

Appendix. References to studies excluded in this review

Exclusion no.	Author. Journal (year)	Title	Reason of exclusion
1	Nothing	A study of animal-assisted therapy and weekday placement of a social therapy	Not acceptable
2	Livingston G, et al. (nothing)	The effectiveness and cost-effectiveness of sensory, psychological and behavioral interventions for managing agitation in older adults with dementia	Ongoing
3	Herrero P, et al. <i>Clinical Rehabilitation</i> (2013)	Study of the therapeutic effects of a hippotherapy simulator in children with cerebral palsy: a stratified single-blind randomized controlled trial	Not animal-assisted therapy
4	Cano A. (2013)	Randomized control trial of an animal-assisted intervention with adjudicated youth	Not detected
5	Iammateo N, et al. (2013)	Animal therapy in a pediatric setting	Not detected
6	Beck CE, et al. <i>The Army Medical Department Journal</i> (2012)	The effects of animal-assisted therapy on wounded warriors in an occupational therapy life skills program	Not randomized controlled trial
7	Rhodes RE, et al. <i>Preventive Medicine</i> (2012)	Pilot study of a dog walking randomized intervention: Effects of a focus on canine exercise	Not curative effect
8	Berget B, et al. <i>Ann Ist Sanita</i> (2011)	Animal-assisted therapy with farm animals for persons with psychiatric disorders	Not randomized controlled trial
9	Moretti F, et al. <i>Psychogeriatrics</i> (2011)	Pet therapy in elderly patients with mental illness	Not randomized controlled trial
10	SilvaBorges, et al. <i>Arq Neuropsiquiatr</i> (2011)	Therapeutic effects of a horse riding simulator in children with cerebral palsy	Not animal therapy
11	Kumasaka T, et al. <i>Journal of the Japanese Association of Rural Medicine</i> (2010)	Study of effectiveness of animal-assisted therapy for patients with mental illness in nursing support (in Japanese)	Not curative effect
12	Tsai CC, et al. <i>Anthrozoos</i> (2010)	The effect of animal-assisted therapy on stress responses in hospitalized children	Not curative effect
13	Coakley AB, et al. <i>Complementary Therapies in Clinical Practice</i> (2009)	Creating a therapeutic and healing environment with a pet therapy program	Not randomized controlled trial
14	Martin C, et al. <i>Anthrozoos</i> (2009)	Animal-assisted therapy in the treatment of substance dependence	Not randomized controlled trial
15	Braun C, et al. <i>Complementary Therapies in Clinical Practice</i> (2009)	Animal-assisted therapy as a pain relief intervention for children	Not randomized controlled trial
16	LeRoux MC, et al. <i>Jornal compilation</i> (2009)	Effect of a companion dog on depression and anxiety levels of elderly residents in a long-term care facility	Not curative effect
17	Berger AM, et al. (2009)	Effects of pet therapy on pain in cancer patients	Not published yet
18	Toukhsati S, et al. (2009)	The use of alternative therapies to treat geriatric depression	Submit preparation at present
19	Parish-Plass N. <i>Clin Child Psychology and Psychiatry</i> (2008)	Animal-assisted therapy with children suffering from insecure attachment due to abuse and neglect: a method to lower the risk of intergenerational transmission of abuse?	Not randomized controlled trial
20	Banks MR, et al. <i>J Am Med Dir Assoc</i> (2008)	Animal-assisted therapy and loneliness in nursing homes: use of robotic versus living dogs	Not curative effect
21	Cole KM, et al. <i>American Journal of Critical Care</i> (2007)	Animal-assisted therapy in patients hospitalized with heart failure	Reduplication
22	Prothmann A, et al. <i>Anthrozoos</i> (2006)	Dogs in child psychotherapy: effects on state of mind	Not randomized controlled trial
23	Motooka M, et al. <i>MJA</i> (2006)	Effect of dog-walking on autonomic nervous activity in senior citizens	Not curative effect

Appendix (Continued)

Exclusion no.	Author. Journal (year)	Title	Reason of exclusion
24	Colombo G, et al. Archives of Gerontology and Geriatrics (2006)	Pet therapy and institutionalized elderly: A study on 144 cognitively unimpaired subjects	Not curative effect
25	Anonymous (memo). Harvard Men's Health Watch (2006)	Dolphins for the doldrums?	Not original article
26	Nathans-Barel I, et al. Psychother Psychosom (2005)	Animal-assisted therapy ameliorates anhedonia in schizophrenia patients	Not randomized controlled trial
27	Cole KM. Circulation (2005)	Innovative interventions to improve management and outcomes in heart disease	Not curative effect
28	Stasi MF, et al. Arch. Gerontol. Geriatr. Suppl. (2004)	Pet-therapy: a trial for institutionalized frail elderly patients	Not randomized controlled trial
29	Kovacs Z, et al. Clinical Rehabilitation (2004)	Animal-assisted therapy for middle-aged schizophrenic patients living in a social institution. A pilot study	Not randomized controlled trial
30	Bouchard F, et al. (2004)	A magical dream: a pilot project in animal-assisted therapy in pediatric oncology	Not original article
31	Richeson NE. American Journal of Alzheimer's Disease and Other Dementias (2003)	Effects of animal-assisted therapy on agitated behaviors and social interactions of older adults with dementia	Not randomized controlled trial
32	Barker SB, et al. The Journal of ECT (2003)	Effects of animal-assisted therapy on patients' anxiety, fear, and depression before ECT	Not randomized controlled trial
33	Johnson RA, et al. American Behavioral Scientist (2003)	Human-animal interaction: A complementary/Alternative medical (CAM) intervention for cancer patients	Not curative effect
34	Martin F, et al. Western Journal of Nursing Research (2002)	Animal-assisted therapy for children with pervasive developmental disorders	Not randomized controlled trial
35	Banks MR, et al. Medical sciences (2002)	The effects of animal-assisted therapy on loneliness in an elderly population in long-term care facilities	Not curative effect
36	Kaminski M, et al. Children's Health Care (2002)	Play and pets: The physical and emotional impact of child-life and pet therapy on hospitalized children	Not curative effect
37	Kanamori M, et al. American Journal of Alzheimer's Disease and Other Dementias (2001)	A day care program and evaluation of animal-assisted therapy (ATT) for the elderly with senile dementia	Not randomized controlled trial
38	Kingwell BA, et al. Clinical Autonomic Research (2001)	Presence of a pet dog and human cardiovascular responses to mild mental stress	Not curative effect
39	Hall PL, et al. British Journal of Nursing (2000)	Pets as therapy: effects on social interaction in long-stay psychiatry	Not randomized controlled trial
40	Bernstein PL, et al. Anthrozoos (2000)	Animal-assisted therapy enhances resident social interaction and initiation in long-term care facilities	Not curative effect
41	Panzer-Koplow S, et al. Bell and Howell Information and Learning (2000)	Effects of animal-assisted therapy on depression and morale among nursing home residents	Not curative effect
42	Churchill M, et al. Journal of Psychosocial Nursing (1999)	Using a therapy dog to alleviate the agitation and desocialization of people with Alzheimer's disease	Not randomized controlled trial
43	Hansen KM, et al. Anthrozoos (1999)	Companion animals alleviating distress in children	Not randomized controlled trial
44	Counsell CM. Sc. In Nursing (1997)	Animal assisted therapy and the individual with spinal cord injury	Not randomized controlled trial
45	Banman JK, et al. The Journal of Pastoral Care (1995)	Animal-assisted therapy with adolescents in a psychiatric facility	Not original article
46	Folse EB, et al. Anthrozoos (1994)	Animal-assisted therapy and depression in adult college students	Not randomized controlled trial

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Effectiveness of music therapy: a summary of systematic reviews based on randomized controlled trials of music interventions

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Objective: The objective of this review was to summarize evidence for the effectiveness of music therapy (MT) and to assess the quality of systematic reviews (SRs) based on randomized controlled trials (RCTs).

Study design: An SR of SRs based on RCTs.

