (2004) Screening of psychiatric disorders via the Internet. A pilot study with tinnitus patients. *Nord J Psychiatry* 58(4):287–291.

Bastien CH, Vallières A, Morin CM. (2001) Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Med* 2(4):297–307.

Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. (1961) An inventory for measuring depression. *Arch Gen Psychiatry* 4:561–571.

British Society of Audiology (BSA). (2004) *Pure Tone Air and Bone Conduction Threshold Audiometry with and without Masking and Determination of Uncomfortable Loudness Levels*. Reading, UK: British Society of Audiology.

British Society of Audiology (BSA). (2011) *Recommended Procedure: Determination of Uncomfortable Loudness Levels*. Reading, UK: British Society of Audiology.

Casey P, Dunn G, Kelly BD, Lehtinen V, Dalgard OS, Dowrick C, Ayuso-Mateos JL. (2008) The prevalence of suicidal ideation in the general population: results from the Outcome of Depression International Network (ODIN) study. *Soc Psychiatry Psychiatr Epidemiol* 43(4):299–304.

Cohen J. (1988) *Statistical Power Analysis for the Behavioral Sciences*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Department of Health. (2009) *Provision of Services for Adults with Tinnitus: A Good Practice Guide*. London, UK: Department of Health.

Gander PE, Hoare DJ, Collins L, Smith S, Hall DA. (2011) Tinnitus referral pathways within the National Health Service in England: a survey of their perceived effectiveness among audiology staff. *BMC Health Serv Res* 11:162.

Gaynes BN, West SL, Ford CA, Frame P, Klein J, Lohr KN. (2004) ; U.S. Preventive Services Task Force. (2004) Screening for suicide risk in adults: a summary of the evidence for the U.S. Preventive Services Task Force. *Ann Intern Med* 140(10):822–835.

Grol R, Wensing M, Mainz J, Ferreira P, Hearnshaw H, Hjortdahl P, Olesen F, Ribacke M, Spenser T, Szécsényi J. (1999) Patients' priorities with respect to general practice care: an international comparison. European Task Force on Patient Evaluations of General Practice (EUROPEP). *Fam Pract* 16(1):4–11.

Jacobson GP, McCaslin DL. (2001) A search for evidence of a direct relationship between tinnitus and suicide. *J Am Acad Audiol* 12(10): 493–496.

Jüris L, Andersson G, Larsen HC, Ekselius L. (2013) Psychiatric comorbidity and personality traits in patients with hyperacusis. *Int J Audiol* 52(4):230–235.

Kessler RC, Borges G, Walters EE. (1999) Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Arch Gen Psychiatry* 56(7):617–626.

Khalfa S, Dubal S, Veuillet E, Perez-Diaz F, Jouvent R, Collet L. (2002) Psychometric normalization of a hyperacusis questionnaire. *ORL J Otorhinolaryngol Relat Spec* 64(6):436–442.

Kroenke K, Spitzer RL, Williams JB. (2001) The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 16(9):606–613.

Maxwell C. (1978) Sensitivity and accuracy of the visual analogue scale: a psycho-physical classroom experiment. *Br J Clin Pharmacol* 6(1):15–24.

McKenna L, Hallam RS, Hinchcliffe R. (1991) The prevalence of psychological disturbance in neurotology outpatients. *Clin Otolaryngol Allied Sci* 16(5):452–456.

Meeus OM, Spaepen M, Ridder DD, Heyning PH. (2010) Correlation between hyperacusis measurements in daily ENT practice. *Int J Audiol* 49(1):7–13.

Newman CW, Jacobson GP, Spitzer JB. (1996) Development of the Tinnitus Handicap Inventory. *Arch Otolaryngol Head Neck Surg* 122(2):143–148.

Pannucci CJ, Wilkins EG. (2010) Identifying and avoiding bias in research. *Plast Reconstr Surg* 126(2):619–625.

Pattyn T, Van Den Eede F, Vanneste S, Cassiers L, Veltman DJ, Van De Heyning P, Sabbe BC. (2015) Tinnitus and anxiety disorders: a review. *Hear Res* 333:255–265.

Paulin J, Andersson L, Nordin S. (2016) Characteristics of hyperacusis in the general population. *Noise Health* 18(83): 178–184.

Pinto PC, Marcelos CM, Mezzasalma MA, Osterne FJ, de Melo Tavares de Lima MA, Nardi AE. (2014) Tinnitus and its association with psychiatric disorders: systematic review. *J Laryngol Otol* 128(8):660–664.

Schecklmann M, Landgrebe M, Langguth B. (2014) ; TRI Database Study Group. (2014) Phenotypic characteristics of hyperacusis in tinnitus. *PLoS One* 9(1):e86944.

Seo JH, Kang JM, Hwang SH, Han KD, Joo YH. (2016) Relationship between tinnitus and suicidal behaviour in Korean men and women: a cross-sectional study. *Clin Otolaryngol* 41(3): 222–227.

Sherlock LP, Formby C. (2005) Estimates of loudness, loudness discomfort, and the auditory dynamic range: normative estimates, comparison of procedures, and test-retest reliability. *J Am Acad Audiol* 16(2):85–100.

Suominen K, Isometsä E, Suokas J, Haukka J, Achte K, Lönnqvist J. (2004) Completed suicide after a suicide attempt: a 37-year follow-up study. *Am J Psychiatry* 161(3):562–563.

Thompson DM, Hall DA, Walker DM, Hoare DJ. (2016) Psychological therapy for people with tinnitus: a scoping review of treatment components. *Ear Hear* 38(2):149–158.

Tyler RS, Baker LJ. (1983) Difficulties experienced by tinnitus sufferers. *J Speech Hear Disord* 48(2):150–154.

Tyler RS, Pienkowski M, Roncancio ER, Jun HJ, Brozoski T, Dauman N, Dauman N, Andersson G, Keiner AJ, Cacace AT, Martin N, Moore BCJ. (2014) A review of hyperacusis and future directions: part I. Definitions and manifestations. *Am J Audiol* 23 (4):402–419.

Zigmond AS, Snaith RP. (1983) The hospital anxiety and depression scale. *Acta Psychiatr Scand* 67(6):361–370.