National Institute for Health and Care Excellence

Final

Tinnitus: assessment and management

[P] Evidence review for combinations of management strategies

NICE guideline NG155

Intervention evidence review

March 2020

Final

This evidence review was developed by the National Guideline Centre

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1 Combinations of management strategies

1.1 Review question: What is the clinical and cost effectiveness of combinations of sound therapy (including sound enrichment), amplification devices, psychological therapies and tinnitus support?

1.2 Introduction

Practice across the UK varies greatly for people with tinnitus. Commonly, treatment strategies include sound therapy, psychological therapies, counselling/ tinnitus support and amplification devices. Some people are offered only one of these approaches, while others are offered more than one or a combination of approaches. Some people with tinnitus find that using sound to manage tinnitus is helpful, while others report that being able to respond differently to their tinnitus is important to them. How decisions are made for people accessing a particular approach also varies greatly, with some people not being actively involved in the decisions about their care.

For the purpose of this guideline, the term 'tinnitus support' is favoured over 'tinnitus counselling' and is defined as an interactive process between the individual with tinnitus and healthcare professional. Within this, the concerns and needs of the individual are identified and explored, including difficulties associated with tinnitus and the individual's understanding of the emotions related to tinnitus. As part of this process, delivery of information about tinnitus involves a two-way discussion promoting an understanding of the tinnitus. Then, a management plan can be developed that is tailored to the individual. The individual is supported to understand why suggested strategies may be helpful and how they can go about putting these in to place. As the tinnitus support is individually focused, consideration is made with regard to the needs, age and ability of the individual to ensure that all information is made accessible to them. Where other needs are identified, for example mental health needs, the person with tinnitus may also benefit from being to be referred to other relevant services.

The purpose of this review is to determine the effectiveness of using a combination of approaches. Separate reviews look at the clinical and cost effectiveness of amplification devices and sound therapy (evidence review M), psychological therapy (evidence review L) and tinnitus support (evidence review A) alone.

1.3 PICO table

For full details see the review protocol in appendix A.

Table 1: PICO characteristics of review question

Population	Children, young people and adults presenting with tinnitus. Strata: Children/young people (up to 18 years) and adults

Intervention(s)	Combinations of:
	• Psychological therapies
	  ○ Cognitive Behavioural therapy (CBT)
	  ○ Mindfulness-based interventions e.g. cognitive therapy and MBSR
	  ○ Brief solution focused therapy

	○ Narrative therapy ○ Family therapy/Systemic therapy ○ Acceptance and commitment therapy (ACT) ○ EMDR • "Tinnitus counselling" – education (including coping strategies, provision of information and relaxation) • Sound therapy and sound enrichment ○ Sound enrichment (e.g. environmental sound, a CD or mp3 download or the radio, a smartphone App, bedside/table-top sound generators, a wearable sound generator) ○ Combination hearing devices (hearing aid combined with sound generator) ○ Customised sound-based therapies, e.g. amplitude modulated tones and notched noise/music ○ Masking • Tinnitus retraining therapy (counselling with sound therapy) • Neuromodulation ○ transcranial direct current stimulation (tDCS) ○ transcranial alternating current stimulation (tACS) ○ vagal nerve stimulation (VNS) ○ transcutaneous vagal nerve stimulation (tVNS) ○ acoustic neuromodulation therapy ○ paired electrical and acoustic stimulation therapy ○ transcranial magnetic stimulation (rTMS) • Amplification devices for people with a hearing loss ○ Hearing aids ○ Implantable devices (including cochlear implants, bone-anchored hearing aids, bone-conduction hearing implants, bone-bridge/middle-ear devices)
Comparison(s)	• Interventions compared with each other (combinations and single interventions) • Control group (waiting-list control/no intervention)
Outcomes	• Tinnitus severity (critical) Impact of tinnitus (critical): • Tinnitus distress • Tinnitus annoyance Health related QoL (critical): • QoL (tinnitus) • QoL Tinnitus percept (important): • Tinnitus loudness Other co-occurring complaints (important): • Depression

	• Anxiety • Anxiety and depression • Sleep Adverse events (important): • Safety • Tolerability • Side effects
Study design	• Systematic review of RCTs • RCT • If there is an inadequate amount of RCT data, non-randomised comparative studies will be considered.

1.4 Clinical evidence

1.4.1 Included studies

Seven studies were included in the review;[1, 3, 9, 15, 17, 31-33] these are summarised in Table 2 below. Evidence from these studies is summarised in the clinical evidence summary below (Table 3).

The committee recognised that there is variation in how tinnitus counselling/ support interventions are described in practice and research. For the purpose of this review, the following categories were used to distinguish between the interventions described in the included studies:

- "Education counselling" – components of the interventions included giving information to people with tinnitus about the medical condition itself or interventions that can be used to manage it. Information would be delivered to participants over several sessions
- "Counselling (information)" – only information was provided to participants (e.g. provision of an information manual)

See also the study selection flow chart in appendix C, study evidence tables in appendix D, forest plots in appendix E and GRADE tables in appendix F.

1.4.2 Excluded studies

See the excluded studies list in appendix H.

1.4.3 Summary of clinical studies included in the evidence review

Table 2: Summary of studies included in the evidence review

Study	Intervention and comparison	Population	Outcomes	Comments
Argstatter 2015 [1] RCT	Intervention (n=146): Sound therapy (sound enrichment) + education counselling – participants received a standardised short-term music therapeutic treatment, over five consecutive days. Consisted of receptive (music listening based) and active (music making) music therapy. Additionally, participants also received a 50 minute single directive counselling session with individualised personal instruction. Comparison (n=144): Education counselling – participants received individualised personal instruction, counselling lasted 50 minutes and consisted of a single session. Aim was to provide participants with self-management strategies enable them to cope with their tinnitus.	n=290 People suffering from chronic tinnitus Age: 49.2 years Gender (male to female ratio): 2:1 Duration of tinnitus: 8 years Germany	Tinnitus severity (follow-up: 5 days/post-treatment): measured using the Tinnitus Questionnaire, total score range not reported (0-84 as indicated in literature)	
Bauer 2017 [3] RCT	Intervention (n=20): Tinnitus retraining therapy (TRT) [sound therapy (combination devices) + counselling] – participants received binaural open fit receiver-in-the-canal	n=39 People with chronic bothersome tinnitus Age: 18-50 years: 16%; 51-	Tinnitus severity (follow up: 18 months): measured using the Tinnitus Handicap Inventory (THI), total score ranges from 0-100	

Study	Intervention and comparison	Population	Outcomes	Comments
	combination devices and received TRT directive standardised counselling (3 one-hour sessions). Duration of counselling aspect of intervention not clearly reported. Comparison (n=19): Standard care (education counselling) – participants received general aural rehabilitation counselling (3 one-hour sessions) using a standardised standard care presentation. Participants were fitted with binaural combination devices (inactivated sound generator).	65 years: 66%; 66-75 years: 18% Gender (male to female ratio): 2:1 Duration of tinnitus: 1-2 years: 5%; 2-3 years: 11%; 3-5 years: 8%; 5+ years: 76% USA		
Dineen 1999 [9] RCT	Intervention 1 (n=20): Counselling (information) + sound therapy (sound enrichment) - participants received information on topics including: prevalence of tinnitus, function of the auditory system, psychology of adaptation to tinnitus and management of sleep problems. Each subject received a 60 page manual. Additionally, participants received long-term white noise (LTWN) stimulation devices. Intervention 2 (n=20): Counselling (information and relaxation) + sound therapy (sound enrichment) - participants received information on topics including: prevalence of tinnitus,	n=96 People presenting with tinnitus Age (mean):54.37 years Gender (male to female ratio): 2:1 Duration of tinnitus: Not reported Australia	Tinnitus loudness (follow-up:12 months): measured using a visual analogue scale, total score ranges from 0-10 Tinnitus annoyance (follow-up: 12 months): measured using a visual analogue scale, total score ranges from 0-10	Also included in counselling review

Study	Intervention and comparison	Population	Outcomes	Comments
	function of the auditory system, psychology of adaptation to tinnitus and management of sleep problems. Each subject received a 60 page manual. Participants received relaxation – 'progressive relaxation' technique (Jacobson, 1968), a relaxed breathing technique was used with the use of positive mental imagery. Two three-hour sessions provided. Additionally, participants received long-term white noise (LTWN) stimulation devices. Comparison 1 (n=28) Counselling (information and relaxation) Participants received information on topics including: prevalence of tinnitus, function of the auditory system, psychology of adaptation to tinnitus and management of sleep problems. Each subject received a 60 page manual. Participants received relaxation – 'progressive relaxation' technique (Jacobson, 1968), a relaxed breathing technique was used with the use of positive mental imagery. Two three-hour sessions provided. Comparison 2 (n=28) Information only – participants received information on topics including: prevalence of tinnitus, function of the auditory system, psychology of adaptation to tinnitus and management			

Study	Intervention and comparison	Population	Outcomes	Comments
	of sleep problems. Each subject received a 60 page manual.			
Henry 2016 [15] RCT	Intervention 1 (n=34) Tinnitus retraining therapy (TRT) [sound therapy (combination devices) + counselling] – participants were fitted with ear-level sound generators/maskers, hearing aids or combination instruments. Combination devices were advised. A structured counselling protocol was used for the TRT intervention. Intervention 2 (n=42): Sound therapy (tinnitus masking) + education counselling – participants were fitted with ear-level sound generators/maskers, hearing aids or combination instruments. A structured counselling protocol was used that containing specific information about tinnitus masking. Intervention 3 (n=39): Education counselling (+ amplification device if needed) - participants received counselling and were given generic information about tinnitus, including how we hear, description of tinnitus and causes of tinnitus. Participants were fitted with hearing aid or combination	n=148 Veterans who experienced bothersome tinnitus Age: 61.7 years Gender (male to female ratio): 36:1 Duration of tinnitus: Not reported USA	Tinnitus severity (follow up: 6 months and 18 months): measured using the Tinnitus Handicap Inventory (THI), total score ranges from 0-100	No details reported about how many participants used sound therapy in the intervention 3 group

Study	Intervention and comparison	Population	Outcomes	Comments
	device if appropriate. A structured counselling protocol was used containing generic information about tinnitus. Comparison (n=33): Waiting-list control, no treatment was provided for 6 months.			
Westin 2011 [31] RCT	Intervention 1 (n=20): Tinnitus retraining therapy (TRT) [counselling + sound therapy (sound enrichment)] – participants completed the TRT treatment that delivered individually, a single 2.5 hours consultation. Participants received wearable sound generators which were fitted bilaterally with an open fitting. Intervention 2 (n=22): Psychological therapy: acceptance and commitment therapy (ACT) – participants completed the ACT treatment, with individual weekly sessions. Treatment involved mindfulness and acceptance training to promote goal-directed behaviour. Comparison (n=22): Waiting-list control – participants received letter stating that they were on	n=64 People experiencing tinnitus Age (mean): 50.9 years Gender (male to female ratio): 1.1:1 Duration of tinnitus: 7.7 years Sweden	Tinnitus severity (follow-up: 10 weeks and 18 months): measured using the Tinnitus Handicap Inventory (THI), total score ranges from 0-100 Sleep (follow-up: 10 weeks and 18 months): measured using the Insomnia Severity Index (ISI), total score ranges from 0-28 Quality of life (follow-up: 10 weeks and 18 months): measured using the Quality of Life Inventory (QOLI), total score range not reported Depression (follow-up: 10 weeks and 18 months): measured using the Hospital Anxiety and Depression Scale (HADS), total score ranges from 0-21 Anxiety (follow-up: 10 weeks and 18 months): measured	Also included in psychological therapies review Waiting list control outcome data is up to 10 weeks

Study	Intervention and comparison	Population	Outcomes	Comments
	the waiting list for treatment. Treatment started after 10 weeks.		using the Hospital Anxiety and Depression Scale (HADS), total score ranges from 0-21	
Zachriat 2004 [32] RCT	Intervention 1 (n=31) Tinnitus retraining therapy (TRT) (habituation-based therapy) – participants in this intervention group had counselling and use of sound generator for habituation. Counselling concentrated on education on the neurophysiological and psychological factors that impact tinnitus. Wide band noise generators (for both ears) were introduced. This intervention was administered within a group setting (6-8 participants per group).There were five session spaced over 6 months. Intervention 2 (n=29) Tinnitus coping therapy (TCT)/cognitive behavioural therapy (CBT) - participants educated on physiological and psychological factors playing a role in tinnitus. Participants were taught relaxation exercise and the use of attention distraction strategies. Participants were also trained to identify cognitive processes. Cognitive-behavioural coping techniques were introduced in order to learn how to cope tinnitus. There were 11 weekly sessions of 90-120 minutes duration and the	n=83 People presenting with tinnitus of >3 months Age (mean): 53.8 years Gender (male to female): 2:1 Duration of tinnitus (mean): 74.7 months Germany	Tinnitus severity (follow-up: post treatment (15 weeks)): measured using the Tinnitus Questionnaire, total score range not reported (0-84 as indicated in literature) Tinnitus loudness (follow-up: post-treatment (15 weeks)): measured using the tinnitus perception diary and subjective change (SSR) – scale ranges from 1-7.	Also included in the psychological therapies review

Study	Intervention and comparison	Population	Outcomes	Comments
	intervention was administered in groups of 6-8 participants. Comparison (n=23) Tinnitus education (education counselling) - single treatment session in which participants were informed about the physiology and psychology of tinnitus. Participants were offered further treatment of a psychological intervention (after 15 weeks).			
Zarenoe 2016 [33] RCT	Intervention (n=25): Sound therapy + counselling – participants were fitted with open-fit slim tube hearing aids. Participants also received counselling in the form of motivational interviewing. Comparison (n=25): Sound therapy – participants were fitted with hearing aids (open-fit slim tube and in-the-ear) and received general advice about using the hearing aids but did not receive motivational interviewing.	n=50 People with tinnitus and sensorineural hearing loss Age (mean): 59.7 years Gender (male to female): 2:1 Duration of tinnitus: Not reported Sweden	Tinnitus severity (follow up: 3 months): measured using the Tinnitus Handicap Inventory (THI), total score ranges from 0-100	

See appendix D for full evidence tables.

1.4.4 Quality assessment of clinical studies included in the evidence review

Tinnitus retraining therapy (TRT) [counselling + sound therapies]

Table 3: Clinical evidence summary: TRT (sound therapy component: sound enrichment) versus waiting-list control

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Waiting-list control	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	42 (1 study) post-treatment	⨁⨁⨀⨀ LOW1 due to risk of bias		The mean tinnitus severity in the control groups was 48.29	The mean tinnitus severity in the intervention groups was 5.07 lower (17.72 lower to 7.58 higher)
Quality of life Quality of Life Inventory. Scale not reported	42 (1 study) post-treatment	⨁⨀⨀⨀ VERY LOW1,2 due to risk of bias, imprecision		The mean quality of life in the control groups was 1.92	The mean quality of life in the intervention groups was 0.55 higher (0.51 lower to 1.61 higher)
Sleep Insomnia Severity Index. Scale from: 0 to 28.	42 (1 study) post-treatment	⨁⨀⨀⨀ VERY LOW1,2 due to risk of bias, imprecision		The mean sleep in the control groups was 11.8	The mean sleep in the intervention groups was 1.26 higher (2.3 lower to 4.82 higher)
Depression Hospital Anxiety and Depression Scale. Scale from: 0 to 21.	42 (1 study) post-treatment	⨁⨀⨀⨀ VERY LOW1,2 due to risk of bias, imprecision		The mean depression in the control groups was 6.2	The mean depression in the intervention groups was 0.42 lower (3.12 lower to 2.28 higher)
Anxiety Hospital Anxiety and Depression Scale. Scale from: 0 to 21.	42 (1 study) post-treatment	⨁⨀⨀⨀ VERY LOW1,2 due to risk of bias, imprecision		The mean anxiety in the control groups was 7.2	The mean anxiety in the intervention groups was 0.2 lower (3.17 lower to 2.77 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Waiting-list control	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs					

Table 4: Clinical evidence summary: TRT (sound therapy component: sound enrichment) versus education counselling

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Education counselling	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
Tinnitus severity Tinnitus Questionnaire Scale from: 0 to 84.	50 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 37.65	The mean tinnitus severity in the intervention groups was 5.81 lower (14.17 lower to 2.55 higher)
Tinnitus loudness (diary)	50 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness (diary) in the control groups was 4.47	The mean tinnitus loudness (diary) in the intervention groups was 0.02 lower (1.21 lower to 1.17 higher)
Tinnitus loudness Subjective change (SSR) Scale from: 1 to 7.	50 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness (ssr) in the control groups was 4.15	The mean tinnitus loudness (ssr) in the intervention groups was 0.22 lower (0.63 lower to 0.19 higher)
1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias 2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs.					

Table 5: Clinical evidence summary: TRT (sound therapy component: sound enrichment) versus CBT

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with CBT	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with CBT	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
Tinnitus severity Tinnitus Questionnaire. Scale from: 0 to 84.	57 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 33.9	The mean tinnitus severity in the intervention groups was 2.06 lower (10.34 lower to 6.22 higher)
Tinnitus loudness (diary)	57 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness (diary) in the control groups was 4.18	The mean tinnitus loudness (diary) in the intervention groups was 0.27 higher (0.69 lower to 1.23 higher)
Tinnitus loudness Subjective change (SSR) Scale from: 1 to 7.	57 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness (ssr) in the control groups was 3.7	The mean tinnitus loudness (ssr) in the intervention groups was 0.23 higher (0.28 lower to 0.74 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs.