Methods: Studies were eligible if they were RCTs. Studies included were those with a treatment group in which MT was applied. We searched the following databases from 1995 to October 1, 2012: MEDLINE via PubMed, CINAHL (Cumulative Index of Nursing and Allied Health Literature), Web of Science, Global Health Library, and Ichushi-Web. We also searched all Cochrane Database and Campbell Systematic Reviews up to October 1, 2012. Based on the *International Classification of Diseases*, 10th revision, we identified a disease targeted for each article.

Results: Twenty-one studies met all inclusion criteria. This study included 16 Cochrane reviews. As a whole, the quality of the articles was very good. Eight studies were about “Mental and behavioural disorders (F00-99)”; there were two studies on “Diseases of the nervous system (G00-99)” and “Diseases of the respiratory system (J00-99)”; and there was one study each for “Endocrine, nutritional and metabolic diseases (E00-90)”, “Diseases of the circulatory system (I00-99)”, and “Pregnancy, childbirth and the puerperium (O60)”. MT treatment improved the following: global and social functioning in schizophrenia and/or serious mental disorders, gait and related activities in Parkinson’s disease, depressive symptoms, and sleep quality.

Conclusion: This comprehensive summary of SRs demonstrated that MT treatment improved the following: global and social functioning in schizophrenia and/or serious mental disorders, gait and related activities in Parkinson’s disease, depressive symptoms, and sleep quality. MT may have the potential for improving other diseases, but there is not enough evidence at present. Most importantly, no specific adverse effect or harmful phenomenon occurred in any of the studies, and MT was well tolerated by almost all patients.

Keywords: ICD-10, schizophrenia, mental disorders, Parkinson’s disease, depression, sleep

Article focus

Although many studies have reported the effects of music therapy (MT), there is no review of systematic reviews (SRs) based on randomized controlled trials (RCTs).

Key messages

The key messages of this paper are as follows.

1. This is the first SR of SRs of the effectiveness of cure based on music interventions in studies with RCT designs.

2. Our study is unique because it summarizes the evidence for each target disease according to the *International Classification of Diseases*, revision 10 (ICD-10).
3. We propose the future research agenda for studies on the treatment effect of MT.

Strength and limitation of this study

The strengths of this study are as follows: 1) the methods and implementation registered high on the PROSPERO database; 2) it was a comprehensive search strategy across multiple databases with no data restrictions; and 3) there were high agreement levels for quality assessment of articles.

This study has three limitations. Firstly, some selection criteria were common across studies; however, the bias remained due to differences in eligibility for participation in each original RCT. Secondly, publication bias was a limitation. Lastly, since this review focused on summarizing the effects of MT for each disease, we did not describe all details on quality and quantity, such as type of MT, frequency of MT, and time on MT.

Introduction

MT is widely utilized for treatment of and assistance in various diseases. In one literature review, the authors found seven case reports/series and seven studies on MT for multiple sclerosis patients. The results of these studies as well as the case reports demonstrated patients' improvements in the domains of self-acceptance, anxiety, and depression.¹ Another review examined the overall efficacy of MT in children and adolescents with psychopathology, and examined how the size of the effect of MT is influenced by the type of pathology, the subject's age, the MT approach, and the type of outcome.² The analysis revealed that MT had a medium to large positive effect (effect size =0.61) on clinically relevant outcomes that was statistically highly significant ($P<0.001$) and statistically homogeneous. A more recent SR assessed the effects of musical elements in the treatment of individuals with acquired neurological disorder.³ The results showed that mechanisms of recovery remained unclear: two of the three studies that examined mechanisms of recovery via neuro-imaging techniques supported the role of the right hemisphere, but reports were contradictory, and exact mechanisms of recovery remained indefinable. An interesting meta-analysis described results that justified strong consideration for the inclusion of neonatal intensive care unit (NICU) MT protocols in best practice standards for NICU treatment of preterm infants: examples of these therapies were listening to music for pacification, music reinforcement of sucking/

feeding ability, and music as a basis for pacification during multilayered, multimodal stimulation.⁴

In different points of view, examining the curative effects of MT has unique challenges. A review article by Nilsson⁵ described how nurses face many challenges as they care for the needs of hospitalized patients, and that they often have to prioritize physical care over the patient's emotional, spiritual, and psychological needs. In clinical practice, music intervention can be a tool to support these needs by creating an environment that stimulates and maintains relaxation, wellbeing, and comfort. Furthermore, the Nilsson article⁵ presented a concrete recommendation for music interventions in clinical practice, such as "slow and flowing music, approximately 60 to 80 beats per minute", "nonlyrical", "maximum volume level at 60 dB", "patient's own choice, with guidance", "suitable equipment chosen for the specific situation", "a minimum duration of 30 minutes in length", and "measurement, follow up, and documentation of the effects". In addition, MT has been variably applied as both a primary and accessory treatment for persons with addictions to alcohol, tobacco, and other drugs of abuse. However, an SR⁶ described that no consensus exists regarding the efficacy of MT as treatment for patients with addictions.

On the other hand, music may be considered an adjunctive therapy in clinical situations. Music is effective in reducing anxiety and pain in children undergoing medical and dental procedures.⁷ A meta-analysis confirmed that patients listening to music during colonoscopy, which is now the recommended method for screening colon cancer, was an effective method for reducing procedure time, anxiety, and the amount of sedation. More importantly, no harmful effects were observed for all the target studies.⁸ The usual practice following a cervical cancer abnormal cervical smear is to perform a colposcopy. However, women experience high levels of anxiety and negative emotional responses at all stages of cervical screening. An SR of RCTs evaluated interventions designed to reduce anxiety levels during colposcopic examination. Psychosexual dysfunction (ie, anxiety) was reduced by playing music during colposcopy.⁹

The definition of musical intervention is complex, but the literature describes two broad categories of music interventions: music medicine and MT.¹⁰ Music medicine is the use of passive listening (usually involving prerecorded music) as implemented by medical personnel. In music medicine studies, the subject's preference for the music used may be considered by having him or her select from a variety of tapes. Alternately, some studies use predefined

music stimuli that do not take the subject's preferences into account. Furthermore, there is generally no attempt by the researcher to form a therapeutic relationship with the subject, and there is no process involved in the music treatment. In essence, music medicine studies usually allow one to assess the effects of music alone as a therapeutic intervention. In contrast, MT interventions most often involve a relationship between the therapist and the subject, the use of live music (performed or created by the therapist and/or patient), and a process that includes assessment, treatment, and evaluation. Patient preference for the music is usually a consideration in MT studies.

We were interested in evaluating the curative effect of MT according to diseases because many of the primary studies and review articles of much MT have reported results in this way. In particular, we wanted to focus on all cure and rehabilitation effects using the ICD-10. It is well known in research design that evidence grading is highest for an SR with meta-analysis of RCTs. Although many studies have reported the effects of MT, there is no review of SRs based on RCTs. The objective of this review was to summarize evidence for the effectiveness of MT and to assess the quality of SRs based on RCTs of these therapies.

Methods

Criteria for considering studies included in this review

Types of studies

Studies were eligible if they were SRs (with or without a meta-analysis) based on RCTs.

Types of participants

There was no restriction on patients.

Types of intervention and language

Studies included were those with at least one treatment group in which MT was applied. The definition of MT is complex, but in this study, any kind of MT (not only music appreciation but also musical instrument performance and singing, for example) was permitted and defined as an intervention. Studies had to include information on the use of medication, alternative therapies, and lifestyle changes, and these had to be comparable among groups. There was no restriction on the basis of language.

Types of outcome measures

We focused on all cure and rehabilitation effects using the ICD-10.

Search methods for studies identification

Bibliographic database

We searched the following databases from 1995 to October 1, 2012: MEDLINE via PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Web of Science, Ichushi Web (in Japanese), the Global Health Library (GHL), and the Western Pacific Region Index Medicus (WPRIM). The International Committee of Medical Journal Editors (ICMJE) recommended uniform requirements for manuscripts submitted to biomedical journals in 1993. We selected articles published (that included a protocol) since 1995, because it appeared that the ICMJE recommendation had been adopted by the relevant researchers and had strengthened the quality of the reports.

We also searched the Cochrane Database of Systematic Reviews (Cochrane Reviews), the Database of Abstracts of Reviews of Effects (Other Reviews), the Cochrane Central Register of Controlled Trials (Clinical Trials or CENTRAL), the Cochrane Methodology Register (Methods Studies), the Health Technology Assessment Database (Technology Assessments), the NHS Economic Evaluation Database (Economic Evaluations), About The Cochrane Collaboration databases (Cochrane Groups), the Campbell Systematic Reviews (the Campbell Collaboration), and the All Cochrane, up to October 1, 2012.

All searches were performed by two specific searchers (hospital librarians) who were qualified in medical information handling, and who were sophisticated in searches of clinical trials.

Search strategies

The special search strategies contained the elements and terms for MEDLINE, CINAHL, Web of Science, Ichushi Web, GHL, WPRIM, and All Cochrane databases (Figure 1 and Table 1). Only keywords about intervention were used for the searches. First, titles and abstracts of identified published articles were reviewed in order to determine the relevance of the articles. Next, references in relevant studies and identified SRs were screened.

Registry checking

We searched the International Clinical Trials Registry Platform (ICTRP), ClinicalTrials.gov, and the University Hospital Medical Information Network – Clinical Trials Registry (UMIN-CTR), up to October 1, 2012.

ICTRP in the WHO Registry Network meet specific criteria for content, quality and validity, accessibility, unique

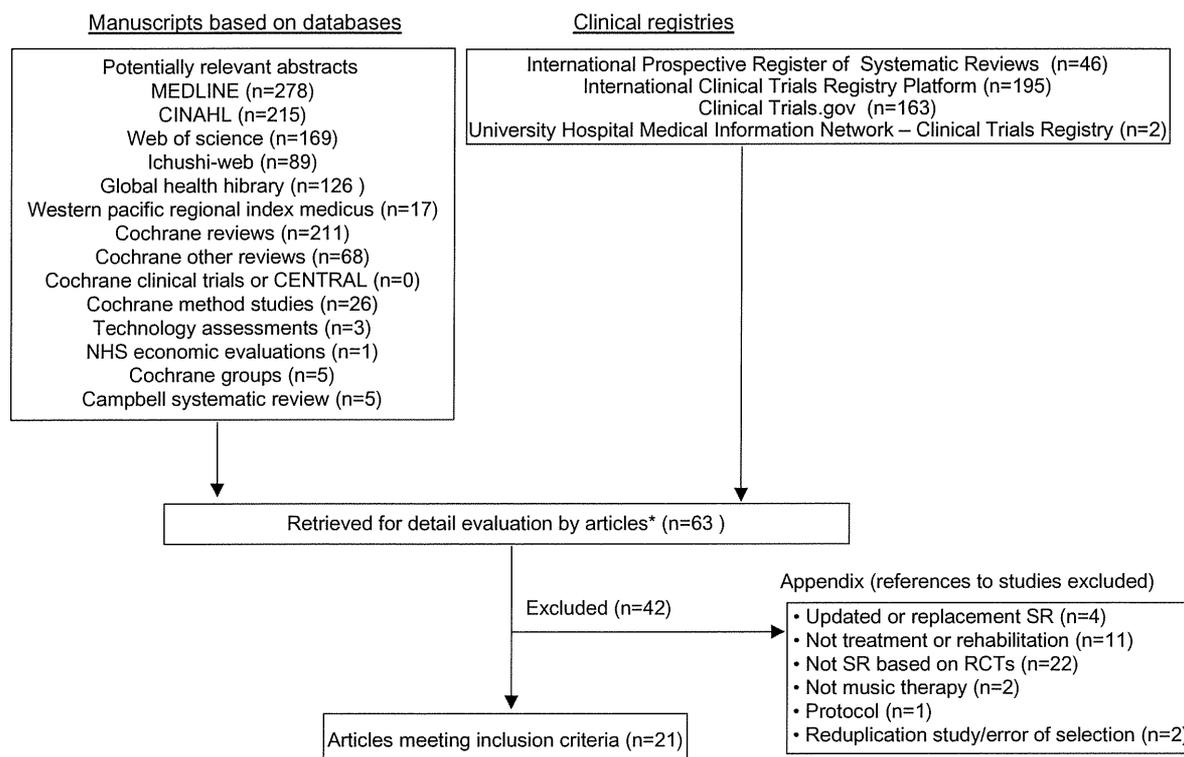


Figure 1 Flowchart of trial process.

Note: *Reduplication.

Abbreviations: CINAHL, Cumulative Index of Nursing and Allied Health Literature; CENTRAL, Cochrane Central Register of Controlled Trials; RCT, randomized controlled trial; SR, systematic review.

identification, technical capacity, and administration. Primary registries meet the requirements of the ICMJE. Clinical Trials.gov is a registry of federally and privately supported clinical trials conducted in the US and around the world. UMIN-CTR is a registry of clinical trials conducted in Japan and around the world.

Handsearching and reference checking

We handsearched abstracts published on MT in relevant journals in Japan. We checked the references of included studies for further relevant literature.

Review methods

Selection of trials

To make the final selection of studies for the review, all criteria were applied independently by four authors (ie, TH, JK, SJP, and TA) to the full text of articles that had passed the first eligibility screening (Figure 1). Disagreements and uncertainties were resolved by discussion with other authors (ie, HK, KT, and YM).

Studies were selected when 1) the design was an SR based on RCTs and 2) one of the interventions was a form of MT. Protocols without results were excluded, and we included

only completed studies. Cure and rehabilitation effects were used as a primary outcome measure. Trials that were excluded are presented with reasons for exclusion (Table S1).

Quality assessment of included studies

To ensure that variation was not caused by systematic errors in the study design or execution, eleven review authors (HP, MY, HO, SO, SJP, TO, KT, TH, SH, JK, and HK) independently assessed the quality of the articles. A full quality appraisal of these papers was made using the combined tool based on the AMSTAR checklist¹¹ developed to assess the methodological quality of SRs.

Each item was scored as “present” (Yes), “absent” (No), “unclear or inadequately described” (Can not answer), or “not applicable” (n/a). Depending on the study design, some items were not applicable. The “n/a” was excluded from calculation for quality assessment. We displayed the percentage of descriptions that were present on all eleven items for the quality assessment of articles. Then, based on the percentage of risk of poor methodology and/or bias, each item was assigned to one of the following categories: good description (80%–100%), poor description (50%–79%), or very poor description (0%–49%).

Table 1 The special search strategies

1. MEDLINE

#1 Search music[all]
 #2 Search musical[all]
 #3 Search music[MeSH]
 #4 Search "Music Therapy"[Mesh]
 #5 Search song[Text Word]
 #6 Search songs[Text Word]
 #7 Search singing[Text Word]
 #8 Search (((((#1) OR #2) OR #3) OR #4) OR #5) OR #6) OR #7
 #9 Search systematic[sb]
 #10 Search Meta-Analysis[Publication type]
 #11 Search "Meta-Analysis as Topic"[MeSH Terms]
 #12 Search Meta-analysis*[all]
 #13 Search Metaanalysis*[all]
 #14 Search systematic review*[all]
 #15 Search (((((#9) OR #10) OR #11) OR #12) OR #13) OR #14
 #16 Search (#8) AND #15
 #17 Search (#8) AND #15 Filters: Publication date from 1995/01/01

2. CINHALL

#1 (TI music OR AB music) OR (TI musical OR AB musical)
 OR TX "music therap*" OR MH music OR MH "music therapy"
 #2 (TI "song" OR AB "song") OR (TI "songs" OR AB "songs")
 OR (TI "singing" OR AB "singing") OR MH "singing"
 #3 MH "meta analysis" OR PT "meta analysis" OR TI "meta analy*"
 OR AB "meta analysis*"
 #4 MH "systematic review" OR PT "systematic review" OR TI
 "systematic review*" OR AB "systematic review*"
 #5 #1 or #2
 #6 #3 or #4
 #7 #5 and #6

3. Web of Science

#1 (music*) OR (music therap*)
 #2 (song*) OR (singing) NOT (song*)
 #3 (meta analys*) OR (systematic review*)
 #4 #2 OR #1
 #5 #4 AND #3
 #6 #5 Article time span=1995-2012