Table 6: Clinical evidence summary: TRT (sound therapy component: sound enrichment) versus ACT

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with ACT	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	42 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 27.43	The mean tinnitus severity in the intervention groups was 15.79 higher (3.67 to 27.91 higher)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	42 (1 study) 18 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 28.19	The mean tinnitus severity in the intervention groups was 13.67 higher (2.59 to 24.75 higher)

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with ACT	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
Quality of life Quality of Life Inventory	42 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean quality of life in the control groups was 2.78	The mean quality of life in the intervention groups was 0.31 lower (1.30 lower to 0.68 higher)
Quality of life Quality of Life Inventory	42 (1 study) 18 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean quality of life in the control groups was 2.92	The mean quality of life in the intervention groups was 0.18 lower (1.06 lower to 0.70 higher)
Sleep Insomnia Severity Index. Scale from: 0 to 100.	42 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean sleep in the control groups was 9.25	The mean sleep in the intervention groups was 3.81 higher (0.53 to 7.09 higher)
Sleep Insomnia Severity Index. Scale from: 0 to 100.	42 (1 study) 18 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean sleep in the control groups was 8.9	The mean sleep in the intervention groups was 3.67 higher (0.07 to 7.27 higher)
Depression Hospital Anxiety and Depression Scale. Scale from: 0 to 21.	42 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean depression in the control groups was 3.2	The mean depression in the intervention groups was 2.58 higher (0.39 to 4.77 higher)
Depression Hospital Anxiety and Depression Scale. Scale from: 0 to 21.	42 (1 study) 18 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean depression in the control groups was 3.24	The mean depression in the intervention groups was 1.19 higher (1.01 lower to 3.39 higher)
Anxiety Hospital Anxiety and Depression Scale. Scale from: 0 to 21.	42 (1 study) post-treatment	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean anxiety in the control groups was 3.6	The mean anxiety in the intervention groups was 3.4 higher (1.14 to 5.66 higher)
Anxiety Hospital Anxiety and Depression Scale.	42 (1 study)	⨁⊖⊖⊖ VERY LOW1,2		The mean anxiety in the control groups was	The mean anxiety in the intervention groups was

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with ACT	Risk difference with TRT (sound therapy component: sound enrichment) (95% CI)
Scale from: 0 to 21.	18 months	due to risk of bias, imprecision		4.05	2.81 higher (0.09 to 5.53 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 7: Clinical evidence summary: TRT (sound therapy component: combination devices) versus waiting-list control

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Waiting-list control	Risk difference with TRT (sound therapy component: combination devices) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	67 (1 study) 6 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 3.09	The mean tinnitus severity in the intervention groups was 14.16 lower (22.52 to 5.8 lower)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 8: Clinical evidence summary: TRT (sound therapy component: combination devices) versus education counselling

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with education counselling	Risk difference with TRT (sound therapy component: combination devices) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	38 (1 study) 18 months	⨁⨁⊖⊖ LOW1,2 due to risk of		The mean tinnitus severity in the control groups was 33.4	The mean tinnitus severity in the intervention groups was 16.1 lower

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with education counselling	Risk difference with TRT (sound therapy component: combination devices) (95% CI)
		bias, imprecision			(26.85 to 5.35 lower)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 9: Clinical evidence summary: TRT (sound therapy component: combination devices) versus education counselling + tinnitus masking

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Education counselling + tinnitus masking	Risk difference with TRT (sound therapy component: combination devices) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	76 (1 study) 6 months	⨁⨁⊖⊖ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was -9.93	The mean tinnitus severity in the intervention groups was 1.14 lower (9.01 lower to 6.73 higher)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	76 (1 study) 18 months	⨁⨁⊖⊖ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was -10.86	The mean tinnitus severity in the intervention groups was 2.64 lower (11.69 lower to 6.41 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 10: Clinical evidence summary: TRT (sound therapy component: combination devices) versus education counselling (+ amplification devices)

Outcomes	No of	Quality of the	Relative	Anticipated absolute effects

	Participants (studies) Follow up	evidence (GRADE)	effect (95% CI)	Risk with Education counselling (+ amplification)	Risk difference with TRT (sound therapy component: combination devices) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	73 (1 study) 6 months	⨁⨁⊖⊖ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was -7.12	The mean tinnitus severity in the intervention groups was 3.95 lower (11.97 lower to 4.07 higher)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	73 (1 study) 18 months	⨁⨁⊖⊖ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was -7.98	The mean tinnitus severity in the intervention groups was 5.52 lower (14.74 lower to 3.70 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Education counselling + sound therapies

Table 11: Clinical evidence summary: Education counselling + tinnitus masking versus waiting-list control

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Waiting-list control	Risk difference with Education counselling + tinnitus masking (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	75 (1 study) 6 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 3.09	The mean tinnitus severity in the intervention groups was 13.02 lower (20.96 to 5.08 lower)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 12: Clinical evidence summary: Education counselling + sound enrichment versus education counselling

Outcomes	No of	Quality of the	Relative	Anticipated absolute effects

	Participants (studies) Follow up	evidence (GRADE)	effect (95% CI)	Risk with Education counselling	Risk difference with Education counselling + sound enrichment (95% CI)
Tinnitus severity Tinnitus Questionnaire. Scale from: 0 to 84.	290 (1 study) 5 days	⨁⨁⨀⨀ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 27.3	The mean tinnitus severity in the intervention groups was 9.40 lower (12.73 to 6.07 lower)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 13: Clinical evidence summary: Education counselling + tinnitus masking versus education counselling (+ amplification devices)

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Education counselling (+ amplification device)	Risk difference with Education counselling + tinnitus masking (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	81 (1 study) 6 months	⨁⨁⨀⨀ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was -7.12	The mean tinnitus severity in the intervention groups was 2.81 lower (10.39 lower to 4.77 higher)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	81 (1 study) 18 months	⨁⨁⨀⨀ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was -7.98	The mean tinnitus severity in the intervention groups was 2.88 lower (11.60 lower to 5.84 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Education counselling + amplification devices

Table 14: Clinical evidence summary: Education counselling + amplification devices versus amplification devices

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Amplification devices	Risk difference with Education counselling + amplification devices (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	46 (1 study) 3 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 25.8	The mean tinnitus severity in the intervention groups was 4 lower (13.76 lower to 5.76 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Education counselling (+ amplification devices – if required)

Table 15: Clinical evidence summary: Education counselling (+ amplification devices) versus waiting-list control

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Waiting-list control	Risk difference with Education counselling (+ amplification device) (95% CI)
Tinnitus severity Tinnitus Handicap Inventory. Scale from: 0 to 100.	72 (1 study) 6 months	⨁⨁⊖⊖ LOW1,2 due to risk of bias, imprecision		The mean tinnitus severity in the control groups was 3.09	The mean tinnitus severity in the intervention groups was 10.21 lower (18.3 to 2.12 lower)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Counselling (information) + sound therapies

Table 16: Clinical evidence summary: Counselling (information) + sound enrichment versus counselling (information)

Outcomes	No of	Quality of the	Relativ	Anticipated absolute effects

	Participants (studies) Follow up	evidence (GRADE)	e effect (95% CI)	Risk with Counselling (information)	Risk difference with Counselling (information) + sound enrichment (95% CI)
Tinnitus annoyance Visual analogue scale. Scale from: 0 to 10.	29 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus annoyance in the control groups was 4.3	The mean tinnitus annoyance in the intervention groups was 0.6 lower (2.43 lower to 1.23 higher)
Tinnitus loudness Visual analogue scale. Scale from: 0 to 10.	29 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness in the control groups was 5.8	The mean tinnitus loudness in the intervention groups was 0.5 lower (2.04 lower to 1.04 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 17: Clinical evidence summary: Counselling (information) + sound enrichment versus counselling (information + relaxation)

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Counselling (information + relaxation)	Risk difference with Counselling (information) + sound enrichment (95% CI)
Tinnitus annoyance Visual analogue scale. Scale from: 0 to 10.	33 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus annoyance in the control groups was 3.9	The mean tinnitus annoyance in the intervention groups was 0.2 lower (2.12 lower to 1.72 higher)
Tinnitus loudness Visual analogue scale. Scale from: 0 to 10.	33 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness in the control groups was 4.4	The mean tinnitus loudness in the intervention groups was 0.9 higher (0.8 lower to 2.6 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 18: Clinical evidence summary: Counselling (information) + sound enrichment versus counselling (information + relaxation) + sound enrichment

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Counselling (information + relaxation) + sound enrichment	Risk difference with Counselling (information) + sound enrichment (95% CI)
Tinnitus annoyance Visual analogue scale. Scale from: 0 to 10.	27 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus annoyance in the control groups was 3.9	The mean tinnitus annoyance in the intervention groups was 0.2 lower (2.21 lower to 1.81 higher)
Tinnitus loudness Visual analogue scale. Scale from: 0 to 10.	27 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness in the control groups was 5.2	The mean tinnitus loudness in the intervention groups was 0.1 higher (1.6 lower to 1.8 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Counselling (information and relaxation) + sound therapies

Table 19: Clinical evidence summary: Counselling (information + relaxation) + sound enrichment versus counselling (information)

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Counselling (information)	Risk difference with Counselling (information + relaxation) + sound enrichment (95% CI)
Tinnitus annoyance Visual analogue scale. Scale from: 0 to 10.	32 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus annoyance in the control groups was 4.3	The mean tinnitus annoyance in the intervention groups was 0.4 lower (2.15 lower to 1.35 higher)
Tinnitus loudness Visual analogue scale. Scale from: 0 to 10.	32 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of		The mean tinnitus loudness in the control groups was 5.8	The mean tinnitus loudness in the intervention groups was 0.6 lower

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Counselling (information)	Risk difference with Counselling (information + relaxation) + sound enrichment (95% CI)
		bias, imprecision			(2.07 lower to 0.87 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 20: Clinical evidence summary: Counselling (information + relaxation) + sound enrichment versus counselling (information + relaxation)

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with Counselling (information + relaxation)	Risk difference with Counselling (information + relaxation) + sound enrichment (95% CI)
Tinnitus annoyance Visual analogue scale. Scale from: 0 to 10.	36 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus annoyance in the control groups was 3.9	The mean tinnitus annoyance in the intervention groups was 0 higher (1.85 lower to 1.85 higher)
Tinnitus loudness Visual analogue scale. Scale from: 0 to 10.	36 (1 study) 12 months	⨁⊖⊖⊖ VERY LOW1,2 due to risk of bias, imprecision		The mean tinnitus loudness in the control groups was 4.4	The mean tinnitus loudness in the intervention groups was 0.8 higher (0.84 lower to 2.44 higher)

1 Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
2 Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

See appendix F for full GRADE tables.

1.5 Economic evidence

1.5.1 Included studies

No relevant health economic studies were identified.

1.5.2 Excluded studies

No health economic studies that were relevant to this question were excluded due to assessment of limited applicability or methodological limitations.

See also the health economic study selection flow chart in appendix G.

1.6 Evidence statements

1.6.1 Clinical evidence statements

- **TRT (sound therapy component: sound enrichment) versus waiting-list control**

One study (n=42) were included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance and tinnitus-related quality of life. There was clinical benefit of TRT (with sound enrichment) in terms of tinnitus severity and no clinical difference between TRT (with sound enrichment) and waiting-list control for the outcomes quality of life, sleep, depression and anxiety. The overall quality of the evidence ranged from Very Low to Low due to risk of bias and imprecision.

- **TRT (sound therapy component: sound enrichment) versus education counselling**

One study (n=50) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was clinical benefit of TRT (with sound enrichment) in terms of tinnitus severity and no clinical difference between TRT (with sound enrichment) and education counselling for the outcome tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **TRT (sound therapy component: sound enrichment) versus CBT**

One study (n=57) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions for tinnitus severity and tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **TRT (sound therapy component: sound enrichment) versus acceptance and commitment therapy (ACT)**

One study (n=42) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance and tinnitus-related quality of life. TRT (with sound enrichment) was less clinically effective than ACT, in terms of tinnitus severity, sleep, depression and anxiety (post-treatment).There was no clinical difference between the two interventions for the outcomes quality of life and depression and anxiety (at a longer

follow-up). The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **TRT (sound therapy component: combination devices) versus waiting-list control**

One study (n=67) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was clinical benefit of TRT (with combination devices) in terms of tinnitus severity. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **TRT (sound therapy component: combination devices) versus education counselling**

One study (n=38) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was clinical benefit of TRT (with combination devices) in terms of tinnitus severity. The overall quality of the evidence was Low due to risk of bias and imprecision.

- **TRT (sound therapy component: combination devices) versus education counselling + masking**

One study (n=76) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus severity. The overall quality of the evidence was Low due to risk of bias and imprecision.

- **TRT (sound therapy component: combination devices) versus education counselling (+ amplification devices – when required)**

One study (n=73) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions post-treatment and at a longer follow-up, particularly at a longer follow-up. The overall quality of the evidence was Low due to risk of bias and imprecision.

- **Education counselling + tinnitus masking versus waiting-list control**

One study (n=75) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was clinical benefit of education counselling in combination with tinnitus masking in terms of tinnitus severity. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **Education counselling + sound enrichment versus education counselling**

One study (n=290) were included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was clinical benefit of education counselling in combination with sound

enrichment for the outcome tinnitus severity. The overall quality of the evidence was Low due to risk of bias and imprecision.

- **Education counselling + tinnitus masking versus education counselling (+amplification devices – when required)**

One study (n=81) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus severity. The overall quality of the evidence was Low due to risk of bias and imprecision.

- **Education counselling + amplification devices versus amplification devices**

One study (n=46) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus severity. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **Education counselling (+ amplification devices – when required) versus waiting-list control**

One study (n=72) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus annoyance, quality of life and tinnitus-related quality of life. There was clinical benefit of education counselling in combination with amplification devices (when required) in terms of tinnitus severity. The overall quality of the evidence was Low due to risk of bias and imprecision.

- **Counselling (information) + sound enrichment versus counselling (information)**

One study (n=29) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus severity, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus annoyance and tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **Counselling (information) + sound enrichment versus counselling (information and relaxation)**

One study (n=33) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus severity, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus annoyance and tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **Counselling (information) + sound enrichment versus counselling (information and relaxation) + sound enrichment**

One study (n=27) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus severity, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus annoyance and tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **Counselling (information and relaxation) + sound enrichment versus counselling (information)**

One study (n=32) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus severity, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus annoyance and tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

- **Counselling (information and relaxation) + sound enrichment versus counselling (information and relaxation)**

One study (n=36) was included in this comparison; no clinical evidence was reported for the critical outcomes: tinnitus distress, tinnitus severity, quality of life and tinnitus-related quality of life. There was no clinical difference between the two interventions in terms of tinnitus annoyance and tinnitus loudness. The overall quality of the evidence was Very Low due to risk of bias and imprecision.

1.6.2 Health economic evidence statements

- *No relevant economic evaluations were identified.*

1.7 The committee's discussion of the evidence

1.7.1 Interpreting the evidence

1.7.1.1 The outcomes that matter most

Tinnitus distress, annoyance and tinnitus severity were critical outcomes as they were thought to be common factors for people with tinnitus and impact their quality of life. Quality of life (QoL) (tinnitus-related) and general QoL were also critical outcomes due to their impact on the person with tinnitus. Mortality was another critical outcome.

Tinnitus loudness, anxiety, depression, sleep, safety, tolerability and side effects were thought to be important outcomes.

1.7.1.2 The quality of the evidence

Seven randomised controlled trials (RCTs) were included in the review that evaluated combination strategies for the management of tinnitus in adults. Four of these studies were multi-arm trials.

Counselling/tinnitus support in combination with sound therapies

Tinnitus retraining therapy (TRT) was evaluated across four studies with the combination of TRT counselling and sound therapies (with the sound therapy components being sound enrichment and combination devices). TRT was compared with waiting-list control, acceptance and commitment therapy (ACT), education counselling and education counselling in combination with masking. Across these comparisons, the critical outcomes: tinnitus severity and quality of life were reported. The important outcomes: tinnitus loudness, depression, anxiety and sleep were also reported. The quality of the evidence ranged from very low to low due to risk of bias and imprecision.

Education counselling in combination with sound therapies (masking and sound enrichment) was evaluated in three studies. These interventions were compared with waiting-list control and education counselling. Across these comparisons, the critical outcome 'tinnitus severity' was reported. The quality of the evidence ranged from very low to low due to risk of bias and imprecision.

One four-armed study evaluated different counselling/support strategies (information and/or relaxation) in combination with sound enrichment. No critical outcomes were reported, but the important outcomes of tinnitus loudness and tinnitus annoyance were reported. The quality of the evidence was very low due to risk of bias and imprecision.

Education counselling in combination with amplification devices.

Two studies evaluated education counselling in combination with amplification devices, these studies reported evidence for the outcome of tinnitus severity only. One of the studies reported that amplification devices could potentially be used in people with tinnitus but the number of participants who actually received the amplification devices was not reported. The quality of the evidence ranged from very low to low due to risk of bias and imprecision.

1.7.1.3 Benefits and harms

The evidence identified in this review was mainly on "education counselling" (for this review - defined as interventions with components of providing information to people with tinnitus about the medical condition itself or interventions that can be used to manage it) and psychological therapies in combination with sound therapies and amplification devices.

The committee discussed the evidence that was identified for the separate evidence review on sound therapy alone (evidence review M). There was insufficient evidence to support the use of sound therapy alone. The committee agreed that there also is a lack of evidence to recommend the use of sound therapies in combination with tinnitus support but acknowledged that sound therapy interventions (particularly sound generators) are commonly used in current practice. The committee decided to make a research recommendation (see appendix I).

There was also some evidence for TRT, an intervention that has a component of "counselling" and sound therapy. The committee discussed the evidence found on TRT and noted that TRT was originally developed to have a directive protocol that does not allow the active engagement of people with tinnitus in the development of their management plan. The "counselling" component focuses on a particular neurophysiological model of tinnitus. In the UK, TRT is usually delivered in a modified form, using less directive methods than the recommended protocol. Within the evidence-base of this review, different TRT interventions were used, with some interventions consisting of three 1-hour sessions and others having 5 sessions of 90-120 minutes. Whilst the evidence for TRT indicated some clinical benefit in reducing tinnitus severity, the evidence was very low quality and was informed by small RCTs.The committee agreed that the evidence base does not reflect the TRT interventions that are typically delivered within current practice. The committee agreed that a recommendation for TRT could not be made but recommended further research, with the 'counselling' component reflecting the principles of 'tinnitus support' as described by the committee (evidence review A) (see appendix I).

The majority of the evidence identified evaluated "education counselling" in combination with other management strategies (sound therapy, amplification devices and psychological therapies). This indicated possible clinical benefit in terms of improving tinnitus severity.

The committee noted that there is a great deal of variation in the name given to interventions such as "education counselling" in current practice. There is also variation in the content and mode of delivery. As described in the tinnitus support evidence review (evidence review A), the committee felt that it is important that the description of what this intervention entails is

clear and concise to encourage consistency in how terminology is used and understood. The committee agreed to use the term “tinnitus support” instead of counselling. No evidence was identified that explicitly evaluated the use of tinnitus support as described in the tinnitus support review. However, the committee agreed that the “education counselling” evidence provides some insight into the benefit of providing some tinnitus support (even if it is mainly by the mean of providing information within the included studies).

The committee highlighted that tinnitus support is the key component of any combination management strategy as it enables a discussion with people about their experience of tinnitus, concerns and its impact, as well as provide guidance and information. Without this support component, the committee felt the interventions may not be as effective in children, young people and adults with tinnitus.

Consequently, no specific recommendations on combinations of tinnitus management strategies were made. The committee agreed that if the recommendations on tinnitus support and management are followed, everyone should receive tinnitus support along with whatever strategy (e.g. amplification devices and psychological therapies) has been chosen in their management plan. The committee agreed that combinations of strategies could be used but this should be discussed with and tailored to the individual’s needs and preferences.

1.7.2 Cost effectiveness and resource use

There were no economic evaluations available for this question. The purpose of this review is to consider those strategies already addressed in other reviews but in combination with each other. There are a number of interventions available for people with tinnitus but there is an expectation that tinnitus support should be provided at every stage of the management pathway. The other interventions such as amplification devices and psychological interventions are provided in addition to tinnitus support, and their provision should depend on the needs of each individual. Importantly, the committee noted that a person with tinnitus could receive more than one intervention to treat their tinnitus. For example, some people may not need hearing aids (as there is no hearing loss) but will require psychological interventions. Conversely, others may require hearing aids as well as psychological therapies to treat their tinnitus. As the recommendations in this review are consistent with the recommendations for the individual strategies, there is not an additional resource impact when considering strategies in combination.

1.7.3 Other factors the committee took into account

The committee wished to make the recommendation clear that people should be involved in discussions around the selection of management strategies (see Evidence review A: tinnitus support). Personal preference may well dictate which strategy to choose.

The committee wished to refer to NICE guideline CG138 “Patient experience in adult NHS services: improving the experience of care for people using adult NHS services” for further details on tailoring healthcare for each person.

There is currently some variation in practice and local protocols may need to be developed to enable implementation of this recommendation. For many the main change to practice may be the focus on providing information, an opportunity for discussion and tailoring the choice to individual preferences and needs.

References

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Appendices

Appendix A: Review protocols

Table 21: Review protocol: What is the clinical and cost effectiveness of combinations of sound therapy (including sound enrichment), psychological therapies counselling and amplification devices?