4. Ichushi Web

#1 (音楽療法/TH or 音楽療法/AL) or (音楽療法士/TH or 音楽療法士/AL) or 音楽/TH or 音楽/AL or ミュージック/AL or 歌唱/AL or (楽器/TH or 楽器/AL) or 演奏/AL
 #2 メタアナリシス/TH or メタアナリシス/AL or メタ分析/AL or (RD=メタアナリシス)
 #3 システマティックレビュー/TH or システマティックレビュー/AL or "systematic review"/AL
 #4 総説文献/TH or (文献研究/TH or 文献/AL) or レビュー/AL or (EBM/TH or EBM/AL)
 #5 #2 or #3 or #4
 #6 #1 and #5
 #7 (#6) and (DT=1995:2012 PT=会議録除く)

5. GHL

(music or musical or singing) AND ("meta analysis" or meta-analysis or #systematic and review*#)

6. WPRIM

#1 All:music or music% or "music therap%"
 #2 Mesh Heading:Music/All Categories/All Subheadings
 #3 Mesh Heading:Music Therapy/All Categories/All Subheadings
 #4 Abstract:song? or singing

(Continued)

Table 1 (Continued)

#5 Keywords:song? or singing
 #6 #5 or #4 or #3 or #2 or #1
 #7 MeSH Heading:Meta-Analysis/All Categories/All Subheadings
 #8 MeSH Heading:Meta-Analysis as Topic/All Categories/All Subheadings
 #9 All:meta-analy% or "meta analy%" or metaanaly%
 #10 All:"sistematic review" or "systematic review%"
 #11 All:review%
 #12 #11 or #10 or #9 or #8 or #7
 #13 #12 and #6
 #14 #12 and #6 -Limits:1995-2012

7. All Cochrane

#1 MeSH descriptor: [Music] explode all trees
 #2 MeSH descriptor: [Music Therapy] explode all trees
 #3 music* (Word variations have been searched)
 #4 song* or singing:ti,ab,kw (Word variations have been searched)
 #5 #1 or #2 or #3 or #4
 #6 MeSH descriptor: [Meta-Analysis] explode all trees
 #7 MeSH descriptor: [Meta-Analysis as Topic] explode all trees
 #8 "meta-analysis":pt (Word variations have been searched)
 #9 meta next analy* (Word variations have been searched)
 #10 systematic next review* (Word variations have been searched)
 #11 #6 or #7 or #8 or #9 or #10
 #12 #5 and #11 from 1995 (Word variations have been searched)

8. Campbell Collaboration

music* in "ALL text"

9. ICTRP

music therapy* OR music* OR singing

10. International Prospective Register of Systematic Review

music

11. Clinical Trials. Gov

#1 music OR musical

12. UMIN-CTR

音楽 in 「自由記載語」

Disagreements and uncertainties were resolved by discussion with other authors (ie, KT and HK). Inter-rater reliability was calculated on a dichotomous scale using percentage agreement and Cohen's kappa coefficient (κ).

Summary of studies and data extraction

Eleven review authors (HP, MY, HO, SO, SJP, TH, TO, SH, JK, KT, and HK) described the summary from each article based on the structured abstracts.^{12,13}

Benefit and harm

The GRADE Working Group¹⁴ reported that the balance between benefit and harm, quality of evidence, applicability, and the certainty of the baseline risk were all considered in judgments about the strength of recommendations. Adverse events for intervention were especially important information for researchers and users of clinical practice guidelines, and we presented this information with the description of each article.

Table 2 A structured abstract of 21 systematic reviews

Study	Title	Aim/objective	Data source/search strategy	Study selection/ selection criteria
Sinha et al ¹⁷	Auditory integration training and other sound therapies for autism spectrum disorders (ASD)	To determine the effectiveness of auditory integration therapy or other methods of sound therapy in individuals with autism spectrum disorders.	For this update, we searched the following databases in September 2010: CENTRAL (2010, Issue 2), MEDLINE (1950 to September week 2, 2010), EMBASE (1980 to week 38, 2010), CINAHL (1937 to current), PsycINFO (1887 to current), ERIC (1966 to current), LILACS (September 2010) and the reference lists of published papers. One new study was found for inclusion.	Randomized controlled trials involving adults or children with autism spectrum disorders. Treatment was auditory integration therapy or other sound therapies involving listening to music modified by filtering and modulation. Control groups could involve no treatment, a waiting list, usual therapy, or a placebo equivalent. The outcomes were changes in core and associated features of autism spectrum disorders, auditory processing, QoL, and adverse events.
Mossler et al ¹⁸	Music therapy for people with schizophrenia and schizophrenia-like disorders	To review the effects of music therapy, or music therapy added to standard care, compared with "placebo" therapy, standard care or no treatment for people with serious mental disorders such as schizophrenia.	We searched the Cochrane Schizophrenia Group Trials Register (December 2010) and supplemented this by contacting relevant study authors, handsearching of music therapy journals, and manual searches of reference lists.	All RCTs that compared music therapy with standard care, placebo therapy, or no treatment.

Data extraction/data collection and analysis	Main results	The authors' conclusions
<p>Two independent review authors performed data extraction. All outcome data in the included papers were continuous. We calculated point estimates and standard errors from <i>t</i>-test scores and post-intervention means. Meta-analysis was inappropriate for the available data.</p> <p>Studies were reliably selected, quality assessed, and data extracted. We excluded data where more than 30% of participants in any group were lost to follow-up. We synthesized non-skewed continuous endpoint data from valid scales using an SMD. If statistical heterogeneity was found, we examined treatment "dosage" and treatment approach as possible sources of heterogeneity.</p>	<p>We identified six RCTs of auditory integration therapy and one of Tomatis therapy, involving a total of 182 individuals aged 3–39 years. Two were cross-over trials. Five trials had fewer than 20 participants. Allocation concealment was inadequate for all studies. Twenty different outcome measures were used, and only two outcomes were used by three or more studies. Meta-analysis was not possible due to very high heterogeneity or the presentation of data in unusable forms. Three studies (Bettison 1996; Zollweg 1997; Mudford 2000) did not demonstrate any benefit of auditory integration therapy over control conditions. Three studies (Veale 1993; Rimland 1995; Edelson 1999) reported improvements at 3 months for the auditory integration therapy group based on the Aberrant Behavior Checklist, but they used a total score rather than subgroup scores, which is of questionable validity, and Veale's results did not reach statistical significance. Rimland 1995 also reported improvements at 3 months in the auditory integration therapy group for the Aberrant Behavior Checklist subgroup scores. The study addressing Tomatis therapy (Corbett 2008) described an improvement in language with no difference between treatment and control conditions and did not report on the behavioral outcomes that were used in the auditory integration therapy trials.</p> <p>We included eight studies (total 483 participants). These examined effects of music therapy over the short-to medium-term (1–4 months), with treatment "dosage" varying from seven to 78 sessions. Music therapy added to standard care was superior to standard care for global state (medium-term, one RCT, $n=72$, RR 0.10, 95% CI 0.03–0.31; NNT 2, 95% CI 1.2–2.2). Continuous data identified good effects on negative symptoms (four RCTs, $n=240$, SMD average endpoint SANS -0.74, 95% CI -1.00 to -0.47); general mental state (one RCT, $n=69$, SMD average endpoint PANSS -0.36, 95% CI -0.85 to 0.12; two RCTs, $n=100$, SMD average endpoint BPRS -0.73, 95% CI -1.16 to -0.31); depression (two RCTs, $n=90$, SMD average endpoint SDS -0.63, 95% CI -1.06 to -0.21; one RCT, $n=30$, SMD average endpoint Ham-D -0.52, 95% CI -1.25 to -0.12); and anxiety (one RCT, $n=60$, SMD average endpoint SAS -0.61, 95% CI -1.13 to -0.09).</p> <p>Positive effects were also found for social functioning (one RCT, $n=70$, SMD average endpoint SDSI score -0.78, 95% CI -1.27 to -0.28). Furthermore, some aspects of cognitive functioning and behavior seem to develop positively through music therapy. Effects, however, were inconsistent across studies and depended on the number of music therapy sessions as well as the quality of music therapy provided.</p>	<p>There is no evidence that auditory integration therapy or other sound therapies are effective as treatments for autism spectrum disorders. As synthesis of existing data has been limited by the disparate outcome measures used between studies, there is not sufficient evidence to prove that this treatment is not effective. However, of the seven studies including 182 participants that have been reported to date, only two (with an author in common), involving a total of 35 participants, report statistically significant improvements in the auditory integration therapy group and for only two outcome measures (Aberrant Behavior Checklist and Fisher's Auditory Problems Checklist). As such, there is no evidence to support the use of auditory integration therapy at this time.</p> <p>Music therapy as an addition to standard care helps people with schizophrenia to improve their global state, mental state (including negative symptoms), and social functioning if a sufficient number of music therapy sessions are provided by qualified music therapists. Further research should especially address the long-term effects of music therapy, dose–response relationships, as well as the relevance of outcomes measures in relation to music therapy.</p>

(Continued)

Table 2 (Continued)

Study	Title	Aim/objective	Data source/search strategy	Study selection/selection criteria
Bradt et al ¹⁹	Music interventions for improving psychological and physical outcomes in cancer patients	To compare the effects of music therapy or music medicine interventions and standard care with standard care alone, or standard care and other interventions in patients with cancer.	We searched CENTRAL (The Cochrane Library 2010, Issue 10), MEDLINE, EMBASE, CINAHL, PsycINFO, LILACS, Science Citation Index, CancerLit, http://www.musictherapyworld.net , CAIRSS, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, and the National Research Register. All databases were searched from their start date to September 2010. We handsearched music therapy journals and reference lists and contacted experts. There was no language restriction.	We included all RCTs and quasi-RCTs of music interventions for improving psychological and physical outcomes in patients with cancer. Participants undergoing biopsy and aspiration for diagnostic purposes were excluded.
Bradt and Dileo ²⁰	Music therapy for end-of-life care	To examine effects of music therapy with standard care versus standard care alone or standard care combined with other therapies on psychological, physiological, and social responses in end-of-life care.	We searched CENTRAL, MEDLINE, CINAHL, EMBASE, PsycINFO, LILACS, CancerLit, Science Citation Index, http://www.musictherapyworld.de , CAIRSS for Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, and the National Research Register to September 2009. We handsearched music therapy journals and reference lists, and contacted experts to identify unpublished manuscripts. There was no language restriction.	We included all RCTs and quasi-RCTs that compared music interventions and standard care with standard care alone or combined with other therapies in any care setting with a diagnosis of advanced life-limiting illness being treated with palliative intent and with a life expectancy of less than 2 years.
Vink et al ²¹	Music therapy for people with dementia	To assess the effects of music therapy in the treatment of behavioral, social, cognitive and emotional problems of older people with dementia, in relation to the type of music therapy intervention.	ALOIS, the specialized Register of the CDCIG was searched on April 14, 2010 using the terms: music therapy, music singing, sing, and auditory stimulation. Additional searches were also carried out on April 14, 2010 in the major health care databases MEDLINE, EMBASE, PsycINFO, CINAHL, and LILACS, trial registers and grey literature sources to ensure the search was as up-to-date and as comprehensive as possible.	Randomized controlled trials that reported clinically relevant outcomes associated with music therapy in treatment of behavioral, social, cognitive, and emotional problems of older people with dementia.

Data extraction/data collection and analysis	Main results	The authors' conclusions
<p>Two review authors independently extracted the data and assessed the risk of bias. Where possible, results were presented in meta-analyses using MDs and SMDs. Post-test scores were used. In cases of significant baseline difference, we used change scores.</p> <p>Data were extracted, and methodological quality was assessed, independently by review authors. Additional information was sought from study authors when necessary. Results are presented using weighted MDs for outcomes measured by the same scale and SMDs for outcomes measured by different scales. Post-test scores were used. In cases of statistically significant baseline difference, we used change scores.</p> <p>Two reviewers screened the retrieved studies independently for methodological quality. Data from accepted studies were independently extracted by the reviewers.</p>	<p>We included 30 trials with a total of 1,891 participants. We included music therapy interventions offered by trained music therapists, as well as listening to prerecorded music offered by medical staff. The results suggest that music interventions may have a beneficial effect on anxiety in people with cancer, with a reported average anxiety reduction of 11.20 units (95% CI -19.59 to -2.82, $P=0.009$) on the STAI-S scale and -0.61 standardized units, (95% CI -0.97 to -0.26, $P=0.0007$) on other anxiety scales. Results also suggested a positive impact on mood (SMD =0.42, 95% CI 0.03-0.81, $P=0.03$), but no support was found for depression. Music interventions may lead to small reductions in heart rate, respiratory rate, and blood pressure. A moderate pain-reducing effect was found (SMD =-0.59, 95% CI -0.92 to -0.27, $P=0.0003$), but no strong evidence was found for enhancement of fatigue or physical status. The pooled estimate of two trials suggested a beneficial effect of music therapy on patients' QoL (SMD =1.02, 95% CI 0.58-1.47, $P=0.00001$). No conclusions could be drawn regarding the effect of music interventions on distress, body image, oxygen saturation level, immunologic functioning, spirituality, and communication outcomes. Seventeen trials used listening to prerecorded music, and 13 trials used music therapy interventions that actively engaged the patients. Not all studies included the same outcomes, and due to the small number of studies per outcome, we could not compare the effectiveness of music medicine interventions with that of music therapy interventions.</p> <p>Five studies (175 participants) were included. There is insufficient evidence of high quality to support the effect of music therapy on QoL of people in end-of-life care. Given the limited number of studies and small sample sizes, more research is needed. No strong evidence was found for the effect of music therapy on pain or anxiety. These results were based on two small studies. There were insufficient data to examine the effect of music therapy on other physical, psychological, or social outcomes.</p> <p>Ten studies were included. The methodological quality of the studies was generally poor, and the study results could not be validated or pooled for further analyses.</p>	<p>This systematic review indicates that music interventions may have beneficial effects on anxiety, pain, mood, and QoL in people with cancer. Furthermore, music may have a small effect on heart rate, respiratory rate, and blood pressure. Most trials were at high risk of bias, and therefore, these results need to be interpreted with caution.</p> <p>A limited number of studies suggest there may be a benefit of music therapy on the QoL of people in end-of-life care. However, the results stem from studies with a high risk of bias. More research is needed.</p> <p>The methodological quality and the reporting of the included studies were too poor to draw any useful conclusions.</p>

(Continued)

Table 2 (Continued)

Study	Title	Aim/objective	Data source/search strategy	Study selection/ selection criteria
Bradt et al ²²	Music interventions for mechanically ventilated patients	To examine the effects of music interventions with standard care versus standard care alone on anxiety and physiological responses in mechanically ventilated patients.	We searched CENTRAL (The Cochrane Library 2010, Issue 1) MEDLINE, CINAHL, AMED, EMBASE, PsycINFO, LILACS, Science Citation Index, http://www.musictherapyworld.net , CAIRSS for Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, the National Research Register, and NIH CRISP (all to January 2010). We handsearched music therapy journals and reference lists and contacted relevant experts to identify unpublished manuscripts. There was no language restriction.	We included all RCTs and quasi-RCTs that compared music interventions and standard care with standard care alone for mechanically ventilated patients.
Cepeda et al ²³	Music for pain relief	To evaluate the effects of music on acute, chronic, or cancer pain intensity, pain relief, and analgesic requirements.	We searched the Cochrane Library, MEDLINE, EMBASE, PsycINFO, LILACS, and the references in retrieved manuscripts. There was no language restriction.	We included RCTs that evaluated the effect of music on any type of pain in children or adults. We excluded trials that reported results of concurrent non-pharmacological therapies.
Bradt et al ²⁴	Music therapy for acquired brain injury	To examine the effects of music therapy with standard care versus standard care alone or standard care combined with other therapies on gait, upper extremity function, communication, mood and emotions, social skills, pain, behavioral outcomes, activities of daily living, and adverse events.	We searched the Cochrane Stroke Group Trials Register (February 2010), the Cochrane Central Register of Controlled Trials (the Cochrane Library Issue 2, 2009), MEDLINE (July 2009), EMBASE (August 2009), CINAHL (July 2010) PsycINFO (July 2009), LILACS (August 2009), AMED (August 2009), and Science Citation Index (August 2009). We handsearched music therapy journals and conference proceedings, searched dissertation and specialist music databases, trials and research reference lists, and contacted experts and music therapy associations. There was no language restriction.	RCTs and quasi-RCTs that compared music therapy interventions and standard care with standard care alone or combined with other therapies for people older than 16 years of age who had acquired brain damage of a non-degenerative nature and were participating in treatment programs offered in hospital, outpatient, or community settings.