ID	Field	Content
0.	PROSPERO registration number	Not registered
1.	Review title	The clinical and cost effectiveness of combinations of sound therapy (including sound enrichment), psychological therapies counselling and amplification devices
2.	Review question	What is the clinical and cost effectiveness of combinations of sound therapy (including sound enrichment), psychological therapies counselling and amplification devices?
3.	Objective	The clinical and cost effectiveness of the various management strategies for tinnitus will be reviewed in individual reviews. This review looks at different combinations of the management strategies and their clinical and cost effectiveness.
4.	Searches	The following databases will be searched: • Cochrane Central Register of Controlled Trials (CENTRAL) • Cochrane Database of Systematic Reviews (CDSR) • Embase • MEDLINE • CINAHL, Current Nursing and Allied Health Literature • PsycInfo Searches will be restricted by:

		• English language • Human studies • Letters and comments are excluded. Other searches: • Inclusion lists of relevant systematic reviews will be checked by the reviewer. The searches may be re-run 6 weeks before final committee meeting and further studies retrieved for inclusion if relevant. The full search strategies will be published in the final review
5.	Condition or domain being studied	Tinnitus
6.	Population	Inclusion: Children, young people and adults presenting with tinnitus Strata: • Children/young people (up to 18 years) • Adults Exclusion: None
7.	Intervention/Exposure/Test	Combinations of: Psychological therapies • Cognitive Behavioural therapy (CBT) • Mindfulness-based interventions e.g. cognitive therapy and MBSR • Brief solution focused therapy • Narrative therapy • Family therapy/Systemic therapy • Acceptance and commitment therapy (ACT) • EMDR

		• "Tinnitus counselling" – education (including coping strategies, provision of information and advice, relaxation) Sound therapy and sound enrichment • Sound enrichment (e.g. environmental sound, a CD or mp3 download or the radio, a smartphone App, bedside/table-top sound generators, a wearable sound generator) • Combination hearing devices (hearing aid combined with sound generator) • Customised sound-based therapies, e.g. amplitude modulated tones and notched noise/music • Masking • Tinnitus retraining therapy (counselling with sound therapy) Neuromodulation • transcranial direct current stimulation (tDCS) • transcranial alternating current stimulation (tACS) • vagal nerve stimulation (VNS) • transcutaneous vagal nerve stimulation (tVNS) • acoustic neuromodulation therapy • paired electrical and acoustic stimulation therapy • transcranial magnetic stimulation (rTMS) Amplification devices for people with hearing loss • Hearing aids • Implantable devices (including cochlear implants, bone-anchored hearing aids, bone-conduction hearing implants, bone-bridge/middle-ear devices)
8.	Comparator/Reference standard/Confounding factors	• Interventions compared with each other (combinations and single interventions) • Control group (waiting-list control/no intervention)

9.	Types of study to be included	• Systematic reviews • RCTs • If there is an inadequate amount of RCT data, non-randomised comparative studies will be considered
10.	Other exclusion criteria	• Non-English language studies • Studies will only be included if they report one or more of the outcomes listed above. • Descriptive (non-comparative) studies will be excluded
11.	Context	N/A
12.	Primary outcomes (critical outcomes)	• Tinnitus severity Impact of tinnitus: • Tinnitus distress • Tinnitus annoyance Health related QoL: • QoL (tinnitus) • QoL
13.	Secondary outcomes (important outcomes)	Tinnitus percept: • Tinnitus loudness Other co-occurring complaints: • Depression • Anxiety • Anxiety and depression • Sleep Adverse events: • Safety • Tolerability • Side effects
14.	Data extraction (selection and coding)	EndNote will be used for reference management, sifting, citations and bibliographies. Titles and/or abstracts of studies retrieved using the search strategy and those from additional sources will be screened for inclusion. The full text of potentially eligible studies will be retrieved and will be assessed for eligibility in

		line with the criteria outlined above. 10% of the abstracts will be reviewed by two reviewers, with any disagreements resolved by discussion or, if necessary, a third independent reviewer. An in-house developed database; EviBase, will be used for data extraction. A standardised form is followed to extract data from studies (see Developing NICE guidelines: the manual section 6.4) and for undertaking assessment of study quality. Summary evidence tables will be produced including information on: study setting; study population and participant demographics and baseline characteristics; details of the intervention and control interventions; study methodology' recruitment and missing data rates; outcomes and times of measurement; critical appraisal ratings. A second reviewer will quality-assure the extracted data. Discrepancies will be identified and resolved through discussion (with a third reviewer where necessary).
15.	Risk of bias (quality) assessment	Risk of bias will be assessed using the appropriate checklist as described in Developing NICE guidelines: the manual. For Intervention reviews the following checklist will be used according to study design being assessed: • Systematic reviews: Risk of Bias in Systematic Reviews (ROBIS) • Randomised Controlled Trial: Cochrane RoB (2.0) Disagreements between the review authors over the risk of bias in particular studies will be resolved by discussion, with involvement of a third review author where necessary.
16.	Strategy for data synthesis	Where possible, data will be meta-analysed. Pairwise meta-analyses will be performed using Cochrane Review Manager (RevMan5) to combine the data given in all studies for each of the outcomes stated above. A fixed effect meta-analysis, with weighted mean differences for continuous outcomes and risk ratios for binary

		outcomes will be used, and 95% confidence intervals will be calculated for each outcome. Heterogeneity between the studies in effect measures will be assessed using the I^2 statistic and visually inspected. We will consider an I^2 value greater than 50% indicative of substantial heterogeneity. Sensitivity analyses will be conducted based on pre-specified subgroups using stratified meta-analysis to explore the heterogeneity in effect estimates. If this does not explain the heterogeneity, the results will be presented using random-effects. GRADE pro will be used to assess the quality of each outcome, taking into account individual study quality and the meta-analysis results. The 4 main quality elements (risk of bias, indirectness, inconsistency and imprecision) will be appraised for each outcome. Publication bias is tested for when there are more than 5 studies for an outcome. Other bias will only be taken into consideration in the quality assessment if it is apparent. Where meta-analysis is not possible, data will be presented and quality assessed individually per outcome. If sufficient data is available to make a network of treatments, WinBUGS will be used for network meta-analysis.
17.	Analysis of sub-groups	• Profoundly deaf • People with learning disability or cognitive impairment • Who is delivering therapy (mental health professional (psychologists and therapists) versus non-mental health professional) • Mild hearing loss
18.	Type and method of review	☒ Intervention ☐ Diagnostic ☐ Prognostic ☐ Qualitative ☐ Epidemiologic ☐ Service Delivery

		☐ Other (please specify)		
19.	Language	English		
20.	Country	England		
21.	Anticipated or actual start date	27/06/18		
22.	Anticipated completion date	11/03/20		
23.	Stage of review at time of this submission	Review stage	Started	Completed
		Preliminary searches	☐	☑
		Piloting of the study selection process	☐	☑
		Formal screening of search results against eligibility criteria	☐	☑
		Data extraction	☐	☑
		Risk of bias (quality) assessment	☐	☑
		Data analysis	☐	☑
24.	Named contact	5a. Named contact National Guideline Centre 5b Named contact e-mail Tinnitus@nice.org.uk 5e Organisational affiliation of the review		

		National Institute for Health and Care Excellence (NICE) and the National Guideline Centre
25.	Review team members	From the National Guideline Centre: • Dr Jennifer Hill [Guideline lead] • Ms Sedina Lewis/Ms Julie Neilson [Senior systematic reviewers] • Dr Richard Clubbe [Systematic reviewer] • Mr David Wonderling [Health economist lead] • Mr Emtiyaz Chowdhury [Health economist] • Ms Jill Cobb [Information specialist] • Dr Giulia Zuodar [Project manager]
26.	Funding sources/sponsor	This systematic review is being completed by the National Guideline Centre which receives funding from NICE.
27.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.
28.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: [NICE guideline webpage].
29.	Other registration details	N/A
30.	Reference/URL for published protocol	N/A
31.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include

		standard approaches such as: • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.
32.	Keywords	Tinnitus, combination management strategies
33.	Details of existing review of same topic by same authors	N/A
34.	Current review status	☐ Ongoing ☒ Completed but not published ☐ Completed and published ☐ Completed, published and being updated ☐ Discontinued
35..	Additional information	N/A
36.	Details of final publication	www.nice.org.uk

Table 22: Health economic review protocol

Review question	All questions – health economic evidence
Objectives	To identify health economic studies relevant to any of the review questions.
Search criteria	• Populations, interventions and comparators must be as specified in the clinical review protocol above. • Studies must be of a relevant health economic study design (cost–utility analysis, cost-effectiveness analysis, cost–benefit analysis, cost–consequences analysis, comparative cost analysis). • Studies must not be a letter, editorial or commentary, or a review of health economic evaluations. (Recent reviews will be ordered although not reviewed. The bibliographies will be checked for relevant studies, which will then be ordered.) • Unpublished reports will not be considered unless submitted as part of a call for evidence. • Studies must be in English.
Search strategy	A health economic study search will be undertaken using population-specific terms and a health economic study filter – see appendix B below.

Review strategy	Studies not meeting any of the search criteria above will be excluded. Studies published before 2003, abstract-only studies and studies from non-OECD countries or the USA will also be excluded. Each remaining study will be assessed for applicability and methodological limitations using the NICE economic evaluation checklist which can be found in appendix H of Developing NICE guidelines: the manual (2014).[20] **Inclusion and exclusion criteria** • If a study is rated as both 'Directly applicable' and with 'Minor limitations' then it will be included in the guideline. A health economic evidence table will be completed and it will be included in the health economic evidence profile. • If a study is rated as either 'Not applicable' or with 'Very serious limitations' then it will usually be excluded from the guideline. If it is excluded then a health economic evidence table will not be completed and it will not be included in the health economic evidence profile. • If a study is rated as 'Partially applicable', with 'Potentially serious limitations' or both then there is discretion over whether it should be included. **Where there is discretion** The health economist will make a decision based on the relative applicability and quality of the available evidence for that question, in discussion with the guideline committee if required. The ultimate aim is to include health economic studies that are helpful for decision-making in the context of the guideline and the current NHS setting. If several studies are considered of sufficiently high applicability and methodological quality that they could all be included, then the health economist, in discussion with the committee if required, may decide to include only the most applicable studies and to selectively exclude the remaining studies. All studies excluded on the basis of applicability or methodological limitations will be listed with explanation in the excluded health economic studies appendix below. The health economist will be guided by the following hierarchies. *Setting:* • UK NHS (most applicable). • OECD countries with predominantly public health insurance systems (for example, France, Germany, Sweden). • OECD countries with predominantly private health insurance systems (for example, Switzerland). • Studies set in non-OECD countries or in the USA will be excluded before being assessed for applicability and methodological limitations. *Health economic study type:* • Cost–utility analysis (most applicable). • Other type of full economic evaluation (cost–benefit analysis, cost-effectiveness analysis, cost–consequences analysis). • Comparative cost analysis. • Non-comparative cost analyses including cost-of-illness studies will be excluded before being assessed for applicability and methodological limitations. *Year of analysis:* • The more recent the study, the more applicable it will be. • Studies published in 2003 or later but that depend on unit costs and resource data entirely or predominantly from before 2003 will be rated as 'Not applicable'. • Studies published before 2003 will be excluded before being assessed for applicability and methodological limitations. *Quality and relevance of effectiveness data used in the health economic analysis:* • The more closely the clinical effectiveness data used in the health economic

	analysis match with the outcomes of the studies included in the clinical review the more useful the analysis will be for decision-making in the guideline.

Appendix B: Literature search strategies

The literature searches for this review are detailed below and complied with the methodology outlined in Developing NICE guidelines: the manual.[20]

For more detailed information, please see the Methodology Review.

B.1 Clinical search literature search strategy

Searches were constructed using a PICO framework where population (P) terms were combined with Intervention (I) and in some cases Comparison (C) terms. Outcomes (O) are rarely used in search strategies for interventions as these concepts may not be well described in title, abstract or indexes and therefore difficult to retrieve. Search filters were applied to the search where appropriate.

Table 23: Database date parameters and filters used

Database	Dates searched	Search filter used
Medline (OVID)	1946 – 02 April 2019	Exclusions
Embase (OVID)	1974 – 02 April 2019	Exclusions
The Cochrane Library (Wiley)	Cochrane Reviews to 2019 Issue 4 of 12 CENTRAL to 2019 Issue 4 of 12 DARE, and NHSEED to 2015 Issue 2 of 4 HTA to 2016 Issue 4 of 4	None
CINAHL, Current Nursing and Allied Health Literature (EBSCO)	Inception – 02 April 2019	Exclusions
PsycINFO (ProQuest)	Inception – 02 April 2019	Exclusions

Medline (Ovid) search terms

1.	Tinnitus/
2.	tinnit*.ti,ab.
3.	1 or 2
4.	letter/
5.	editorial/
6.	news/
7.	exp historical article/
8.	Anecdotes as Topic/
9.	comment/
10.	case report/
11.	(letter or comment*).ti.
12.	or/4-11
13.	randomized controlled trial/ or random*.ti,ab.
14.	12 not 13

15.	animals/ not humans/
16.	exp Animals, Laboratory/
17.	exp Animal Experimentation/
18.	exp Models, Animal/
19.	exp Rodentia/
20.	(rat or rats or mouse or mice).ti.
21.	or/14-20
22.	3 not 21
23.	limit 22 to English language

Embase (Ovid) search terms

1.	tinnitus/
2.	tinnit*.ti,ab.
3.	1 or 2
4.	letter.pt. or letter/
5.	note.pt.
6.	editorial.pt.
7.	Case report/ or Case study/
8.	(letter or comment*).ti.
9.	or/4-8
10.	randomized controlled trial/ or random*.ti,ab.
11.	9 not 10
12.	animal/ not human/
13.	Nonhuman/
14.	exp Animal Experiment/
15.	exp Experimental animal/
16.	Animal model/
17.	exp Rodent/
18.	(rat or rats or mouse or mice).ti.
19.	or/11-18
20.	3 not 19
21.	limit 20 to English language

Cochrane Library (Wiley) search terms

#1.	MeSH descriptor: [Tinnitus] explode all trees
#2.	tinnit*:ti,ab
#3.	#1 or #2

CINAHL (EBSCO) search terms

S1.	(MH "Tinnitus")
S2.	(MH "Tinnitus Retraining Therapy")
S3.	tinnit*
S4.	S1 OR S2 OR S3
S5.	PT anecdote or PT audiovisual or PT bibliography or PT biography or PT book or PT book review or PT brief item or PT cartoon or PT commentary or PT computer program or PT editorial or PT games or PT glossary or PT historical material or PT interview or PT letter or PT listservs or PT masters thesis or PT obituary or PT pamphlet or PT pamphlet chapter or PT pictorial or PT poetry or PT proceedings or PT “questions and

	answers" or PT response or PT software or PT teaching materials or PT website
S6.	S4 NOT S5

PsycINFO (ProQuest) search terms

1.	((MAINSUBJECT.EXACT.EXPLODE("Tinnitus") OR tinnit*) NOT (su.exact.explode("rodents") OR su.exact.explode("mice") OR (su.exact("animals") NOT (su.exact("human males") OR su.exact("human females"))) OR ti(rat OR rats OR mouse OR mice))) AND la.exact("ENG")Limits applied

B.2 Health Economics literature search strategy

Health economic evidence was identified by conducting a broad search relating to the tinnitus population in NHS Economic Evaluation Database (NHS EED – this ceased to be updated after March 2015) and the Health Technology Assessment database (HTA) with no date restrictions. NHS EED and HTA databases are hosted by the Centre for Research and Dissemination (CRD). Additional searches were run on Medline and Embase for health economics and quality of life studies

Table 24: Database date parameters and filters used

Database	Dates searched	Search filter used
Medline	2002 – 02 March 2019	Exclusions Health economics studies Quality of life studies
Embase	2002 – 02 March 2019	Exclusions Health economics studies Quality of life studies
Centre for Research and Dissemination (CRD)	HTA - Inception – 31 Mar 2018 NHSEED - Inception to March 2015	None

Medline (Ovid) search terms

1.	Tinnitus/
2.	tinnit*.ti,ab.
3.	1 or 2
4.	letter/
5.	editorial/
6.	news/
7.	exp historical article/
8.	Anecdotes as Topic/
9.	comment/
10.	case report/
11.	(letter or comment*).ti.
12.	or/4-11
13.	randomized controlled trial/ or random*.ti,ab.
14.	12 not 13
15.	animals/ not humans/
16.	exp Animals, Laboratory/
17.	exp Animal Experimentation/
18.	exp Models, Animal/

19.	exp Rodentia/
20.	(rat or rats or mouse or mice).ti.
21.	or/14-20
22.	3 not 21
23.	limit 22 to English language
24.	Economics/
25.	Value of life/
26.	exp "Costs and Cost Analysis"/
27.	exp Economics, Hospital/
28.	exp Economics, Medical/
29.	Economics, Nursing/
30.	Economics, Pharmaceutical/
31.	exp "Fees and Charges"/
32.	exp Budgets/
33.	budget*.ti,ab.
34.	cost*.ti.
35.	(economic* or pharmaco?economic*).ti.
36.	(price* or pricing*).ti,ab.
37.	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
38.	(financ* or fee or fees).ti,ab.
39.	(value adj2 (money or monetary)).ti,ab.
40.	or/24-39
41.	quality-adjusted life years/
42.	sickness impact profile/
43.	(quality adj2 (wellbeing or well being)).ti,ab.
44.	sickness impact profile.ti,ab.
45.	disability adjusted life.ti,ab.
46.	(qal* or qtime* or qwb* or daly*).ti,ab.
47.	(euroqol* or eq5d* or eq 5*).ti,ab.
48.	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
49.	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
50.	(hui or hui1 or hui2 or hui3).ti,ab.
51.	(health* year* equivalent* or hye or hyes).ti,ab.
52.	discrete choice*.ti,ab.
53.	rosser.ti,ab.
54.	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
55.	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
56.	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
57.	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
58.	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
59.	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
60.	or/41-59
61.	23 and (40 or 60)

Embase (Ovid) search terms

1.	tinnitus/
2.	tinnit*.ti,ab.
3.	1 or 2
4.	letter.pt. or letter/
5.	note.pt.
6.	editorial.pt.
7.	Case report/ or Case study/
8.	(letter or comment*).ti.
9.	or/4-8
10.	randomized controlled trial/ or random*.ti,ab.
11.	9 not 10
12.	animal/ not human/
13.	Nonhuman/
14.	exp Animal Experiment/
15.	exp Experimental animal/
16.	Animal model/
17.	exp Rodent/
18.	(rat or rats or mouse or mice).ti.
19.	or/11-18
20.	3 not 19
21.	health economics/
22.	exp economic evaluation/
23.	exp health care cost/
24.	exp fee/
25.	budget/
26.	funding/
27.	budget*.ti,ab.
28.	cost*.ti.
29.	(economic* or pharmaco?economic*).ti.
30.	(price* or pricing*).ti,ab.
31.	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
32.	(financ* or fee or fees).ti,ab.
33.	(value adj2 (money or monetary)).ti,ab.
34.	or/21-33
35.	quality adjusted life year/
36.	"quality of life index"/
37.	short form 12/ or short form 20/ or short form 36/ or short form 8/
38.	sickness impact profile/
39.	(quality adj2 (wellbeing or well being)).ti,ab.
40.	sickness impact profile.ti,ab.