Data extraction/data collection and analysis	Main results	The authors' conclusions
<p>Two authors independently extracted the data and assessed the methodological quality. Additional information was sought from the trial researchers, when necessary. Results were presented using MDs for outcomes measured by the same scale and SMDs for outcomes measured by different scales. Post-test scores were used. In cases of significant baseline difference, we used change scores.</p>	<p>We included eight trials (213 participants). Listening to music was the main intervention used, and seven of the studies did not include a trained music therapist. Results indicated that listening to music may be beneficial for anxiety reduction in mechanically ventilated patients; however, these results need to be interpreted with caution due to the small sample size. Findings indicated that listening to music consistently reduced heart rate and respiratory rate, suggesting a relaxation response. No strong evidence was found for blood pressure reduction. Listening to music did not improve oxygen saturation level. No studies could be found that examined the effects of music interventions on QoL, patient satisfaction, post-discharge outcomes, mortality, or cost-effectiveness.</p>	<p>Listening to music may have a beneficial effect on heart rate, respiratory rate, and anxiety in mechanically ventilated patients. However, the quality of the evidence is not strong. Most studies examined the effects of listening to prerecorded music. More research is needed on the effects of music offered by a trained music therapist.</p>
<p>Data was extracted by two independent review authors. We calculated the MD in pain intensity levels, percentage of patients with at least 50% pain relief, and opioid requirements. We converted opioid consumption to morphine equivalents. To explore heterogeneity, studies that evaluated adults, children, acute, chronic, malignant, labor, procedural, or experimental pain were evaluated separately, as well as those studies in which patients chose the type of music.</p>	<p>Fifty-one studies involving 1,867 subjects exposed to music and 1,796 controls met inclusion criteria. In the 31 studies evaluating mean pain intensity there was a considerable variation in the effect of music, indicating statistical heterogeneity ($I^2 = 85.3\%$). After grouping the studies according to the pain model, this heterogeneity remained, with the exception of the studies that evaluated acute postoperative pain. In this last group, patients exposed to music had pain intensity that was 0.5 units lower on a 0–10 scale than unexposed subjects (95% CI -0.9 to -0.2). Studies that permitted patients to select the music did not reveal a benefit from music; the decline in pain intensity was 0.2 units, 95% CI $(-0.7$ to $0.2)$. Four studies reported the proportion of subjects with at least 50% pain relief; subjects exposed to music had a 70% higher likelihood of having pain relief than unexposed subjects (95% CI 1.21–2.37). NNT = 5 (95% CI 4–13). Three studies evaluated opioid requirements two hours after surgery: subjects exposed to music required 1.0 mg (18.4%) less morphine (95% CI -2.0 to -0.2) than unexposed subjects. Five studies assessed requirements 24 hours after surgery: the music group required 5.7 mg (15.4%) less morphine than the unexposed group (95% CI -8.8 to -2.6). Five studies evaluated requirements during painful procedures: the difference in requirements showed a trend towards favoring the music group (-0.7 mg, 95% CI -1.8 to 0.4).</p>	<p>Listening to music reduces pain intensity levels and opioid requirements, but the magnitude of these benefits is small and, therefore, its clinical importance unclear.</p>
<p>Two review authors independently assessed methodological quality and extracted data. We present results using MDs (using post-test scores), as all outcomes were measured with the same scale.</p>	<p>We included seven studies (184 participants). The results suggest that RAS may be beneficial for improving gait parameters in stroke patients, including gait velocity, cadence, stride length, and gait symmetry. These results were based on two studies that received a low risk of bias score. There were insufficient data to examine the effect of music therapy on other outcomes.</p>	<p>RAS may be beneficial for gait improvement in people with stroke. These results are encouraging, but more RCTs are needed before recommendations can be made for clinical practice. More research is needed to examine the effects of music therapy on other outcomes in people with acquired brain injury.</p>

(Continued)

Table 2 (Continued)

Study	Title	Aim/objective	Data source/search strategy	Study selection/ selection criteria
Gold et al ²⁵	Music therapy for autistic spectrum disorder	To review the effects of music therapy for individuals with autistic spectrum disorders.	The following databases were searched: CENTRAL, 2005 (issue 3); MEDLINE (1966 to July 2004); EMBASE (1980 to July 2004); LILACS (1982 to July 2004); PsycINFO (1872 to July 2004); CINAHL, (1872 to July 2004); ERIC (1966 to July 2004); ASSIA (1987 to July 2004); Sociofile (1963 to July 2004); Dissertation Abstracts International (late 1960s to July 2004). These searches were supplemented by searching specific sources for music therapy literature and manual searches of reference lists. Personal contacts to some investigators were made.	All RCTs or controlled clinical trials comparing music therapy added to standard care to “placebo” therapy, no treatment, or standard care.
Laopaiboon et al ²⁶	Music during caesarean section under regional anesthesia for improving maternal and infant outcomes	To evaluate the effectiveness of music during caesarean section under regional anesthesia for improving clinical and psychological outcomes for mothers and infants.	We searched the Cochrane Pregnancy and Childbirth Group’s Trials Register (30 September 2008).	We included randomized controlled trials comparing music added to standard care during caesarean section under regional anesthesia to standard care alone.
Bradt and Dileo ²⁷	Music for stress and anxiety reduction in coronary heart disease patients	To examine the effects of music interventions with standard care versus standard care alone on psychological and physiological responses in persons with CHD.	We searched CENTRAL, MEDLINE, CINAHL, EMBASE, PsycINFO, LILACS, Science Citation Index, http://www.musictherapyworld.net , CAIRSS for Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, and the National Research Register (all to May 2008). We handsearched music therapy journals and reference lists, and contacted relevant experts to identify unpublished manuscripts. There was no language restriction.	We included all RCTs that compared music interventions and standard care with standard care alone for persons with CHD.
Maratos et al ²⁸	Music therapy for depression	To examine the efficacy of music therapy with standard care compared with standard care alone among people with depression and to compare the effects of music therapy for people with depression against other psychological or pharmacological therapies.	CCDANCTR studies and CCDANCTR references were searched on November 7, 2007, and MEDLINE, PsycINFO, EMBASE, PsycLIT, PSYindex, and other relevant sites were searched in November 2006. Reference lists of retrieved articles were handsearched, as well as specialist music and arts therapies journals.	All RCTs comparing music therapy with standard care or other interventions for depression.