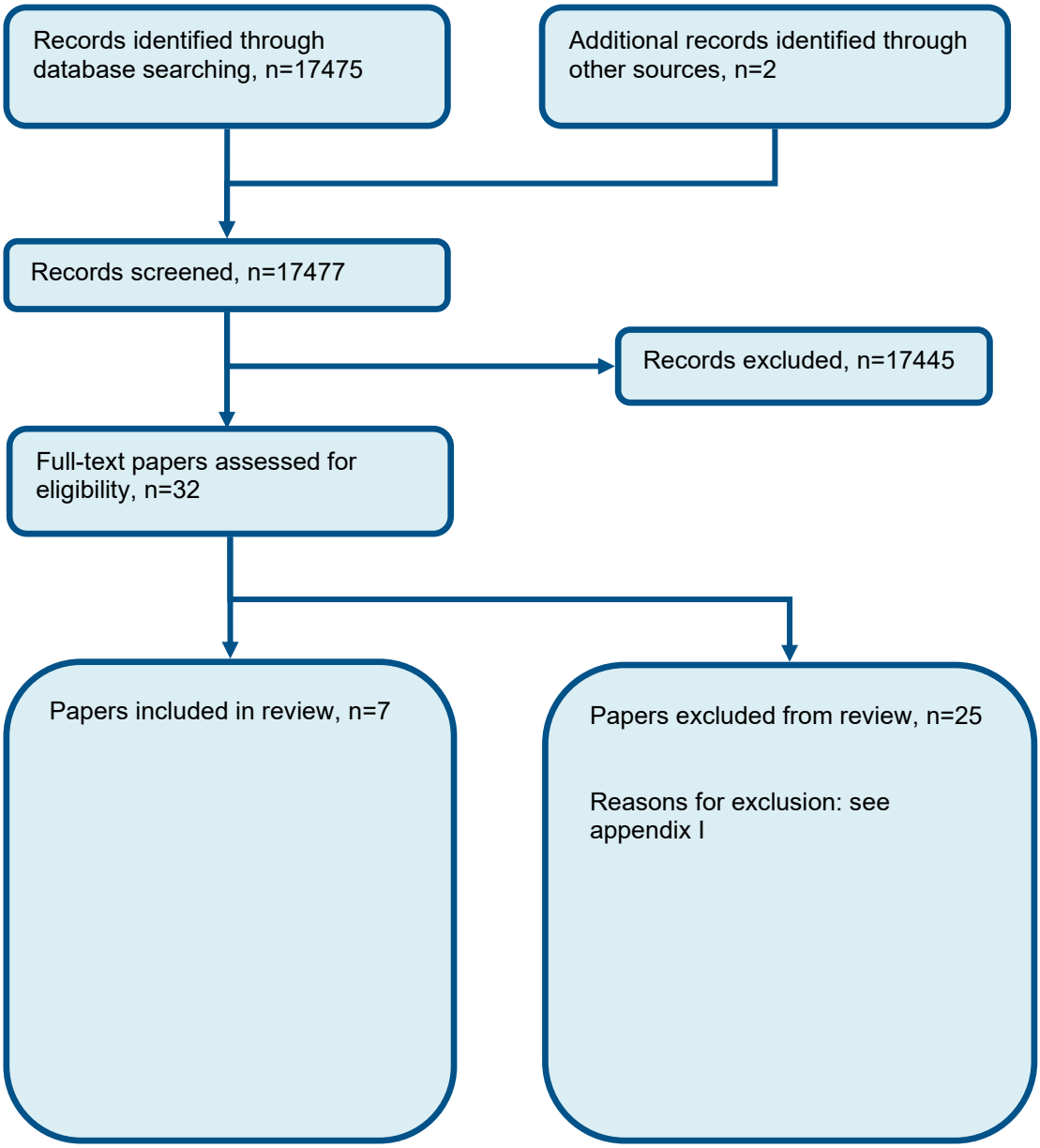
41.	disability adjusted life.ti,ab.
42.	(qal* or qtime* or qwb* or daly*).ti,ab.
43.	(euroqol* or eq5d* or eq 5*).ti,ab.
44.	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
45.	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
46.	(hui or hui1 or hui2 or hui3).ti,ab.
47.	(health* year* equivalent* or hye or hyes).ti,ab.
48.	discrete choice*.ti,ab.
49.	rosser.ti,ab.
50.	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
51.	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
52.	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
53.	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
54.	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
55.	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
56.	or/35-55
57.	20 and (34 or 56)
58.	limit 57 to English language

NHS EED and HTA (CRD) search terms

#1.	MeSH DESCRIPTOR Tinnitus EXPLODE ALL TREES
#2.	(tinnit*)
#3.	#1 OR #2

Appendix C: Clinical evidence selection

Figure 1: Flow chart of clinical study selection for the review of combination strategies



Appendix D: Clinical evidence tables

Study	Argstatter 2015[1]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=290)
Countries and setting	Conducted in Germany; Setting: Heidelberg Outpatient Center for Tinnitus
Line of therapy	Not applicable
Duration of study	Intervention time: 5 days
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Adults
Subgroup analysis within study	Not applicable
Inclusion criteria	People were eligible if they suffered from chronic tinnitus (duration of more than 6 months) which could be musically compiled (distinct frequency) and had no psychiatric co-morbidity requiring ongoing medicinal or psychotherapeutic care.
Exclusion criteria	People were excluded if any tinnitus-related otological conditions were present, such as pronounced hyperacusis, dizziness or vertigo; tinnitus is concomitant symptom of a known systematic disease (such as Meniere's disease, vestibular schwannoma, endolymphatic hydrops); severe hearing impairment (greater than 60 dB HL in the region of the center tinnitus frequency
Recruitment/selection of patients	Trial and intervention (neuro-music therapy) concept was announced by press releases leading to self-admittance to the Heidelberg Outpatient Centre for Tinnitus. It was offered to people by ENT-doctors in own practice nationwide and to people attending the ENT-clinic of the university hospital Heidelberg.
Age, gender and ethnicity	Age - Mean (SD): 49.2 years. Gender (M:F): 2/1. Ethnicity: Not reported
Further population details	1. Mild hearing loss: Not applicable 2. People with learning disability or cognitive impairment: Not applicable 3. Profoundly deaf: Not applicable
Extra comments	Mean duration of tinnitus: 8 years (sound therapy + counselling 7.4 years, counselling 8.6 years)
Indirectness of population	No indirectness
Interventions	(n=146) Intervention 1: Sound therapy and sound enrichment - Customised sound-based therapies. Neuro-music therapy (standardised short-term music therapeutic treatment) was based on the Heidelberg Model for tinnitus. It lasted for eight 50-minute sessions of individualised neuro-music therapy and one individual

	counselling session. Therapy took place on five consecutive days (Monday to Friday) with two therapy sessions per dat. Music therapy can be divided to two main categories, receptive (music listening based) and active (music making). Each morning and each afternoon session lasted 50 minutes, thereof 25 minutes of active music therapy and 25 minutes of receptive music therapy. Modules of the intervention: (1) directive counselling (see description in information for comparator information below) (2) resonance training (3) intonation training (4) tinnitus reconditioning. Duration 5 days. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: mental health professionals (psychologists and therapists) (Therapist performed the active modules of the intervention; another therapist performed the receptive modules.). (n=144) Intervention 2: Counselling - Information. Participants in the counselling intervention group received comprehensive individualised personal instruction. This counselling lasted 50 minutes and consisted of a single session. A cognitive model of tinnitus based on neuroscientific principles should be established. The counselling then targeted at a reclassification of tinnitus to a category of neutral, impartial signals. The aim was to provide participants with key self-management strategies enabling them to cope with their tinnitus percept. . Duration 5 days. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: mental health professionals (psychologists and therapists) (Trained psychologist).
Funding	Academic or government funding (Funded by KTS Klaus Tschira Stiftung)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: MUSIC THERAPY + COUNSELLING versus COUNSELLING Protocol outcome 1: Severity - Actual outcome for Adults: Tinnitus severity at 5 days; Group 1: mean 17.9 (SD 16.5); n=146, Group 2: mean 27.3 (SD 12.1); n=144; Tinnitus Questionnaire 0-84 Top=High is poor outcome Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Health related quality of life; Tinnitus distress; Tinnitus annoyance; Tinnitus loudness; Depression; Anxiety; Depression and anxiety; Sleep; Adverse events

Study	**Bauer 2017[3]**
Study type	RCT (Patient randomised; Parallel)

Number of studies (number of participants)	1 (n=39)
Countries and setting	Conducted in USA; Setting: Southern Illinois University School of Medicine, Springfield, Illinois
Line of therapy	Not applicable
Duration of study	Follow up (post intervention): 18 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Adults
Subgroup analysis within study	Not applicable
Inclusion criteria	(1) Adults (age 18 and 75 years) (2) Moderate to severe tinnitus (3) (THI score >36) (4) Tinnitus criteria: chronic (>1year), non-pulsatile, continuous (5) Sensorineural hearing loss with subjective impairment (5) Symmetric sensorineural hearing loss amenable to amplification within limits of ReSound combination device
Exclusion criteria	(1) Tinnitus amenable to medical or surgical treatment (2) Subjective complaints of hyperacusis (3) Loudness discomfort levels (LDL) less than 100 dB SPL on live-voice testing (4) Prior tinnitus treatment (5) Residence outside a 60-mile radius of Springfield Illinois (6) Beck Depression Inventory total score >30; endorsing suicide or self- harm on BDI item #9 (7) Unwilling to wear prescribed devices, participate in educational counseling, return for follow-up over 18 months (8) Currently using hearing aids or use within the preceding 6 months
Recruitment/selection of patients	Participants were recruited regionally using print, radio, and web-based media until enrollment goals were met. Enrollment was restricted to adults living within a 60-mile radius of Springfield. Participants that met audiometric, medical and tinnitus severity criteria with an average THI score greater than 36 and a difference score between the first and second THI assessment of less than 17 were enrolled in the study.
Age, gender and ethnicity	Age - Other: 18-50 years: 16%; 51-65 years: 66%; 66-75 years: 18%. Gender (M:F): 2.1/1. Ethnicity: White, 100%
Further population details	1. Mild hearing loss: Not applicable 2. People with learning disability or cognitive impairment: Not applicable 3. Profoundly deaf: Not applicable
Extra comments	Duration of tinnitus: 1-2 years: 5%; 2-3 years: 11%; 3-5 years: 8%; 5+ years: 76%
Indirectness of population	No indirectness
Interventions	(n=20) Intervention 1: Sound therapy and sound enrichment - Combination hearing devices. TRT participants received binaural open fit receiver-in-the-canal combination devices correctly fit to their audiogram by the study audiologist. Participants were instructed on device use and had control over amplification volume only. The broadband noise volume was set by the study audiologist at the direction of the participant to an audible but

	comfortable level that was less loud than their tinnitus. TRT directive counselling was provided using a standardised TRT Powerpoint presentation, distributed over three 1-hour sessions. The counselling content was based on Jastreboff's neurophysiologic model and consisted of information on hearing mechanisms and theories and examples of how hearing loss and emotional reactions lead to bothersome tinnitus. . Duration 18 months. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Non-mental health professionals (Audiologist). (n=19) Intervention 2: Counselling - Information. Participants in the standard care group received general aural rehabilitation counselling distributed over three 1-hour sessions, using a standardised standard care PowerPoint presentation. Aural rehabilitation counselling was comprised of information on mechanisms of hearing, hearing health, coping, and listening strategies. Participants were fitted with binaural combination devices, identical to those fitted to the TRT group, but with the sound generator feature inactivated by the study audiologist. . Duration Not clearly reported. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: (Audiologist).
Funding	Academic or government funding (Tinnitus Research Consortium)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) versus INFORMATION (STANDARD CARE) Protocol outcome 1: Severity - Actual outcome for Adults: Tinnitus severity at 18 months; Group 1: mean 17.3 (SD 12.3); n=19, Group 2: mean 33.4 (SD 20.5); n=19; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Participants that completed the study were compensated for participation by transfer of ownership of their devices for their personal use. Participants that did not complete the final assessment received $50 in compensation for their time and were requested to return their devices to the study coordinator.; Indirectness of outcome: No indirectness ; Baseline details: Co-variate adaptive randomisation performed to maintain treatment group balance for the variables of tinnitus severity (total THI score) and gender; Group 1 Number missing: 1, Reason: Scheduling conflict identified post-enrollment; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Health related quality of life; Tinnitus distress; Tinnitus annoyance; Tinnitus loudness; Depression; Anxiety; Depression and anxiety; Sleep; Adverse events

Study	**Dineen 1999[9]**

Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=96)
Countries and setting	Conducted in Australia; Setting: Speech and Hearing Clinic of the School of Communication Sciences, La Trobe University, Melbourne
Line of therapy	Not applicable
Duration of study	Follow up (post intervention): 12 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Adults
Subgroup analysis within study	Not applicable
Inclusion criteria	Subjects with tinnitus, no other details reported
Exclusion criteria	Not reported
Recruitment/selection of patients	Subjects who responded to community announcements, via newspapers and radio, of the tinnitus research and management programme were assessed.
Age, gender and ethnicity	Age - Mean (SD): 53.37 (13.86) years. Gender (M:F): 2/1. Ethnicity: Not reported
Further population details	1. Mild hearing loss: Not applicable 2. People with learning disability or cognitive impairment: Not applicable 3. Profoundly deaf: Not applicable
Extra comments	Duration of tinnitus not reported
Indirectness of population	No indirectness
Interventions	(n=20) Intervention 1: Sound therapy and sound enrichment - Sound enrichment. Sound therapy was use of long-term white noise (LTWN) stimulation devices. The optimal response for the LTWN device is a stable wide-band noise with as wide a frequency range as possible. The counselling aspect of the intervention which was based on 'information' provided participants with information on: prevalence of tinnitus, function of the auditory system, contemporary theories of tinnitus generation, tinnitus-related pathologies, pharmacological and dietary influences on tinnitus, psychology of adaptation to tinnitus, role of hearing aids, the use of cognitive and environmental sound-masking strategies in tinnitus management, management of sleep problems and the influence of stress on tinnitus perception. Each participant received a 60 page manual: 'Tinnitus: How to live with it', which gave written details of the topics. Duration Unclear. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Not stated / Unclear (n=20) Intervention 2: Sound therapy and sound enrichment - Sound enrichment. Sound therapy was use of

	long-term white noise (LTWN) stimulation devices. The optimal response for the LTWN device is a stable wide-band noise with as wide a frequency range as possible. The counselling aspect of the intervention which was based on 'information' provided participants with information on: prevalence of tinnitus, function of the auditory system, contemporary theories of tinnitus generation, tinnitus-related pathologies, pharmacological and dietary influences on tinnitus, psychology of adaptation to tinnitus, role of hearing aids, the use of cognitive and environmental sound-masking strategies in tinnitus management, management of sleep problems and the influence of stress on tinnitus perception. Each participant received a 60 page manual: 'Tinnitus: How to live with it', which gave written details of the topics. For the 'relaxation' aspect of the intervention two three-hour sessions were provided - subjects received training in a ‘progressive relaxation’ technique, a relaxed breathing technique, and the use of positive mental imagery. Subjects were supplied with an audiocassette that guided them through the relaxation process and were encouraged to regularly practice the relaxation techniques. Practice was given at both sessions of the tinnitus management training. Duration Unclear. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Not reported (n=28) Intervention 3: Counselling - Information. Participants were provided with information on: prevalence of tinnitus, function of the auditory system, contemporary theories of tinnitus generation, tinnitus-related pathologies, pharmacological and dietary influences on tinnitus, psychology of adaptation to tinnitus, role of hearing aids, the use of cognitive and environmental sound-masking strategies in tinnitus management, management of sleep problems and the influence of stress on tinnitus perception. Each participant received a 60 page manual: 'Tinnitus: How to live with it', which gave written details of the topics. For the 'relaxation' aspect of the intervention two three-hour sessions were provided - subjects received training in a ‘progressive relaxation’ technique, a relaxed breathing technique, and the use of positive mental imagery. Subjects were supplied with an audiocassette that guided them through the relaxation process and were encouraged to regularly practice the relaxation techniques. Practice was given at both sessions of the tinnitus management training.. Duration Unclear. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Not reported (n=28) Intervention 4: Counselling - Information. Participants were provided with information on: prevalence of tinnitus, function of the auditory system, contemporary theories of tinnitus generation, tinnitus-related pathologies, pharmacological and dietary influences on tinnitus, psychology of adaptation to tinnitus, role of hearing aids, the use of cognitive and environmental sound-masking strategies in tinnitus management, management of sleep problems and the influence of stress on tinnitus perception. Each participant received a 60 page manual: 'Tinnitus: How to live with it', which gave written details of the topics.. Duration Unclear. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Not reported

Funding	No funding

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: COUNSELLING (INFORMATION) + SOUND THERAPY versus COUNSELLING (INFORMATION AND RELAXATION) + SOUND THERAPY

Protocol outcome 1: Tinnitus annoyance
- Actual outcome for Adults: Tinnitus annoyance at 12 months; Group 1: mean 3.7 (SD 2.6); n=12, Group 2: mean 3.9 (SD 2.7); n=15; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: Drop-outs (details not reported); Group 2 Number missing: 5, Reason: Drop-outs (details not reported)

Protocol outcome 2: Tinnitus loudness
- Actual outcome for Adults: Tinnitus loudness at 12 months; Group 1: mean 5.3 (SD 2.2); n=12, Group 2: mean 5.2 (SD 2.3); n=15; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: Drop-outs (details not reported); Group 2 Number missing: 5, Reason: Drop-outs (details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: COUNSELLING (INFORMATION) + SOUND THERAPY versus COUNSELLING (INFORMATION AND RELAXATION)

Protocol outcome 1: Tinnitus annoyance
- Actual outcome for Adults: Tinnitus annoyance at 12 months; Group 1: mean 3.7 (SD 2.6); n=12, Group 2: mean 3.9 (SD 2.9); n=21; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: Drop-outs (details not reported); Group 2 Number missing: 7, Reason: Drop-outs (details not reported)

Protocol outcome 2: Tinnitus loudness
- Actual outcome for Adults: Tinnitus loudness at 12 months; Group 1: mean 5.3 (SD 2.2); n=12, Group 2: mean 4.4 (SD 2.7); n=21; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: Drop-outs (details not reported); Group 2 Number missing: 7, Reason: Drop-outs (details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: COUNSELLING (INFORMATION) + SOUND THERAPY versus

COUNSELLING (INFORMATION)

Protocol outcome 1: Tinnitus annoyance
- Actual outcome for Adults: Tinnitus annoyance at 12 months; Group 1: mean 3.7 (SD 2.6); n=12, Group 2: mean 4.3 (SD 2.3); n=17; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: Drop-outs (details not reported); Group 2 Number missing: 7, Reason: Drop-outs (details not reported)

Protocol outcome 2: Tinnitus loudness
- Actual outcome for Adults: Tinnitus loudness at 12 months; Group 1: mean 5.3 (SD 2.2); n=12, Group 2: mean 5.8 (SD 1.9); n=17; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: Drop-outs (details not reported); Group 2 Number missing: 7, Reason: Drop-outs (details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: COUNSELLING (INFORMATION AND RELAXATION) + SOUND THERAPY versus COUNSELLING (INFORMATION AND RELAXATION)

Protocol outcome 1: Tinnitus annoyance
- Actual outcome for Adults: Tinnitus annoyance at 12 months; Group 1: mean 3.9 (SD 2.7); n=15, Group 2: mean 3.9 (SD 2.9); n=21; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 5, Reason: Drop-outs (details not reported); Group 2 Number missing: 7, Reason: Drop-outs (details not reported)

Protocol outcome 2: Tinnitus loudness
- Actual outcome for Adults: Tinnitus loudness at 12 months; Group 1: mean 5.2 (SD 2.3); n=15, Group 2: mean 4.4 (SD 2.7); n=21; Visual analogue scale 0-10 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 5, Reason: Drop-outs (details not reported); Group 2 Number missing: 7, Reason: Drop-outs (details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: COUNSELLING (INFORMATION AND RELAXATION) + SOUND THERAPY versus COUNSELLING (INFORMATION)

Protocol outcome 1: Tinnitus annoyance
- Actual outcome for Adults: Tinnitus annoyance at 12 months; Group 1: mean 3.9 (SD 2.7); n=15, Group 2: mean 4.3 (SD 2.3); n=17; Visual analogue

scale 0-10 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 5, Reason: Drop-outs (details not reported); Group 2 Number missing: 11, Reason: Drop-outs (details not reported) Protocol outcome 2: Tinnitus loudness - Actual outcome for Adults: Tinnitus loudness at 12 months; Group 1: mean 5.2 (SD 2.3); n=15, Group 2: mean 5.8 (SD 1.9); n=17; Visual analogue scale 0-10 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 5, Reason: Drop-outs (details not reported); Group 2 Number missing: 11, Reason: Drop-outs (details not reported)	
Protocol outcomes not reported by the study	Health related quality of life; Tinnitus distress; Severity; Depression; Anxiety; Depression and anxiety; Sleep; Adverse events