Data extraction/data collection and analysis	Main results	The authors' conclusions
<p>Studies were independently selected, quality assessed, and data extracted by two authors. Continuous outcomes were synthesized using an SMD to enable a meta-analysis combining different scales, and to facilitate the interpretation of effect sizes. Heterogeneity was assessed using the I^2 statistic.</p>	<p>Three small studies were included (total $n=24$). These examined the short-term effect of brief music therapy interventions (daily sessions over 1 week) for autistic children. Music therapy was superior to “placebo” therapy with respect to verbal and gestural communicative skills (verbal, two RCTs, $n=20$, SMD 0.36, CI 0.15–0.57; gestyrak, 2 RCTs, $n=20$, SMD 0.50, CI 0.22–0.79). Effects on behavioral problems were not significant.</p>	<p>The included studies were of limited applicability to clinical practice. However, the findings indicate that music therapy may help children with autistic spectrum disorder to improve their communicative skills. More research is needed to examine whether the effects of music therapy are enduring, and to investigate the effects of music therapy in typical clinical practice.</p>
<p>Two review authors, Malinee Laopaiboon and Ruth Martis, independently assessed eligibility, risk of bias in included trials and extracted data. We analyzed continuous outcomes using an MD with a 95% CI.</p>	<p>One trial involving 76 women who planned to have their babies delivered by cesarean section met the inclusion criteria, but data were available for only 64 women. This trial was of low quality with unclear allocation concealment, and only a few main clinical outcomes reported for the women. The trial did not report any infant outcomes. It appears that music added to standard care during cesarean section under regional anesthesia had some impact on pulse rate at the end of maternal contact with the neonate in the intra-operative period (MD -7.50 fewer beats per minute, 95% CI 14.08 to -0.92) and after completion of skin suture for the cesarean section (MD -7.37 fewer beats per minute, 95% CI 13.37–1.37). There was also an improvement in the birth satisfaction score (maximum possible score of 35) (MD of 3.38, 95% CI 1.59–5.17). Effects on other outcomes were either not significant or not reported in the one included trial.</p>	<p>The findings indicate that music during planned cesarean section under regional anesthesia may improve pulse rate and birth satisfaction score. However, the magnitude of these benefits is small and the methodological quality of the one included trial is questionable. Therefore, the clinical significance of music is unclear. More research is needed to investigate the effects of music during cesarean section under regional anesthesia on both maternal and infant outcomes, in various ethnic pregnant women, and with adequate sample sizes.</p>
<p>Data were extracted and methodological quality was assessed, independently by the two reviewers. Additional information was sought from the trial researchers when necessary. Results are presented using weighted MDs for outcomes measured by the same scale and SMDs for outcomes measured by different scales. Post-test scores were used. In cases of significant baseline difference, we used change scores. Data on participants, interventions, and outcomes were extracted and entered into a database independently by two review authors. The methodological quality of each study was also assessed independently by two review authors. The primary outcome was reduction in symptoms of depression, based on a continuous scale.</p>	<p>Twenty-three trials (1,461 participants) were included. Listening to music was the main intervention used, and 21 of the studies did not include a trained music therapist. Results indicated that listening to music has a moderate effect on anxiety in patients with CHD; however, results were inconsistent across studies. This review did not find strong evidence for reduction of psychological distress. Findings indicated that listening to music reduces heart rate, respiratory rate, and blood pressure. Studies that included two or more music sessions led to a small and consistent pain-reducing effect. No strong evidence was found for peripheral skin temperature. None of the studies considered hormone levels, and only one study considered QoL as an outcome variable. Five studies met the inclusion criteria of the review. Marked variations in the interventions offered and the populations studied meant that meta-analysis was not appropriate. Four of the five studies individually reported greater reduction in symptoms of depression among those randomized to music therapy than to those in standard care conditions. The fifth study, in which music therapy was used as an active control treatment, reported no significant change in mental state for music therapy compared with standard care. Dropout rates from music therapy conditions appeared to be low in all studies.</p>	<p>Listening to music may have a beneficial effect on blood pressure, heart rate, respiratory rate, anxiety, and pain in persons with CHD. However, the quality of the evidence is not strong and the clinical significance unclear. Most studies examined the effects of listening to prerecorded music. More research is needed on the effect of music offered by a trained music therapist. Findings from individual randomized trials suggest that music therapy is accepted by people with depression and is associated with improvements in mood. However, the small number and low methodological quality of studies mean that it is not possible to be confident about its effectiveness. High quality trials evaluating the effects of music therapy on depression are required.</p>

(Continued)

Table 2 (Continued)

Study	Title	Aim/objective	Data source/search strategy	Study selection/ selection criteria
de Dreu et al ²⁹	Rehabilitation, exercise therapy and music in patients with Parkinson's disease: a meta-analysis of the effects of music-based movement therapy on walking ability, balance and quality of life	To study that people with PD benefit from MbM therapy when compared with conventional therapy or no therapy in terms of standing balance, transfers, gait performance, severity of freezing, and QoL.	We searched PubMed, EMBASE, Cochrane, CINAHL, and SPORTDiscus for articles published until 1th August, 2011.	The following selection criteria were applied: 1) people with PD were targeted, 2) the study was an RCT of high quality (PEDro score of >4), 3) the intervention contained MbM, and 4) the rhythmic cues were embedded in music.
Cogo-Moreira et al ³⁰	Music education for improving reading skills in children and adolescents with dyslexia	To study the effectiveness of music education on reading skills (ie, oral reading skills, reading comprehension, reading fluency, phonological awareness, and spelling) in children and adolescents with dyslexia.	We searched the following electronic databases in June 2012: CENTRAL (2012, Issue 5), MEDLINE (1948 to May week 4 2012), EMBASE (1980 to 2012 week 22), CINAHL (searched June 7, 2012), LILACS (searched June 7, 2012), PsycINFO (1887 to May week 5 2012), ERIC (searched June 7, 2012), Arts and Humanities Citation Index (1970 to 6 June 2012), Conference Proceedings Citation Index – Social Sciences and Humanities (1990 to June 2012), and WorldCat (searched June 7, 2012). We also searched the WHO ICTRP and reference lists of studies. We did not apply any date or language limits.	We planned to include RCTs. We looked for studies that included at least one of our primary outcomes. The primary outcomes were related to the main domain of reading: oral reading skills, reading comprehension, reading fluency, phonological awareness, and spelling measured through validated instruments. The secondary outcomes were self-esteem and academic achievement.
Drahota et al ³¹	Sensory environment on health-related outcomes of hospital patients	To assess the effect of hospital environments on adult patient health-related outcomes.	We searched: CENTRAL (last searched January 2006); MEDLINE (1902 to December 2006); EMBASE (January 1980 to February 2006); 14 other databases covering health, psychology, and the built environment; reference lists; and organization websites. This review is currently ongoing (MEDLINE last search October 2010), see Studies awaiting classification.	RCTs and non-randomized controlled trials, before-and-after studies, and interrupted times series of environmental interventions in adult hospital patients reporting health-related outcomes.

Data extraction/data collection and analysis	Main results	The authors' conclusions
<p>Two reviewers extracted relevant data from the included studies. A meta-analysis of RCTs on the efficacy of MbM therapy, including individual rhythmic music training and partnered dance classes, was performed. Identified studies (K=6) were evaluated on methodological quality, and SESs were calculated. Two authors (HCM and RBA) independently screened all titles and abstracts identified through the search strategy to determine their eligibility. For our analysis we had planned to use MD for continuous data, with 95% CIs, and to use the random-effects statistical model when the effect estimates of two or more studies could be combined in a meta-analysis.</p>	<p>Studies were generally small (total N=168). Significant homogeneous SESs were found for the Berg Balance Scale, Timed Up and Go test, and stride length (SESs, 4.1, 2.2, and 0.11; P-values <0.01; I², 0%, 0%, and 7%, respectively). A sensitivity analysis on type of MbM therapy (dance- or gait-related interventions) revealed a significant improvement in walking velocity for gait-related MbM therapy but not for dance-related MbM therapy. No significant effects were found for UPDRS-motor score, freezing of gait, and QoL. We retrieved 851 references via the search strategy. No RCTs testing music education for the improvement of reading skills in children with dyslexia could be included in this review.</p>	<p>MbM therapy appears promising for the improvement of gait and gait-related activities in PD. Future studies should incorporate larger groups and focus on long-term compliance and follow-up.</p> <p>There is no evidence available from RCTs on which to base a judgment about the effectiveness of music education for the improvement of reading skills in children and adolescents with dyslexia. This uncertainty warrants further research via RCTs, involving an interdisciplinary team: musicians, hearing and speech therapists, psychologists, and physicians.</p>
<p>Two review authors independently undertook data extraction and "risk of bias" assessment. We contacted authors to obtain missing information. For continuous variables, we calculated an MD or SMD, and 95% CIs for each study. For dichotomous variables, we calculated RR with 95% CI. When appropriate, we used a random-effects model of meta-analysis. Heterogeneity was explored qualitatively and quantitatively based on risk of bias, case mix, hospital visit characteristics, and country of study.</p>	<p>Overall, 102 studies were included in this review. Interventions explored were: "positive distracters", to include aromas (two studies), audiovisual distractions (five studies), decoration (one study), and music (85 studies); interventions to reduce environmental stressors through physical changes, to include air quality (three studies), bedroom type (one study), flooring (two studies), furniture and furnishings (one study), lighting (one study), and temperature (one study); and multifaceted interventions (two studies). We did not find any studies meeting the inclusion criteria to evaluate: art, access to nature for example through hospital gardens, atriums, flowers, and plants, ceilings, interventions to reduce hospital noise, patient controls, technologies, way-finding aids, or the provision of windows. Overall, it appears that music may improve patient-reported outcomes such as anxiety; however, the benefit for physiological outcomes, and medication consumption has less support. There are few studies to support or refute the implementation of physical changes, and except for air quality, the included studies demonstrated that physical changes in the hospital environment at least did no harm.</p>	<p>Music may improve patient-reported outcomes in certain circumstances, so support for this relatively inexpensive intervention may be justified. For some environmental interventions, well designed research studies have yet to take place.</p>