Study	**Henry 2016[15]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=148)
Countries and setting	Conducted in USA; Setting: Four veteran affairs medical centre sites: Bay Pines, Portland, San Diego and Seattle
Line of therapy	Not applicable
Duration of study	Follow up (post intervention): 18 months (outcome data only provided up to 6 months for all intervention groups)
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Adults
Subgroup analysis within study	Not applicable
Inclusion criteria	Veterans who experienced sufficiently bothersome tinnitus. No further details reported
Exclusion criteria	No details reported
Recruitment/selection of patients	Participants were recruited by (a) direct referral at each veteran affairs medical centre (VA) sites (b) flyers posted at each VA site; and (c) newspaper ads. Screening involved use of the tinnitus-impact screening interview, which includes eight questions. The tinnitus-impact screening interview facilitated a conversation

	leading to a decision as to whether participation in the study would likely be worth the potential benefits.
Age, gender and ethnicity	Age - Mean (SD): 61.7 (9.8). Gender (M:F): 36/1. Ethnicity: 86.5% White, 4.1% Hispanic, 2.7% Black, 2.7% Other, 2.0% American Indian or Alaskan Native, 2% Asian or Pacific Islander
Further population details	1. Mild hearing loss: People with mild hearing loss (31.1% - sometimes experience difficulty hearing). 2. People with learning disability or cognitive impairment: Not applicable 3. Profoundly deaf: Not applicable
Extra comments	Duration of tinnitus: not reported
Indirectness of population	No indirectness
Interventions	(n=34) Intervention 1: Sound therapy and sound enrichment - Combination hearing devices. Sound therapy and structured education counselling were utilised in this intervention group. Sound therapy involved primarily use of ear-level devices. Participants were fitted with ear-level sound generators (aka "maskers"), hearing aids, or combination instruments. A structured counselling protocol was used to teach concepts unique to TRT.. Duration 18 months. Concurrent medication/care: Participants who did not complain of hearing problems but whose hearing thresholds reflected hearing aid candidacy were advised to try combination instruments. Participants were fitted with ear-level sound generators if they had normal hearing or if their hearing loss was mild enough that they would not be considered for amplification under normal circumstances. Further details: 1. Who is delivering the therapy: Non-mental health professionals (n=42) Intervention 2: Sound therapy and sound enrichment - Masking. Sound therapy and structured education counselling were utilised in this intervention group. Sound therapy involved primarily use of ear-level devices. Education counselling protocol was modified to match the TRT counselling with respect to comparable formatting and length of counselling sessions but containing information specific to the concepts of tinnitus masking. Duration 18 months. Concurrent medication/care: Participants were fitted with ear-level "maskers" if they had normal hearing or if their hearing loss was mild enough that they would not be considered hearing aid candidates under normal circumstances. If amplification was appropriate based on level of hearing loss, then participants could choose either hearing aids or combination instructions, whichever they preferred to receive sound-based relief. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Non-mental health professionals (n=39) Intervention 3: Counselling - Education. Sound therapy and structured education counselling were utilised in this intervention group. The study audiologists were instructed to determine candidacy for amplification same as for a participant who does not have tinnitus. When hearing loss was consistent with borderline hearing aid candidacy, the audiologists were instructed to encourage trial use of amplification (either a hearing aid or combination instrument as appropriate). Education counselling protocol was modified to match the other counselling protocols with respect to comparable formatting and length of counselling sessions but information was more generic (audiogram, how we hear, description of tinnitus, causes of tinnitus, strategies for minimising tinnitus and treatment for tinnitus. Duration 18 months. Concurrent medication/care: For the

	counselling aspect of the intervention a flip-chart counselling guide was developed with discussion points on clinician side, and graphics and major points on participant side. . Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Non-mental health professionals (n=33) Intervention 4: Waiting list control. No treatment was given to participants in this intervention group.. Duration 6 months. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Not applicable
Funding	Academic or government funding (Grants from Veterans Affairs Rehabilitation Research and Development)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) versus TINNITUS MASKING + COUNSELLING

Protocol outcome 1: Severity
- Actual outcome for Adults: Tinnitus severity at 6 months (post-treatment); Group 1: mean -11.07 (SD 2.99); n=34, Group 2: mean -9.93 (SD 2.68); n=42; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E).; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Drop-outs (further details not reported); Group 2 Number missing: 9, Reason: Drop=outs (further details not reported)
- Actual outcome for Adults: Tinnitus severity at 18 months; Group 1: mean -13.5 (SD 3.44); n=34, Group 2: mean -10.86 (SD 3.08); n=42; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E).; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Drop-outs (further details not reported); Group 2 Number missing: 9, Reason: Drop=outs (further details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) versus EDUCATION (+ AMPLIFICATION DEVICES)

Protocol outcome 1: Severity
- Actual outcome for Adults: Tinnitus severity at 6 months (post-treatment); Group 1: mean -11.07 (SD 2.99); n=34, Group 2: mean -7.12 (SD 2.79); n=39; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E). The number of participants that received sound therapy in the comparator arm was not reported. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Drop-outs (further details not reported); Group 2 Number missing: 5,

Reason: Drop=outs (further details not reported)
- Actual outcome for Adults: Tinnitus severity at 18 months; Group 1: mean -13.5 (SD 3.44); n=34, Group 2: mean -7.98 (SD 3.21); n=39; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E). The number of participants that received sound therapy in the comparator arm was not reported. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Drop-outs (further details not reported); Group 2 Number missing: 5, Reason: Drop=outs (further details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) versus WAITING LIST CONTROL

Protocol outcome 1: Severity
- Actual outcome for Adults: Tinnitus severity at 6 months (post-treatment); Group 1: mean -11.07 (SD 2.99); n=34, Group 2: mean 3.09 (SD 3.04); n=33; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E); Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Drop-outs (further details not reported); Group 2 Number missing: 1, Reason: Drop=outs (further details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS MASKING + COUNSELLING versus EDUCATION (+ AMPLIFICATION DEVICES)

Protocol outcome 1: Severity
- Actual outcome for Adults: Tinnitus severity at 6 months (post-treatment); Group 1: mean -9.93 (SD 2.68); n=42, Group 2: mean -7.12 (SD 2.79); n=39; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E). The number of participants that received sound therapy in the comparator arm was not reported. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 9, Reason: Drop-outs (further details not reported); Group 2 Number missing: 6, Reason: Drop=outs (further details not reported)
- Actual outcome for Adults: Tinnitus severity at 18 months; Group 1: mean -10.86 (SD 3.08); n=42, Group 2: mean -7.98 (SD 3.21); n=39; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E). The number of participants that received sound therapy in the comparator arm was not reported. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Drop-outs (further details not reported); Group 2 Number missing: 5, Reason: Drop=outs (further details not reported)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS MASKING + COUNSELLING versus WAITING LIST CONTROL Protocol outcome 1: Severity - Actual outcome for Adults: Tinnitus severity at 6 months (post-treatment); Group 1: mean -9.93 (SD 2.68); n=42, Group 2: mean 3.09 (SD 3.04); n=33; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome; Comments: Standard error reported Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Standard error was reported with mean values, these values were manually converted to standard deviation in Review Manager 5.3 and reported in forest plots (see Appendix E). ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 9, Reason: Drop-outs (further details not reported); Group 2 Number missing: 1, Reason: Drop=outs (further details not reported)

Protocol outcomes not reported by the study	Health related quality of life; Tinnitus distress; Tinnitus annoyance; Tinnitus loudness; Depression; Anxiety; Depression and anxiety; Sleep; Adverse events

Study	**Westin 2011[31]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=64)
Countries and setting	Conducted in Sweden; Setting: Three audiological departments in Sweden
Line of therapy	Not applicable
Duration of study	Follow up (post intervention): 18 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Adults
Subgroup analysis within study	Not applicable
Inclusion criteria	Participants needed (a) to have tinnitus as their primary problem (b) to be ≥18 years old, (c) to have a score of ≥30 on the Tinnitus Handicap Inventory (THI), (d) a duration of tinnitus of ≥6 months, (e) not to suffer from a severe psychiatric disorder, (f) not to have previously received a psychological or sound-generator treatment for tinnitus (g) not be in need of immediate medical consultation and (h) have hearing thresholds which would allow for the use of wearable sound generators (i.e., in severe hearing loss the sound stimulation may not be heard or need to be so loud that the person would have problems hearing conversations)
Exclusion criteria	Based on inclusion criteria. No further details reported.

Recruitment/selection of patients	Participants were recruited from three different audiology departments and via advertisements and articles in newspapers over the course of 17 months. All were registered as regular patients within the public health care system and diagnostic assessments and treatments were provided within that system.
Age, gender and ethnicity	Age - Mean (SD): 50.9 (12.9) years. Gender (M:F): 1.1/1. Ethnicity: Not reported
Further population details	1. Mild hearing loss: Not stated / Unclear 2. People with learning disability or cognitive impairment: Not stated / Unclear 3. Profoundly deaf: Not stated / Unclear
Extra comments	Mean duration of tinnitus: 7.7 years (ACT group 6.77 years, TRT group 9.19 years, waiting-list control group 7.11 years)
Indirectness of population	No indirectness
Interventions	(n=20) Intervention 1: Sound therapy and sound enrichment - Sound enrichment. TRT was delivered individually following the principles outlined by Jastreboff and Hazell (2004). The participants in the TRT intervention group received a single 2.5 hours consultation. At the same appointment wearable sound generators were fitted bilaterally with an open fitting. The consultation started with a medical evaluation, taking the history of tinnitus, decreased sound tolerance and hearing loss, and assessing the category for treatment using the criteria presented by Jastreboff and Hazell in order to adjust treatment accordingly. Consultation included retraining counselling with education about the neurophysiological model of tinnitus. Participants were also given an introduction to sound therapy and instructions on how to wear and monitor their wearable sound generators. The instruction was to wear the devices throughout the waking hours. Duration 18 months. Concurrent medication/care: Intensity of the sound enrichment was set to the "mixing point", at which level partial suppression of the tinnitus sound begins to occur. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Non-mental health professionals (Consultation provided by an ear-nose-throat physician who was also a specialist in audiology and TRT. Fitting of the sound generators was performed by an audiologist.). (n=22) Intervention 2: Psychological therapies - Acceptance and commitment therapy. Acceptance and commitment therapy (ACT) intervention was delivered in an individual format using a treatment manual developed according to ACT treatment principles as outlined by Hayes, Strosahl, and Wilson 1999. All participants in the ACT condition received weekly sessions. A maximum of 10 sessions was offered and the average number of treatment sessions was 8.38 sessions. The sessions were set to be 60 minutes, with exception for session two, which was set to 75 minutes. The first sessions contained evaluating the patients' current coping strategies in relation to tinnitus, examining costs and benefits and the introduction to mindfulness. The treatment further consisted of mindfulness and acceptance training to promote goal-directed behaviours in valued life-domains. The mindfulness exercises involved approaching the tinnitus sound and related reactions in a non-judgmental way. Other treatment components included working with values, and life goals, changing tinnitus related behavioural patterns, and psychoeducation regarding tinnitus. . Duration 18 months. Concurrent medication/care: Each session ended with a homework assignment such as daily ACT-

	ratings. . Indirectness: No indirectness Further details: 1. Who is delivering the therapy: mental health professionals (psychologists and therapists) (Eight therapists delivered the intervention. Six were master program students and two were clinical psychologists). (n=22) Intervention 3: Waiting list control. Participants in the waiting-list control group received a written confirmation that they were included in the study, and received information about when their treatment would start. Treatment started after 10 weeks. Participants received CBT either in an individual, self-help or a group format. . Duration 10 weeks. Concurrent medication/care: Some participants declined treatment after time on the waiting-list, no further details reported. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Not applicable
Funding	Academic or government funding (The Medical Research Council of Southeast Sweden and the Swedish Council for Working Life and Social Research.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) versus ACCEPTANCE AND COMMITMENT THERAPY (ACT)

Protocol outcome 1: Health related quality of life
- Actual outcome for Adults: Quality of life at 10 weeks; Group 1: mean 2.47 (SD 1.72); n=18, Group 2: mean 2.78 (SD 1.53); n=21; Quality of Life Inventory Not reported Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessment
- Actual outcome for Adults: Quality of life at 18 months; Group 1: mean 2.74 (SD 1.27); n=14, Group 2: mean 2.92 (SD 1.63); n=21; Quality of Life Inventory (QOLI) Not reported Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Discontinued treatment and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

Protocol outcome 2: Severity
- Actual outcome for Adults: Tinnitus severity at 10 weeks; Group 1: mean 43.22 (SD 20.75); n=18, Group 2: mean 27.43 (SD 19.18); n=21; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the

waiting-list control group as participants were allocated to treatment after that time-point. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessment
- Actual outcome for Adults: Tinnitus severity at 18 months; Group 1: mean 41.86 (SD 18.75); n=14, Group 2: mean 28.19 (SD 17.8); n=21; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Discontinued treatment and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

Protocol outcome 3: Depression
- Actual outcome for Adults: Depression at 10 weeks; Group 1: mean 5.78 (SD 3.73); n=18, Group 2: mean 3.2 (SD 3.47); n=21; Hospital Anxiety and Depression Scale 0-21 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments
- Actual outcome for Adults: Depression at 18 months; Group 1: mean 4.43 (SD 3.94); n=14, Group 2: mean 3.24 (SD 3.25); n=21; Hospital Anxiety and Depression Scale (HADS) (depression subscale) 0-21 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Discontinued treatment and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

Protocol outcome 4: Anxiety
- Actual outcome for Adults: Anxiety at 10 weeks; Group 1: mean 7 (SD 4.2); n=18, Group 2: mean 3.6 (SD 3.14); n=21; Hospital Anxiety and Depression Scale 0-21 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments
- Actual outcome for Adults: Anxiety at 18 months; Group 1: mean 6.86 (SD 5.7); n=14, Group 2: mean 4.05 (SD 2.56); n=21; Hospital Anxiety and Depression Scale (HADS) (anxiety subscale) 0-21 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Discontinued treatment and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

Protocol outcome 5: Sleep

- Actual outcome for Adults: Sleep at 10 weeks; Group 1: mean 13.06 (SD 5.63); n=18, Group 2: mean 9.25 (SD 5.17); n=21; Insomnia Severity Index 0-100 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments
- Actual outcome for Adults: Sleep at 18 months; Group 1: mean 12.57 (SD 6.33); n=14, Group 2: mean 8.9 (SD 5.49); n=21; Insomnia Severity Index (ISI) 0-100 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 6, Reason: Discontinued treatment and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) versus WAITING LIST CONTROL

Protocol outcome 1: Health related quality of life
- Actual outcome for Adults: Quality of life at 10 weeks; Group 1: mean 2.47 (SD 1.72); n=18, Group 2: mean 1.92 (SD 1.77); n=21; Quality of Life Inventory Not reported Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

Protocol outcome 2: Severity
- Actual outcome for Adults: Tinnitus severity at 10 weeks; Group 1: mean 43.22 (SD 20.75); n=18, Group 2: mean 48.29 (SD 21.04); n=21; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments

Protocol outcome 3: Depression
- Actual outcome for Adults: Depression at 10 weeks; Group 1: mean 5.78 (SD 3.73); n=18, Group 2: mean 6.2 (SD 5.13); n=21; Hospital Anxiety and Depression Scale 0-21 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. To ensure comparability, the latest time-point used was 10 weeks

for all intervention groups.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments Protocol outcome 4: Anxiety - Actual outcome for Adults: Anxiety at 10 weeks; Group 1: mean 7 (SD 4.2); n=18, Group 2: mean 7.2 (SD 5.57); n=21; Hospital Anxiety and Depression Scale 0-21 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. ; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments Protocol outcome 5: Sleep - Actual outcome for Adults: Sleep at 10 weeks; Group 1: mean 13.06 (SD 5.63); n=18, Group 2: mean 11.8 (SD 6.14); n=21; Insomnia Severity Index 0-100 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Comments - Outcome data was reported for up to 18 months for TRT and ACT but outcome data was reported for up to 10 weeks for the waiting-list control group as participants were allocated to treatment after that time-point. To ensure comparability, the latest time-point used was 10 weeks for all intervention groups.; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Dropped out and did not complete assessments; Group 2 Number missing: 1, Reason: Did not complete assessments	
Protocol outcomes not reported by the study	Tinnitus distress; Tinnitus annoyance; Tinnitus loudness; Depression and anxiety; Adverse events

Study	**Zachriat 2004[32]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=83)
Countries and setting	Conducted in Germany; Setting: Therapy and Counselling Centre of the Department of Clinical Psychology and Psychotherapy at the University of Gottingen.
Line of therapy	Not applicable
Duration of study	Intervention time: 11 weeks
Method of assessment of guideline condition	Adequate method of assessment/diagnosis: All patients were diagnosed by their physicians as suffering from tinnitus without a treatable organic disease.
Stratum	Adults

Subgroup analysis within study	Not applicable
Inclusion criteria	Tinnitus for a period of more than 3 months; absence of treatable organic causes of tinnitus; absence of Morbus Meniere; hearing capacity sufficient for communication within groups; tinnitus disability score >/= 25 (see tinnitus questionnaire (TQ)); no ongoing psychotherapy or masker treatment.
Exclusion criteria	Not reported
Recruitment/selection of patients	Newspaper announcements about the research project.
Age, gender and ethnicity	Age - Mean (SD): 53.8 years. Gender (M:F): 2/1. Ethnicity: Not reported
Further population details	1. Mild hearing loss: Not stated / Unclear 2. People with learning disability or cognitive impairment: Not stated / Unclear 3. Profoundly deaf: Not stated / Unclear
Extra comments	Tinnitus duration in months, mean (SD): TCT group 68.5 (61.9); HT group 65.4 (64.3); EDU group: 90.2 (79.0). Hearing deficit: TCT group 50%; HT group 35.7%; EDU group: 45%.
Indirectness of population	No indirectness
Interventions	(n=29) Intervention 1: Psychological therapies - Cognitive behavioural therapy. Cognitive-behavioural tinnitus coping training (TCT). Administered in groups of 6-8 tinnitus patients. 11 weekly sessions of 90-120 minutes. After a first (psychoeducational) session and a subsequent intermission of 4 weeks to test for effect of education alone, TCT continued. Treatment was given in adherence to a detailed training manual (Kroner Herwig 1997). The following interventions were included: educated on physiological and psychological factors playing a role in tinnitus; taught relaxation exercises and the use of attention distraction strategies. Also trained to identify cognitive processes (e.g. automatic thoughts regarding tinnitus, worrying, catastrophising) and emotional responses (e.g. depression, anger, helplessness, fear) relating to tinnitus and to modify them. Avoidance behaviour was analysed and cognitive-behavioural coping techniques were introduced in order to learn how to cope with tinnitus as a stressor and to cope with stress as an exacerbator of tinnitus. Attitudes towards illness and health, and their influence on dealing with tinnitus were explored. Finally coping with relapse was discussed. . Duration 11 weeks. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: mental health professionals (psychologists and therapists) (5 therapists were postgraduate female psychologists, who were intensively schooled in delivering the training in strict adherence to the manuals. Regular supervision took place.). (n=23) Intervention 2: Counselling - Education. EDU consisted of a single treatment session in which patients were informed about the physiology and psychology of tinnitus. The content of this session was, in main parts, identical to the first session of TCT. The educational part of HT (session 1) also corresponded closely to the educational contents of EDU. They were encouraged to use the information to improve their coping with tinnitus. . Duration 1 session. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: mental health professionals (psychologists and therapists) (5

	therapists were postgraduate female psychologists, who were intensively schooled in delivering the training in strict adherence to the manuals. Regular supervision took place.). (n=31) Intervention 3: Sound therapy and sound enrichment - Sound enrichment. Habituation-therapy (tinnitus retraining therapy (TRT)) was delivered with 5 sessions of 90-120 minutes spaced over a period of 6 months, sessions taking place every 406 weeks. Main components of HT were counselling and sound generator use to foster habituation. Counselling concentrated on education on the neurophysiological and psychological factors that have an impact on tinnitus and determine in distressing quality. Also information on the peripheral and central neuronal mechanisms involved in tinnitus perception and in its becoming a chronic disorder were given. Wide band noise generators (both ears) were introduced in the second session and their correct use (noise level below masking level of tinnitus) was explained. Participants were instructed to use the generators regularly for several hours per day (≥6 hours). . Duration 6 months. Concurrent medication/care: Habituation-therapy intervention was modelled after Jastreboff/s conception. A major difference was that intervention was delivered in groups instead of individually. A manual was compiled by the first author of the study. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: mental health professionals (psychologists and therapists) (5 therapists were postgraduate female psychologists, who were intensively schooled in delivering the training in strict adherence to the manuals. Regular supervision took place. Audiologists also provided support in adapting the generators to the individual participants.).
Funding	Other (Grant from the Geers Foundation. The noise generators were donated by Hansaton, the batteries by Energiser and support in fitting noise generators by Reuter Acoustics.)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) SOUND ENRICHMENT + COUNSELLING versus COGNITIVE BEHAVIOURAL THERAPY

Protocol outcome 1: Severity
- Actual outcome for Adults: Tinnitus severity at Post-treatment; Group 1: mean 31.84 (SD 15.62); n=30, Group 2: mean 33.9 (SD 16.2); n=27; Tinnitus Questionnaire 0-84 Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Difference in baseline characteristics (% of males and duration of tinnitus); Group 1 Number missing: 1, Reason: Dropouts ; Group 2 Number missing: 2, Reason: Dropouts

Protocol outcome 2: Tinnitus loudness
- Actual outcome for Adults: Tinnitus loudness (perception diary) at Post-treatment; Group 1: mean 4.45 (SD 1.95); n=30, Group 2: mean 4.18 (SD 1.74); n=27; Tinnitus perception diary Not reported Top=High is poor outcome
Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low,

Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Difference in baseline characteristics (% of males and duration of tinnitus); Group 1 Number missing: 1, Reason: Dropouts ; Group 2 Number missing: 2, Reason: Dropouts - Actual outcome for Adults: Tinnitus loudness (subjective change) at Post-treatment; Group 1: mean 3.93 (SD 0.97); n=30, Group 2: mean 3.7 (SD 1); n=27; Subjective change 1-7 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Difference in baseline characteristics (% of males and duration of tinnitus); Group 1 Number missing: 1, Reason: Dropouts ; Group 2 Number missing: 2, Reason: Dropouts RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: TINNITUS RETRAINING THERAPY (TRT) SOUND ENRICHMENT + COUNSELLING versus EDUCATION Protocol outcome 1: Severity - Actual outcome for Adults: Tinnitus severity at Post-treatment; Group 1: mean 31.84 (SD 15.62); n=30, Group 2: mean 37.65 (SD 14.19); n=20; Tinnitus Questionnaire 0-84 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Difference in baseline characteristics (% of males and duration of tinnitus); Group 1 Number missing: 1, Reason: Dropouts ; Group 2 Number missing: 3, Reason: Dropouts Protocol outcome 2: Tinnitus loudness - Actual outcome for Adults: Tinnitus loudness (subjective change) at Post-treatment; Group 1: mean 3.93 (SD 0.97); n=30, Group 2: mean 4.15 (SD 0.49); n=20; Subjective change 1-7 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Difference in baseline characteristics (% of males and duration of tinnitus); Group 1 Number missing: 1, Reason: Dropouts ; Group 2 Number missing: 3, Reason: Dropouts - Actual outcome for Adults: Tinnitus loudness (perception diary) at Post-treatment; Group 1: mean 4.45 (SD 1.95); n=30, Group 2: mean 4.47 (SD 2.2); n=20; Tinnitus perception diary Not reported Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Difference in baseline characteristics (% of males and duration of tinnitus); Group 1 Number missing: 1, Reason: Dropouts ; Group 2 Number missing: 3, Reason: Dropouts
Protocol outcomes not reported by the study	Health related quality of life; Tinnitus distress; Tinnitus annoyance; Depression; Anxiety; Depression and anxiety; Sleep; Adverse events

Study	**Zarenoe 2016[33]**
Study type	RCT (Patient randomised; Parallel)

Number of studies (number of participants)	(n=50)
Countries and setting	Conducted in Sweden; Setting: Ear-nose-throat clinic (ENT clinic) in Linköping, Sweden
Line of therapy	Not applicable
Duration of study	Follow up (post intervention): 3 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Adults
Subgroup analysis within study	Not applicable
Inclusion criteria	People with both tinnitus and sensorineural hearing loss and a pure-tone average (PTA, average of 0.5, 1, 2, and 4 kHz) <70 dB HL. Participants were first-time hearing aid users.
Exclusion criteria	People were excluded if they had middle ear disorders or hearing loss since birth/childhood. People with significant physical disability and/or a behavioural disorder and those who did not speak fluent Swedish and needed an interpreter during their visit were also excluded.
Recruitment/selection of patients	People who sought care for tinnitus and/or hearing loss at the ear-nose-throat clinic in Linköping, Sweden during the period September 2012 to March 2013.
Age, gender and ethnicity	Age - Mean (range): 59.7 (40-82) years. Gender (M:F): 2/1. Ethnicity: Not reported
Further population details	1. Mild hearing loss: People with mild hearing loss (Symmetric loss: 70%; High-frequency loss: 93.5%). 2. People with learning disability or cognitive impairment: Not applicable 3. Profoundly deaf: Not applicable
Extra comments	Duration of tinnitus: not reported, % of participants with bilateral tinnitus: 71.5%
Indirectness of population	No indirectness
Interventions	(n=25) Intervention 1: Sound therapy and sound enrichment - Sound enrichment. Participants were fitted with open-fit slim tube hearing aids and were optimised for the amplification of low-input sounds. Number of visits to the audiologist over the intervention varied depending on the audiologist. The number of visits usually spanned from three to five visits. The choice of hearing aid was based on the patients' audiogram, their ability to handle the hearing aids, and their preferences for hearing aid type. A majority of the people tinnitus used open-fit slim tube hearing aids. Two participants used in-the-ear hearing aids. All participants received information about the probable outcomes with regard to the function in hearing aids. In addition, they were informed about the limitations of hearing aids in certain situations. Audiologists supplied the participant with written information on skills that could enhance listening in difficult environment. It was pointed out that hearing aid rehabilitation requires substantial effort from the participant. Motivational interviewing - this was used to improve participants' hearing aid usage, techniques included open questions, reflective listening, summaries, and affirmations. A specific instructor manual based on the studies

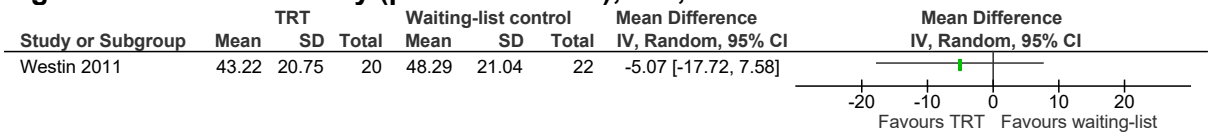
	of Rollnick et al (1999) and Miller and Rollnick (2012) was constructed for the intervention. Duration 3 months. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Non-mental health professionals (Audiologists). (n=25) Intervention 2: Sound therapy and sound enrichment - Sound enrichment. Participants were fitted with open-fit slim tube hearing aids and were optimized for the amplification of low-input sounds. Number of visits to the audiologist over the intervention varied depending on the audiologist. The number of visits usually spanned from three to five visits. The choice of hearing aid was based on the patients' audiogram, their ability to handle the hearing aids, and their preferences for hearing aid type. A majority of the people tinnitus used open-fit slim tube hearing aids. Two participants used in-the-ear hearing aids. All participants received information about the probable outcomes with regard to the function in hearing aids. In addition, they were informed about the limitations of hearing aids in certain situations. Audiologists supplied the participant with written information on skills that could enhance listening in difficult environment. It was pointed out that hearing aid rehabilitation requires substantial effort from the participant.. Duration 3 months. Concurrent medication/care: n/a. Indirectness: No indirectness Further details: 1. Who is delivering the therapy: Non-mental health professionals (Audiologists).
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: SOUND THERAPY + COUNSELLING (MOTIVATIONAL INTERVIEWING) versus SOUND THERAPY Protocol outcome 1: Severity - Actual outcome for Adults: Tinnitus severity at 3 months; Group 1: mean 21.8 (SD 12.4); n=23, Group 2: mean 25.8 (SD 20.4); n=23; Tinnitus Handicap Inventory 0-100 Top=High is poor outcome Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 2, Reason: Participants discontinued the hearing aid fitting because they were not satisfied with the amplification, and believed that they were more bothered by the devices than they were helped.; Group 2 Number missing: 2, Reason: Participants discontinued the hearing aid fitting because they were not satisfied with the amplification, and believed that they were more bothered by the devices than they were helped.	
Protocol outcomes not reported by the study	Health related quality of life; Tinnitus distress; Tinnitus annoyance; Tinnitus loudness; Depression; Anxiety; Depression and anxiety; Sleep; Adverse events

Appendix E: Forest plots

Tinnitus retraining therapy (TRT) [counselling + sound therapies]

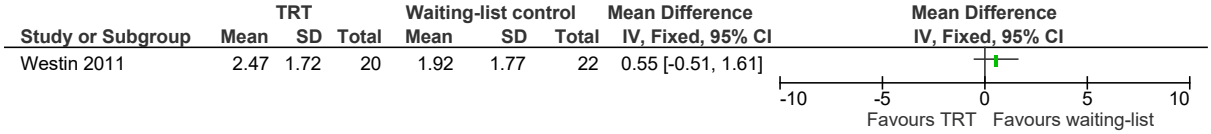
E.1 TRT (sound therapy component: sound enrichment) versus waiting-list control

Figure 2: Tinnitus severity (post-treatment); THI, scale 0-100



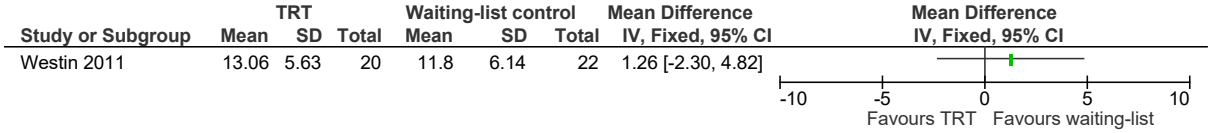
THI = Tinnitus Handicap Inventory

Figure 3: Quality of life (post-treatment); QOLI, scale not reported



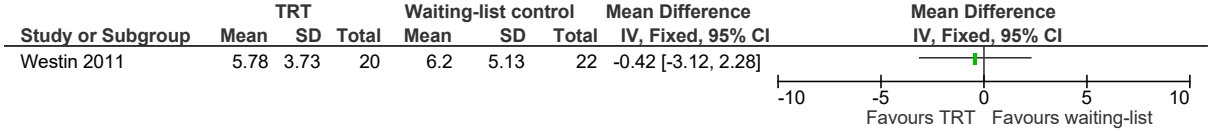
QOLI = Quality of Life Inventory

Figure 4: Sleep (post-treatment); ISI, scale 0-28



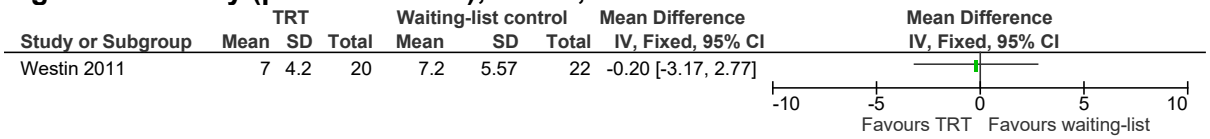
ISI = Insomnia Severity Index

Figure 5: Depression (post-treatment); HADS, scale 0-21



HADS = Hospital Anxiety and Depression Scale

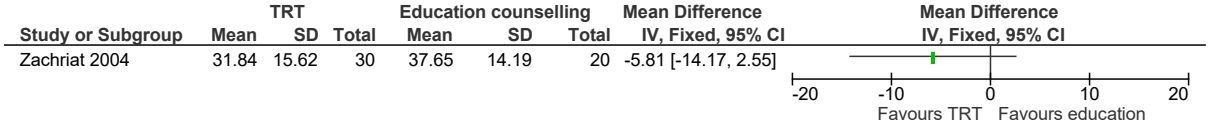
Figure 6: Anxiety (post-treatment); HADS, scale 0-21



HADS = Hospital Anxiety and Depression Scale

E.2 TRT (sound therapy component: sound enrichment) versus education counselling

Figure 7: Tinnitus severity (post-treatment); TQ, scale 0-84



TQ = Tinnitus Questionnaire

Figure 8: Tinnitus loudness (tinnitus perception diary) (post-treatment)

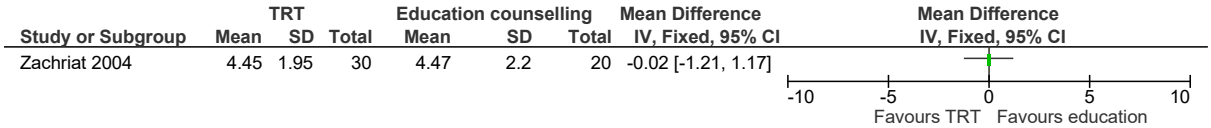
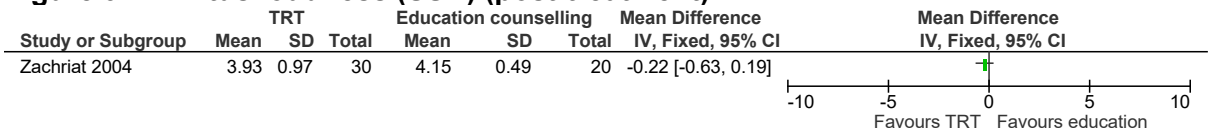


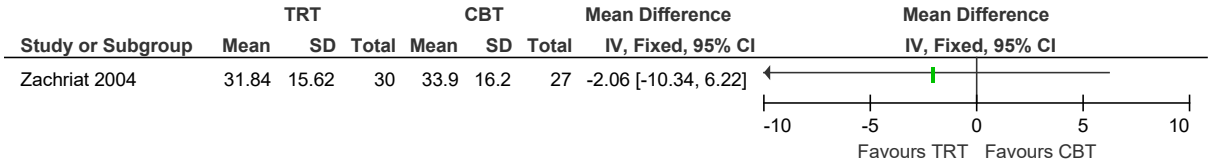
Figure 9: Tinnitus loudness (SSR) (post-treatment)



SSR = Subjective Change

E.3 TRT (sound therapy component: sound enrichment) versus CBT

Figure 10: Tinnitus severity (post-treatment), TQ, scale 0-84



TQ = Tinnitus Questionnaire

Figure 11: Tinnitus loudness (tinnitus perception diary) (post-treatment)

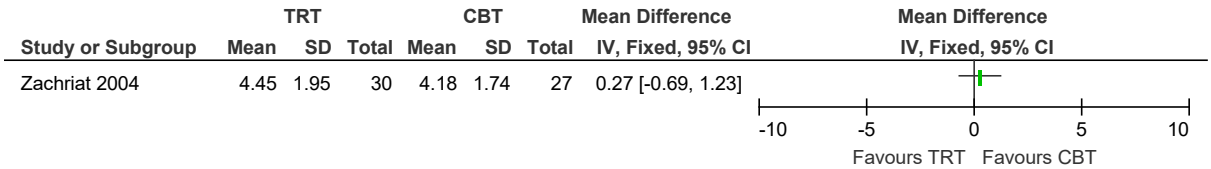
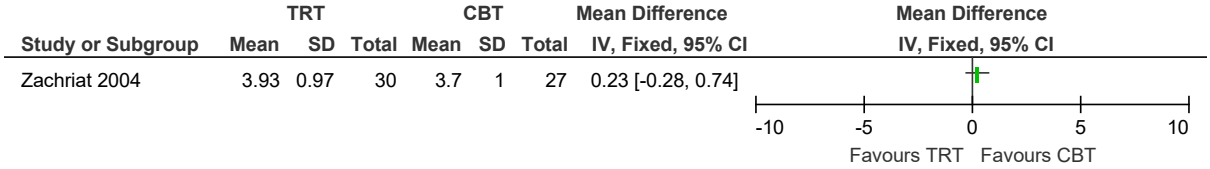


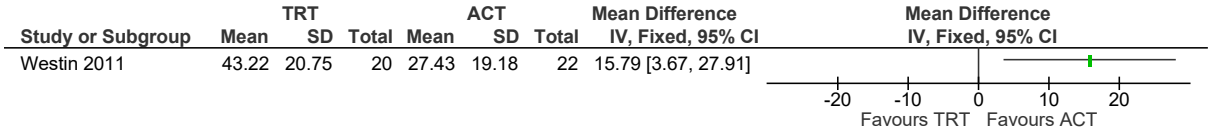
Figure 12: Tinnitus loudness (SSR) (post-treatment), scale 1-7



SSR = subjective change

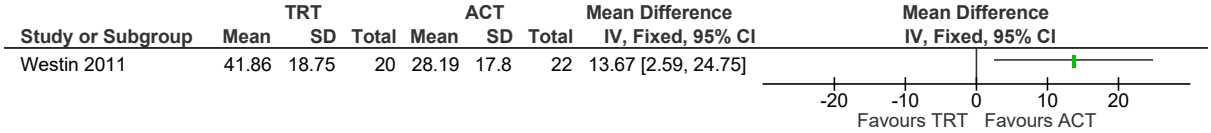
E.4 TRT (sound therapy component: sound enrichment) versus ACT

Figure 13: Tinnitus severity (post-treatment); THI, scale 0-100



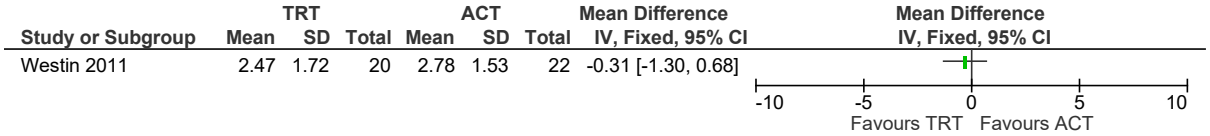
THI = Tinnitus Handicap Inventory

Figure 14: Tinnitus severity (18 months); THI, scale 0-100



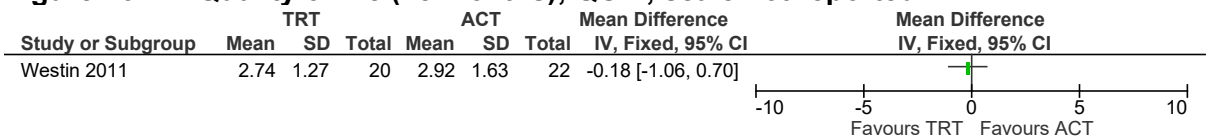
THI = Tinnitus Handicap Inventory

Figure 15: Quality of life (post-treatment); QOLI, scale not reported



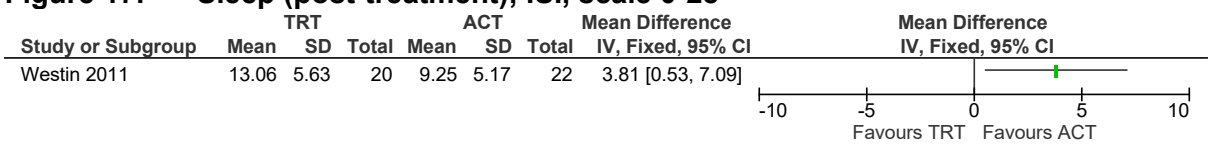
QOLI = Quality of Life Inventory

Figure 16: Quality of life (18 months); QOLI, scale not reported



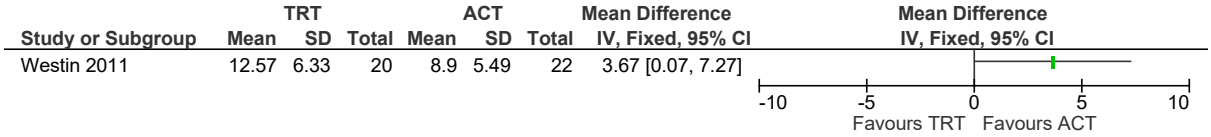
QOLI = Quality of Life Inventory

Figure 17: Sleep (post-treatment); ISI, scale 0-28



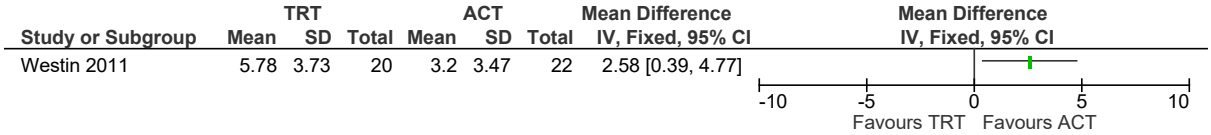
ISI = Insomnia Severity Index

Figure 18: Sleep (18 months); ISI, scale 0-28



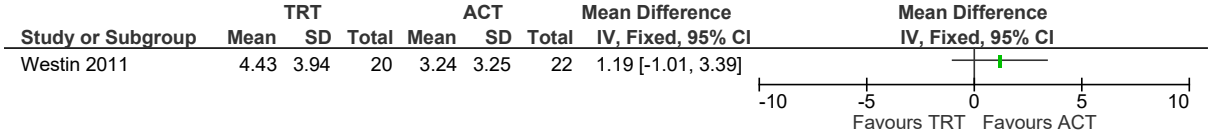
ISI = Insomnia Severity Index

Figure 19: Depression (post-treatment); HADS, scale 0-21



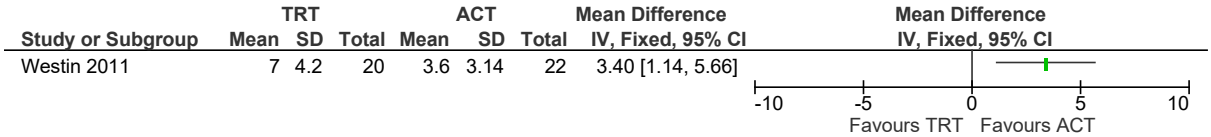
HADS = Hospital Anxiety and Depression Scale