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Table 2 (Continued)

Study	Title	Aim/objective	Data source/search strategy	Study selection/selection criteria
Chan et al ³²	The effectiveness of music listening in reducing depressive symptoms in adults: a systematic review	To review trials of the effectiveness of listening to music in reducing depressive symptoms in adults, and identify areas requiring further study.	A comprehensive search strategy was employed to identify all published papers in English language between January 1989 and March 2010. We searched nine databases with initial search terms including “music”, “depression”, or “depressive symptoms”.	We searched the published literature for RCTs and quasi-experimental trials that included an intervention with music listening designed to reduce the depression level, compared with a control group. The intervention was music listening, it is defined as listening to music via any form of music device or live music, without the active involvement of a music therapist.
Naylor et al ³³	The effectiveness of music in pediatric healthcare: a systematic review of randomized controlled trials	To systematically review the effectiveness of music on pediatric health-related outcomes.	The following international electronic databases were searched on March 4, 2009: Ovid Medline (Medical Literature Analysis and Retrieval System Online), 1950 to February, week 3, 2009; EMBASE, 1980–2009 week 9; PsycINFO, 1967 to February, week 4, 2009; AMED (Allied and Complementary Medicine), 1985–February 2009; and CINAHL, 1983–2008.	Studies were included if they met the following six criteria: 1) examined the effectiveness of a music intervention; 2) involved a clinical population in a health care, research, or education setting; 3) involved children and adolescents between 1 and 18 years of age (or reported a mean age within this range); 4) used an RCT design (parallel or crossover); 5) reported at least one quantifiable outcome measure; and 6) was published between 1984 and 2009.
Irons et al ³⁴	Singing for children and adults with cystic fibrosis	To evaluate the effects of a singing intervention in addition to usual therapy on the QoL, morbidity, respiratory muscle strength, and pulmonary function of children and adults with cystic fibrosis.	We searched the Group’s Cystic Fibrosis Trials Register, the CENTRAL, major allied complementary databases, and clinical trial registers. Handsearching for relevant conference proceedings and journals was also carried out. Date of search of trials register: September 2, 2009. Date of additional searches: September 17, 2009.	RCTs in which singing (as an adjunctive intervention) is compared with either a sham intervention or no singing in people with cystic fibrosis.
Irons et al ³⁵	Singing for children and adults with bronchiectasis	To evaluate the effects of a singing intervention as a therapy on the QoL, morbidity, respiratory muscle strength, and pulmonary function of children and adults with bronchiectasis.	We searched the CAG trial register, CENTRAL, major allied complementary databases, and clinical trials registers. Professional organizations and individuals were also contacted. CAG performed searches in February, and additional searches were carried out in February 2011.	RCTs in which singing (as an intervention) is compared with either a sham intervention or no singing in patients with bronchiectasis.
de Niet et al ³⁶	Music-assisted relaxation to improve sleep quality: meta-analysis	To evaluate the efficacy of music-assisted relaxation for sleep quality in adults and elders with sleep complaints with or without a comorbid medical condition.	We conducted searches in EMBASE (1997–July 2008), Medline (1950–July 2008), Cochrane (2000–July 2008), PsycINFO (1987–July 2008) and CINAHL (1982–July 2008) for studies published in English, German, French, or Dutch.	We included published RCTs performed in an adult (18–60 years) or elderly (60 years or older) population with primary sleep complaints or sleep complaints comorbid with a medical condition. Studies involving active use of music, such as playing instruments, were excluded.

Data extraction/data collection and analysis	Main results	The authors' conclusions
<p>The data extracted included specific details about the interventions, populations, study methods, and outcomes of significance to the review question and specific objectives. Two studies were pooled together for meta-analysis due to similarity in outcome measures and intervention time points.</p>	<p>Listening to music over a period of time helps to reduce depressive symptoms in the adult population. Daily intervention does not seem to be superior over weekly intervention, and it is recommended that music listening sessions be conducted repeatedly over a time span of more than 3 weeks to allow an accumulative effect to occur.</p>	<p>All types of music can be used as listening material, depending on the preferences of the listener. It is recommended that the listeners are given choices over the kind of music they listen to. There is a need to conduct more studies, which replicate the designs used in the existing studies that met the inclusion criteria, on the level of efficacy of music listening and on the reduction of depressive symptoms for a more accurate meta-analysis of the findings and which would reflect with greater accuracy the significant effects that music has on the level of depressive symptoms. These findings offer limited qualitative evidence to support the effectiveness of music on health-related outcomes for children and adolescents with clinical diagnoses. Recommendations for establishing a consensus on research priorities and addressing methodological limitations are put forth to support the continued advancement of this popular intervention.</p>
<p>Date extraction includes information about each study (authorship, year of publication, country, recruitment setting, and experimental design), participants (sample size, sex, population, and age), intervention (treatment, delivery, participant involvement, and dosage), and quality rating. Because of heterogeneity in the study populations, interventions used, and outcome measures applied, it was neither feasible nor appropriate to conduct a meta-analysis.</p>	<p>Qualitative synthesis revealed significant improvements in one or more health outcomes within four of seven trials involving children with learning and developmental disorders; two of three trials involving children experiencing stressful life events; and four of five trials involving children with acute and/or chronic physical illness. No significant effects were found for two trials involving children with mood disorders and related psychopathology.</p>	<p>These findings offer limited qualitative evidence to support the effectiveness of music on health-related outcomes for children and adolescents with clinical diagnoses. Recommendations for establishing a consensus on research priorities and addressing methodological limitations are put forth to support the continued advancement of this popular intervention.</p>
<p>No trials were found that met the selection criteria.</p>	<p>No meta-analysis could be performed.</p>	<p>As no studies that met the criteria were found, this review is unable to support or refute the benefits of singing as a therapy for people with cystic fibrosis. Future RCTs are required to evaluate singing therapy for people with cystic fibrosis.</p>
<p>Two authors independently reviewed the titles, abstracts, and citations to assess potential relevance for full review. No eligible trials were identified and thus no data were available for analysis.</p>	<p>No meta-analysis could be performed.</p>	<p>In the absence of data, we cannot draw any conclusion to support or refute the adoption of singing as an intervention for people with bronchiectasis. Given the simplicity of the potentially beneficial intervention, future RCTs are required to evaluate singing therapy for people with bronchiectasis.</p>
<p>Pre- and post-test means and standard deviations, demographic data, and condition properties were extracted from each included study. Review Manager 5.0.12 (The Cochrane Collaboration, Oxford, UK) was used to calculate the effect sizes of the individual studies and for calculation of the pooled MD.</p>	<p>Five RCTs with six treatment conditions and a total of 170 participants in intervention groups and 138 controls met our inclusion criteria. Music-assisted relaxation had a moderate effect on the sleep quality of patients with sleep complaints (SMD -0.74; 95% CI -0.96 to -0.46). Subgroup analysis revealed no statistically significant contribution of accompanying measures.</p>	<p>Music-assisted relaxation can be used without intensive investment in training and materials and is therefore cheap, easily available, and can be used by nurses to promote music-assisted relaxation to improve sleep quality.</p>

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