Figure 20: Depression (18 months); HADS, scale 0-21



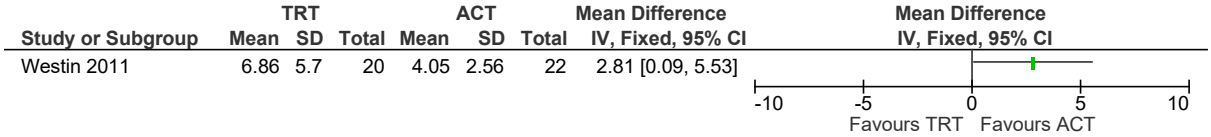
HADS = Hospital Anxiety and Depression Scale

Figure 21: Anxiety (post-treatment); HADS, scale 0-21



HADS = Hospital Anxiety and Depression Scale

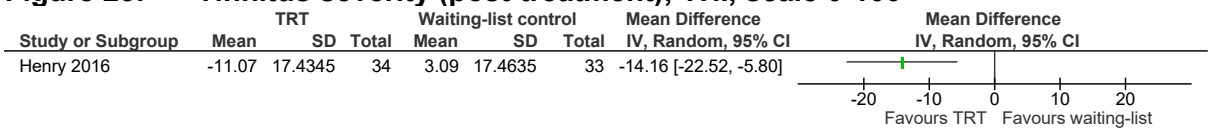
Figure 22: Anxiety (18 months); HADS, scale 0-21



HADS = Hospital Anxiety and Depression Scale

E.5 TRT (sound therapy component: combination devices) versus waiting-list control

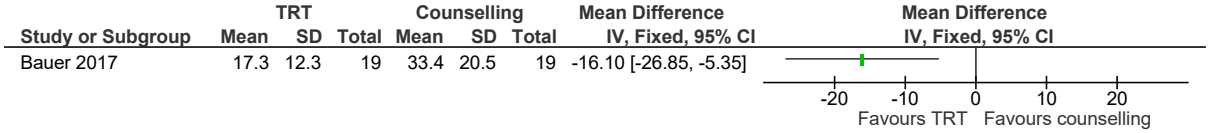
Figure 23: Tinnitus severity (post-treatment); THI, scale 0-100



THI = Tinnitus Handicap Inventory

E.6 TRT (sound therapy component: combination devices) versus education counselling

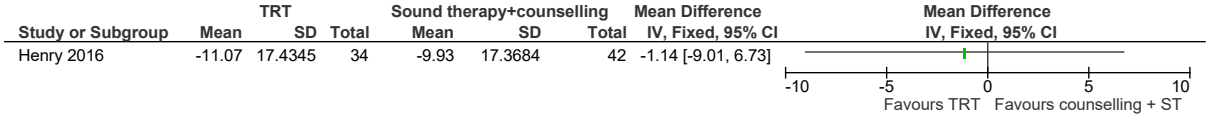
Figure 24: Tinnitus severity (18 months); THI, scale 0-100



THI = Tinnitus Handicap Inventory

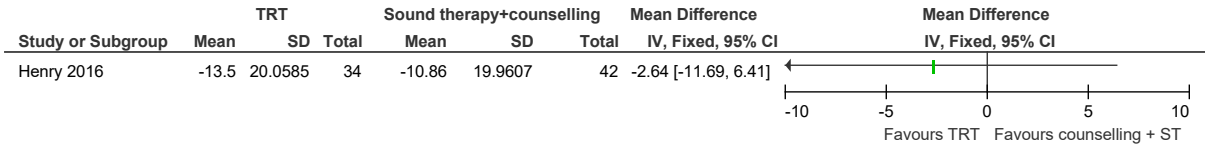
E.7 TRT (sound therapy component: combination devices) versus education counselling + tinnitus masking

Figure 25: Tinnitus severity (post-treatment), THI, scale 0-100



THI = Tinnitus Handicap Inventory

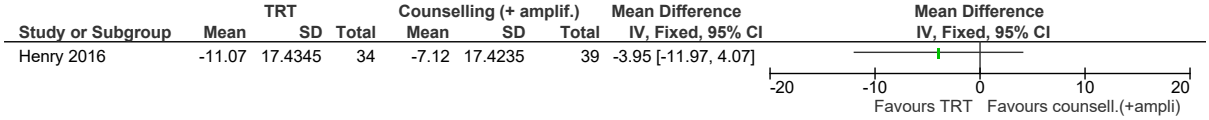
Figure 26: Tinnitus severity (18 months), THI, scale 0-100



THI = Tinnitus Handicap Inventory

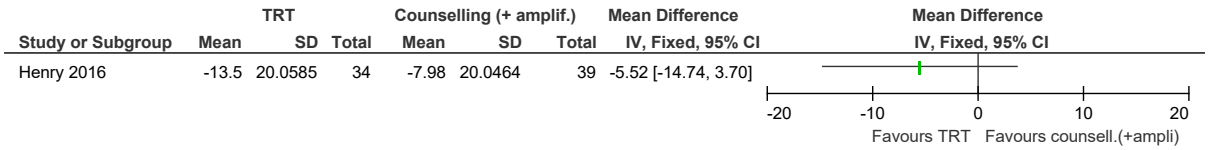
E.8 TRT (sound therapy component: combination devices) versus education counselling (+ amplification devices – when required)

Figure 27: Tinnitus severity (post-treatment); THI, scale 0-100



THI = Tinnitus Handicap Inventory

Figure 28: Tinnitus severity (18 months), THI, scale 0-100

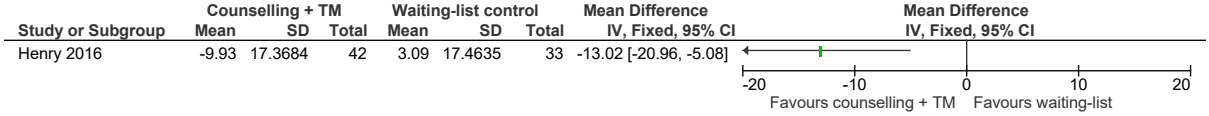


THI = Tinnitus Handicap Inventory

Education counselling + sound therapies

E.9 Education counselling + tinnitus masking versus waiting list control

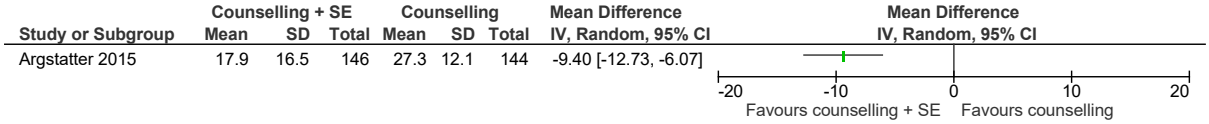
Figure 29: Tinnitus severity (post-treatment); THI, scale 0-100



THI = Tinnitus Handicap Inventory

E.10 Education counselling + sound enrichment versus education counselling

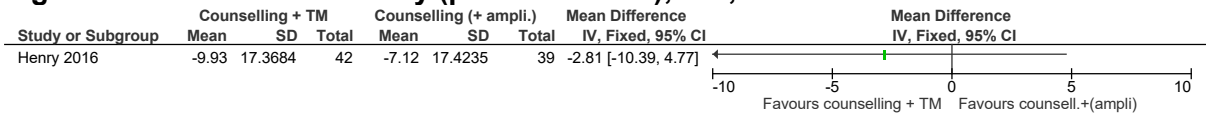
Figure 30: Tinnitus severity (5 days); TQ, scale 0-84



TQ = Tinnitus Questionnaire

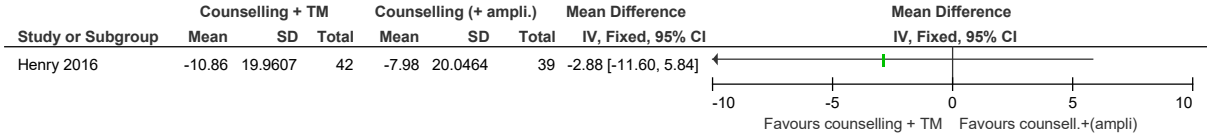
E.11 Education counselling + tinnitus masking versus education counselling (+amplification devices – if required)

Figure 31: Tinnitus severity (post-treatment); THI, scale 0-100



THI = Tinnitus Handicap Inventory

Figure 32: Tinnitus severity (18 months); THI, scale 0-100

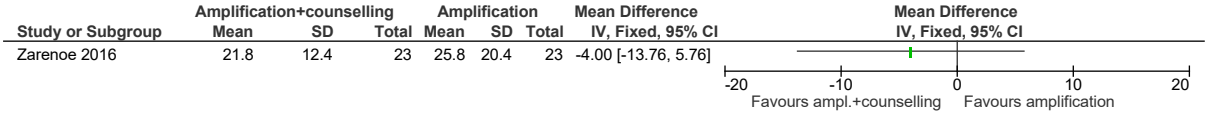


THI = Tinnitus Handicap Inventory

Education counselling + amplification devices

E.12 Education counselling + amplification devices versus amplification devices

Figure 33: Tinnitus severity (3 months); THI, scale 0-100

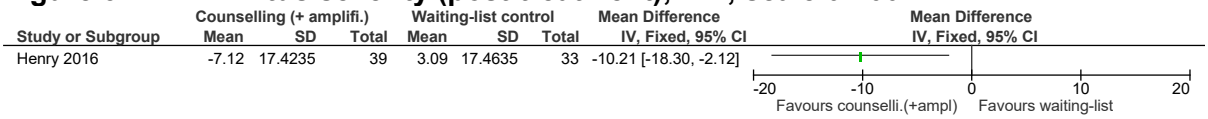


THI = Tinnitus Handicap Inventory

Education counselling (+ amplification devices – if required)

E.13 Education counselling (+ amplification devices) versus waiting list control

Figure 34: Tinnitus severity (post-treatment); THI, scale 0-100

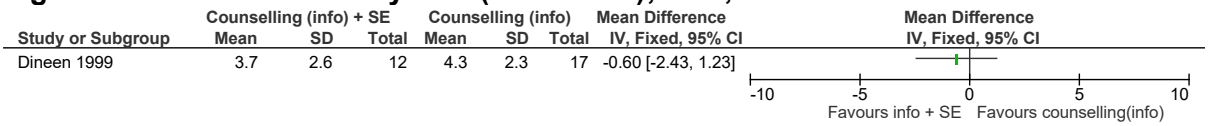


THI = Tinnitus Handicap Inventory

Counselling (information) + sound therapies

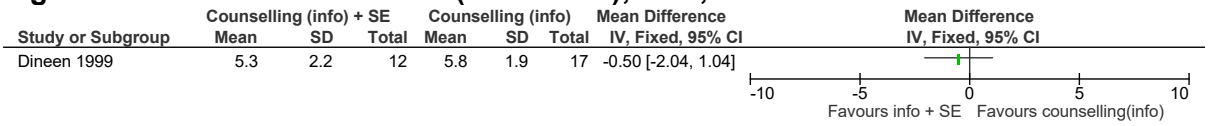
E.14 Counselling (information) + sound enrichment versus counselling (information)

Figure 35: Tinnitus annoyance (12 months); VAS, scale 0-10



VAS = visual analogue scale

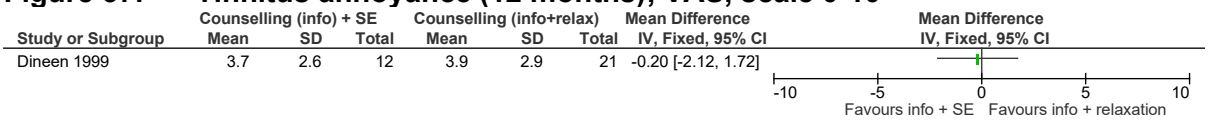
Figure 36: Tinnitus loudness (12 months); VAS, scale 0-10



VAS = visual analogue scale

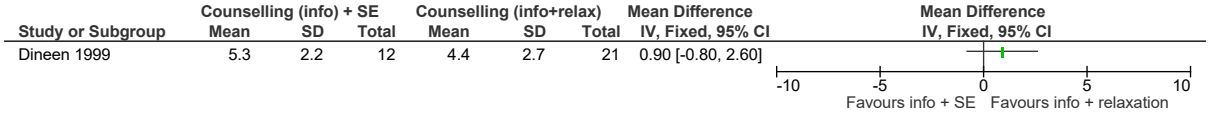
E.15 Counselling (information) + sound enrichment versus counselling (information and relaxation)

Figure 37: Tinnitus annoyance (12 months); VAS, scale 0-10



VAS = visual analogue scale

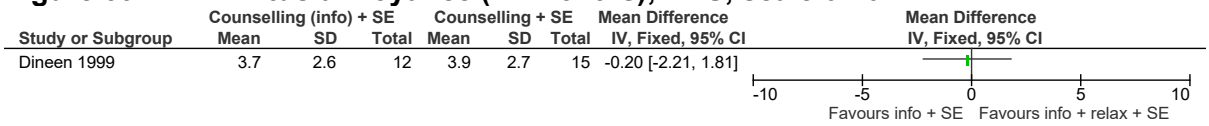
Figure 38: Tinnitus loudness (12 months); VAS, scale 0-10



VAS = visual analogue scale

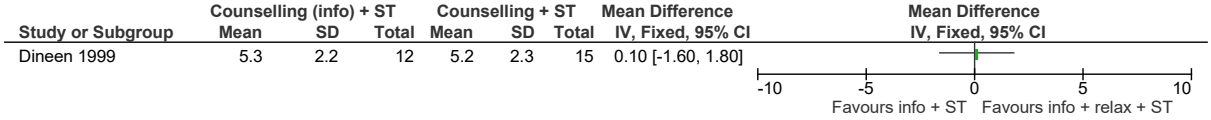
E.16 Counselling (information) + sound enrichment versus counselling (information and relaxation) + sound enrichment

Figure 39: Tinnitus annoyance (12 months); VAS, scale 0-10



VAS = visual analogue scale

Figure 40: Tinnitus loudness (12 months); VAS, scale 0-10

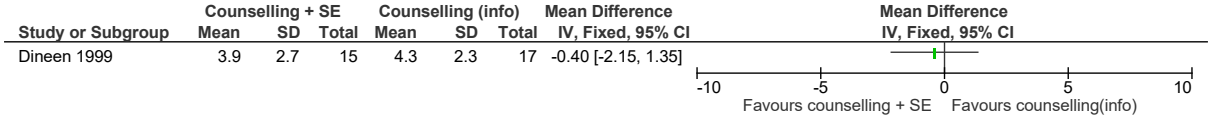


VAS = visual analogue scale

Counselling (information and relaxation) + sound therapies

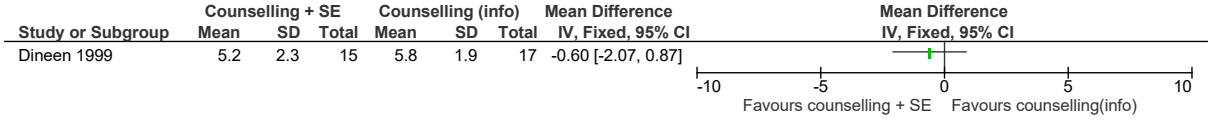
E.17 Counselling (information and relaxation) + sound enrichment versus counselling (information)

Figure 41: Tinnitus annoyance (12 months); VAS, scale 0-10



VAS = visual analogue scale

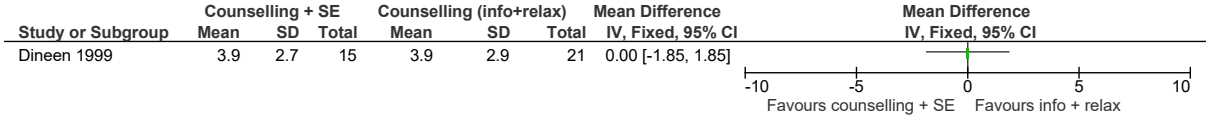
Figure 42: Tinnitus loudness (12 months); VAS, scale 0-10



VAS = visual analogue scale

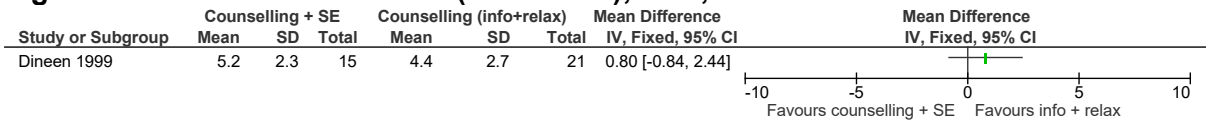
E.18 Counselling (information and relaxation) + sound enrichment versus counselling (information and relaxation)

Figure 43: Tinnitus annoyance (12 months); VAS, scale 0-10



VAS = visual analogue scale

Figure 44: Tinnitus loudness (12 months); VAS, scale 0-10



VAS = visual analogue scale

Appendix F: GRADE tables

Tinnitus retraining therapy (TRT) [counselling + sound therapies]

Table 25: Clinical evidence profile: TRT (sound therapy component: sound enrichment) versus waiting-list control

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	TRT (sound therapy component: sound enrichment)	Waiting-list control	Relative (95% CI)	Absolute		
Tinnitus severity (follow-up post-treatment; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	20	22	-	MD 5.07 lower (17.72 lower to 7.58 higher)	⊕⊕OO LOW	CRITICAL
Quality of life (follow-up post-treatment; measured with: Quality of Life Inventory; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	20	22	-	MD 0.55 higher (0.51 lower to 1.61 higher)	⊕OOO VERY LOW	CRITICAL
Sleep (follow-up post-treatment; measured with: Insomnia Severity Index; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	20	22	-	MD 1.26 higher (2.3 lower to 4.82 higher)	⊕OOO VERY LOW	IMPORTANT
Depression (follow-up post-treatment; measured with: Hospital Anxiety and Depression Scale; range of scores: 0-21; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	20	22	-	MD 0.42 lower (3.12 lower to 2.28	⊕OOO VERY	IMPORTANT

										higher)	LOW	
Anxiety (follow-up post-treatment; measured with: Hospital Anxiety and Depression Scale; range of scores: 0-21; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	20	22	-	MD 0.2 lower (3.17 lower to 2.77 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 26: Clinical evidence profile: TRT (sound therapy component: sound enrichment) versus education counselling

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component: sound enrichment)**	**Education counselling**	**Relative (95% CI)**	**Absolute**		
Tinnitus severity (follow-up post-treatment; range of scores: 0-84; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	20	-	MD 5.81 lower (14.17 lower to 2.55 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (diary) (follow-up post-treatment; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	30	20	-	MD 0.02 lower (1.21 lower to 1.17 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (SSR) (follow-up post-treatment; range of scores: 1-7; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	20	-	MD 0.22 lower (0.63 lower to 0.19	⊕OOO VERY	IMPORTANT

										higher)	LOW	

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs.

Table 27: Clinical evidence profile: TRT (sound therapy component: sound enrichment) versus CBT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component: sound enrichment)**	**CBT**	**Relative (95% CI)**	**Absolute**		
Tinnitus severity (follow-up post-treatment; measured with: Tinnitus Questionnaire; range of scores: 0-84; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	27	-	MD 2.06 lower (10.34 lower to 6.22 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (diary) (follow-up post-treatment; measured with tinnitus dairy; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	27	-	MD 0.27 higher (0.69 lower to 1.23 higher)	⊕OOO VERY LOW	IMPORTANT
Tinnitus loudness (SSR) (follow-up post-treatment; measured with Subjective Change (SSR); range of scores: 1-7; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	30	27	-	MD 0.23 higher (0.28 lower to 0.74 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs.

Table 28: Clinical evidence profile: TRT (sound therapy component: sound enrichment) versus ACT

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component: sound enrichment)**	**ACT**	**Relative (95% CI)**	**Absolute**		
Tinnitus severity (follow-up post-treatment; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 15.79 higher (3.67 to 27.91 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus severity (follow-up 18 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 13.67 higher (2.59 to 24.75 higher)	⊕OOO VERY LOW	CRITICAL
Quality of life (follow-up post-treatment; measured with: Quality of Life Inventory; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 0.31 lower (1.30 lower to 0.68 higher)	⊕OOO VERY LOW	CRITICAL
Quality of life (follow-up 18 months; measured with: Quality of Life Inventory; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	20	22	-	MD 0.18 lower (1.06 lower to 0.70 higher)	⊕OOO VERY LOW	CRITICAL
Sleep (follow-up post-treatment; measured with: Insomnia Severity Index; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 3.81 higher (0.53 to 7.09 higher)	⊕OOO VERY LOW	IMPORTANT
Sleep (follow-up 18 months; measured with: Insomnia Severity Index; range of scores: 0-100; Better indicated by lower values)												

1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 3.67 higher (0.07 to 7.27 higher)	⊕OOO VERY LOW	IMPORTANT
Depression (follow-up post-treatment; measured with: Hospital Anxiety and Depression Scale; range of scores: 0-21; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 2.58 higher (0.39 to 4.77 higher)	⊕OOO VERY LOW	IMPORTANT
Depression (follow-up 18 months; measured with: Hospital Anxiety and Depression Scale; range of scores: 0-21; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 1.19 higher (1.01 lower to 3.39 higher)	⊕OOO VERY LOW	IMPORTANT
Anxiety (follow-up post-treatment; measured with: Hospital Anxiety and Depression Scale; range of scores: 0-21; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 3.4 higher (1.14 to 5.66 higher)	⊕OOO VERY LOW	IMPORTANT
Anxiety (follow-up 18 months; measured with: Hospital Anxiety and Depression Scale; range of scores: 0-21; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	20	22	-	MD 2.81 higher (0.09 to 5.53 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 29: Clinical evidence profile: TRT (sound therapy component: combination devices) versus waiting-list control

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component: combination**	**Waiting-list control**	**Relative (95%**	**Absolute**		

							devices)		CI)			
Tinnitus severity (follow-up 6 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	33	-	MD 14.16 lower (22.52 to 5.8 lower)	⊕OOO VERY LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 30: Clinical evidence profile: TRT (sound therapy component: combination devices) versus education counselling

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component: combination devices)**	**Education counselling**	**Relative (95% CI)**	**Absolute**		
Tinnitus severity (follow-up 18 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	19	19	-	MD 16.1 lower (26.85 to 5.35 lower)	⊕⊕OO LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 31: Clinical evidence profile: TRT (sound therapy component: combination devices) versus education counselling + tinnitus masking

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component:**	**Education counselling +**	**Relative (95%**	**Absolute**		

							combination devices)	tinnitus masking	CI)			
Tinnitus severity (follow-up 6 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	42	-	MD 1.14 lower (9.01 lower to 6.73 higher)	⊕⊕OO LOW	CRITICAL
Tinnitus severity (follow-up 18 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	42	-	MD 2.64 lower (11.69 lower to 6.41 higher)	⊕⊕OO LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 32: Clinical evidence profile: TRT (sound therapy component: combination devices) versus education counselling (+ amplification devices)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**TRT (sound therapy component: combination devices)**	**Education counselling (+ amplification)**	**Relative (95% CI)**	**Absolute**		
Tinnitus severity (follow-up 6 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	39	-	MD 3.95 lower (11.97 lower to 4.07 higher)	⊕⊕OO LOW	CRITICAL
Tinnitus severity (follow-up 18 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	34	39	-	MD 5.52 lower (14.74 lower to 3.70 higher)	⊕⊕OO LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Education counselling + sound therapies

Table 33: Clinical evidence profile: Education counselling + tinnitus masking versus waiting-list control

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Education counselling + tinnitus masking	Waiting-list control	Relative (95% CI)	Absolute		
Tinnitus severity (follow-up 6 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	33	-	MD 13.02 lower (20.96 to 5.08 lower)	⊕OOO VERY LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 34: Clinical evidence profile: Education counselling + sound enrichment versus education counselling

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Education counselling + sound enrichment	Education counselling	Relative (95% CI)	Absolute		
Tinnitus severity (follow-up 5 days; measured with: Tinnitus Questionnaire; range of scores: 0-84; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	146	144	-	MD 9.40 lower (12.73 to 6.07 lower)	⊕⊕OO LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 35: Clinical evidence profile: Education counselling + tinnitus masking versus education counselling (+amplification devices)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Education counselling + tinnitus masking	Education counselling (+ amplification device)	Relative (95% CI)	Absolute		
Tinnitus severity (follow-up 6 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	-	MD 2.81 lower (10.39 lower to 4.77 higher)	⊕⊕OO LOW	CRITICAL
Tinnitus severity (follow-up 18 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	42	39	-	MD 2.88 lower (11.60 lower to 5.84 higher)	⊕⊕OO LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Education counselling + amplification devices

Table 36: Clinical evidence profile: Education counselling + amplification devices versus amplification devices

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Education counselling + amplification devices	Amplification devices	Relative (95% CI)	Absolute		
Tinnitus severity (follow-up 3 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	23	23	-	MD 4 lower (13.76 lower to 5.76 higher)	⊕OOO VERY LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Education counselling (+ amplification devices – if required)

Table 37: Clinical evidence profile: Education counselling (+ amplification devices) versus waiting-list control

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Education counselling (+ amplification device)	Waiting-list control	Relative (95% CI)	Absolute		
Tinnitus severity (follow-up 6 months; measured with: Tinnitus Handicap Inventory; range of scores: 0-100; Better indicated by lower values)												
1	randomised trials	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	39	33	-	MD 10.21 lower (18.3 to 2.12 lower)	⊕⊕OO LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Counselling (information) + sound therapies

Table 38: Clinical evidence profile: Counselling (information) + sound enrichment versus counselling (information)

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Counselling (information) + sound enrichment**	**Counselling (information)**	**Relative (95% CI)**	**Absolute**		
Tinnitus annoyance (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	12	17	-	MD 0.6 lower (2.43 lower to 1.23 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	12	17	-	MD 0.5 lower (2.04 lower to 1.04 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 39: Clinical evidence profile: Counselling (information) + sound enrichment versus counselling (information + relaxation)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Counselling (information) + sound enrichment**	**Counselling (information + relaxation)**	**Relative (95% CI)**	**Absolute**		
Tinnitus annoyance (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	12	21	-	MD 0.2 lower (2.12 lower to 1.72 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												

1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	12	21	-	MD 0.9 higher (0.8 lower to 2.6 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 40: Clinical evidence profile: Counselling (information) + sound enrichment versus counselling (information + relaxation) + sound enrichment

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Counselling (information) + sound enrichment**	**Counselling (information + relaxation) + sound enrichment**	**Relative (95% CI)**	**Absolute**		
Tinnitus annoyance (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	12	15	-	MD 0.2 lower (2.21 lower to 1.81 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	12	15	-	MD 0.1 higher (1.6 lower to 1.8 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Counselling (information and relaxation) + sound therapies

Table 41: Clinical evidence profile: Counselling (information + relaxation) + sound enrichment versus counselling (information)

Quality assessment	No of patients	Effect	Quality	Importance

No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Counselling (information + relaxation) + sound enrichment**	**Counselling (information)**	**Relative (95% CI)**	**Absolute**		
Tinnitus annoyance (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	15	17	-	MD 0.4 lower (2.15 lower to 1.35 higher)	⊕OOO VERY LOW	CRITICAL
Tinnitus loudness (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	17	-	MD 0.6 lower (2.07 lower to 0.87 higher)	⊕OOO VERY LOW	CRITICAL

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias
[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Table 42: Clinical evidence profile: Counselling (information + relaxation) + sound enrichment versus counselling (information + relaxation)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Counselling (information + relaxation) + sound enrichment**	**Counselling (information + relaxation)**	**Relative (95% CI)**	**Absolute**		
Tinnitus annoyance (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	15	21	-	MD 0 higher (1.85 lower to 1.85 higher)	⊕OOO VERY LOW	CRITICAL

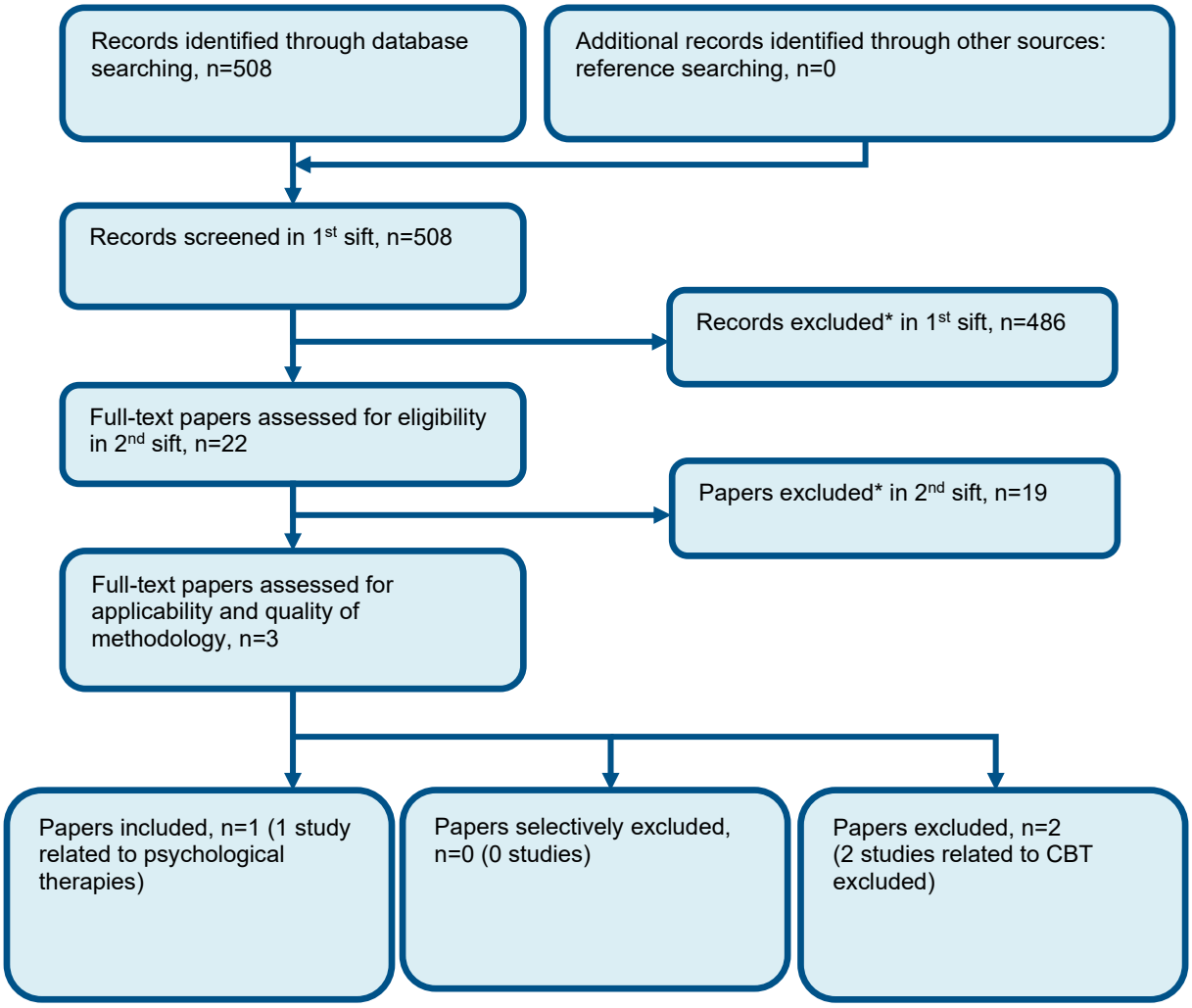
Tinnitus loudness (follow-up 12 months; measured with: Visual analogue scale; range of scores: 0-10; Better indicated by lower values)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	15	21	-	MD 0.8 higher (0.84 lower to 2.44 higher)	⊕OOO VERY LOW	IMPORTANT

[1] Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias

[2] Downgraded by 1 increment if the confidence interval crossed one MID or by 2 increments if the confidence interval crossed both MIDs

Appendix G: Health economic evidence selection

Figure 45: Flow chart of health economic study selection for the guideline



* Non-relevant population, intervention, comparison, design or setting; non-English language

Appendix H: Excluded studies

H.1 Excluded clinical studies

Table 43: Studies excluded from the clinical review

Study	Exclusion reason
Bartnik 2001[2]	Incorrect study design: non-randomised study
Caffier 2006[4]	No relevant extractable outcome data
Cima 2012[6]	Incorrect intervention: included in psychological therapies review
Delb 2000[8]	Incorrect study design: abstract only
Delb 2003[7]	Incorrect study design: abstract only
Formby 2013[10]	Incorrect study design: study protocol
Grewal 2014[11]	Incorrect study design: systematic review
Gudex 2009[12]	Incorrect study design: non-randomised study
Henry 2006[13]	Incorrect study design: quasi-randomised study
Henry 2006[14]	No relevant outcome data
Henry 2017[16]	Incorrect intervention: included in counselling review
Hiller 2005 [17]	Incorrect study design: non-randomised study
Kim 2016[18]	Incorrect study design: non-randomised study
Luyten 2019[19]	Incorrect study design: study protocol
Maes 2014[5]	Incorrect study design: cost-effectiveness analysis
Parazzini 2011[21]	No relevant outcome data
Scherer 2014[22]	Incorrect study design: study protocol
Searchfield 2016[23]	No relevant outcome data
Seydel 2010[25]	No relevant outcome data
Seydel 2015[24]	Incorrect intervention (intervention includes physiotherapy)
Suchova 2005[26]	Incorrect study design: non-randomised study
Teismann 2014[27]	No relevant outcome data
Tyler 2001[29]	Incorrect study design: non-randomised study
Tyler 2017[28]	Incorrect intervention: included in neuromodulation review
Vesterager 1994[30]	Incorrect study design: non-randomised study

H.2 Excluded health economic studies

None.

Appendix I: Research recommendations

I.1 Combination management strategy: sound therapy and tinnitus support

Research question: What is the clinical and cost effectiveness of a combination management strategy consisting of sound therapy and tinnitus support?

Why this is important:

People who have tinnitus often notice that it is more noticeable and bothersome in a quiet environment, for example at night, and that listening to other sounds can make it less intrusive. The deliberate use of any sound to reduce tinnitus awareness or reduce the distress associated with it can be called *sound enrichment or sound therapy.* Sound enrichment can be used as a self-help technique or as a component of a broader tinnitus management programme delivered with the support of a hospital or clinic. Tinnitus support should be an essential component of tinnitus management strategies, allowing individuals with tinnitus to discuss their experiences and concerns. However, there is limited evidence available for sound therapy in combination with tinnitus support.

Criteria for selecting high-priority research recommendations

PICO question	**Population:** Children, young people and adults presenting with tinnitus **Intervention(s):** Intervention involving the following components: • Discussion of experience of tinnitus, including any concerns and its impact with individuals presenting with tinnitus. This discussion occurs between the person with tinnitus or their family members or carers and healthcare professional. • A management plan is also developed to include information and opportunities for discussion about different management options **AND** Sound therapy: • Sound enrichment (e.g. environmental sound, a CD or mp3 download or the radio, a smartphone App, bedside/table-top sound generators, a wearable sound generator) • Combination hearing devices (hearing aid combined with sound generator) • Customised sound-based therapies, • Masking **Comparison:** • Opportunity for discussion alone • Waiting-list control • Control (i.e. no opportunity for discussion or sound therapy) **Outcomes:** • Tinnitus severity (critical)- measured using validation questionnaires

	Impact of tinnitus, measured using validated questionnaires: -(critical) • Tinnitus Distress • Tinnitus Annoyance Health related QoL: (critical) • QoL (EQ-5D) Tinnitus percept, measured using validated questionnaires: • Tinnitus Loudness (important) Other co-occurring complaints, measured using validated questionnaires (important) • Depression • Anxiety • Anxiety and depression • Sleep Adverse events (important) • Safety • Tolerability/adherence/drop-outs/attrition • Side effects (e.g. worsening of tinnitus)
Importance to patients or the population	Options for helping people to live with tinnitus are limited. Access to various forms of support and interventions are variable across the country. Evidence that sound therapy and support are effective could improve services and also help people with tinnitus self-manage the condition.
Relevance to NICE guidance	Currently there is little evidence for sound therapy in combination with tinnitus support and the committee were therefore unable to make a recommendation. The answer to this question would enable future guidance to either recommend sound therapy or otherwise state it was not effective.
Relevance to the NHS	The answer to this question could guide staff towards a possibly effective intervention. It may also help people with tinnitus to use a self-management strategy that would reduce their reliance on clinical staff.
National priorities	N/A
Current evidence base	No evidence was identified that evaluated sound therapy with tinnitus support (with tinnitus support as defined in the section above). There is some evidence (three studies) for “education counselling” in combination with sound therapies (masking and sound enrichment). These interventions were compared with waiting-list control, education counselling and CBT. Additionally, one four-armed study evaluated different counselling strategies (information and/or relaxation) in combination with sound enrichment. However, this evidence is insufficient for evaluating the clinical effectiveness of tinnitus support with sound therapy as the “counselling” components of the interventions do not reflect an interactive model of tinnitus support that committee recommended in this guideline.
Equality	No equality issues
Study design	Randomised controlled trials
Feasibility	This research should be feasible within reasonable time frame.
Other comments	Tinnitus retraining therapy (TRT) has the components of counselling and

	sound therapy. Modified TRT using the principles of tinnitus support described above can be researched under this research question
Importance	High: the research is essential to inform future updates of key recommendations in the future