Effects of music listening on adult patients' pre-procedural state anxiety in hospital
Gillen E, Biley F, Allen D

CRD summary
This review assessed the effectiveness of listening to music as an intervention to reduce pre-procedural state anxiety in adult hospital patients. Overall, the authors stated that psychological outcomes show reduced anxiety as a result of music listening interventions. The conclusion of this relatively robust review is reasonable, but the choice of synthesis method might have overstated the benefits.

Authors' objectives
This review assessed the effectiveness of listening to music to reduce pre-procedural state anxiety in hospital settings.

Searching
The following databases were searched from January 1985 to February 2006 using the search terms and strategies reported in the paper: CINAHL, MEDLINE, British Nursing Index, PsycINFO, EMBASE, Zetoc, the Cochrane Library, Web of Knowledge, Music Index Online and Repertoire International de Littérature Musicale. Unpublished literature was sought via SIGLE and Digital Dissertations and clinical trial registers. Reference lists, bibliographies and relevant Internet sites were also searched.

Study selection
Randomised controlled trials (RCTs) and quasi-experimental study designs, including unblinded and single-blinded studies, were eligible for this review provided they met the specified methodological standard. The participants were adult patients (over 18 years) waiting for a clinical procedure and could include day, ambulatory or in-patients. The included populations were aged between 18 and 99 years, received minimally or noninvasive procedures, and included both genders.

Studies of music listening defined as listening to any recorded music via headphones, or any type of music or delivery system, and delivered as a single episode of care were eligible for inclusion. The included studies generally used cassette or compact-disc players with headphones, although two used speakers rather than earphones. The duration of exposure to the intervention varied between studies with most music listening lasting between 15 and 30 minutes. Participants chose from a selection of recordings. Comparison or control groups received standard care.

Eligible outcomes for this review assessed the change in participants' levels of anxiety via pre- and post-test questionnaire measures of state anxiety, respiratory rate, blood-pressure, heart rate and other physiological parameters. Two questionnaire measures of anxiety (State Trait Anxiety Inventory, Profile of Mood States) and a visual analogue scale were the most commonly reported outcomes alongside a variety of physiological measures.

The included studies were mostly from the USA but also included papers from China, Australia and Sweden.

Two reviewers independently selected the studies, with arbitration by a third reviewer where required. Additional information was sought from authors where necessary to aid decisions on inclusion and exclusion.

Assessment of study quality
Two reviewers independently assessed validity using the Joanna Briggs Institute quality checklists for RCTs and quasi-experimental studies. Study groups were required to be comparable at entry, receive the same treatment (apart from music listening) and undergo the same procedure for outcome measurements. Additional information was sought from authors where necessary.

Data extraction
The authors did not state how the data were extracted for this review, or how many reviewers performed the data extraction.
Methods of synthesis
A narrative synthesis was carried out, with studies grouped by reported outcome measures. Mean scores with standard deviations were presented in tabular format for both control and intervention groups pre and post-procedure. No summary values were calculated because of the variation in study design and methodological quality.

Heterogeneity was assessed visually and on the basis of available information for each included study.

Publication bias was not assessed.

Results of the review
Twelve studies were included in this review having met the required standards of methodological rigour: 7 RCTs (832 patients) and 5 quasi-experimental studies (294 patients). The authors reported that a number of the included studies claiming to have used randomisation had not reported the methods used, and 6 studies were included in the review with caution following the methodological quality assessment. Sample sizes ranged from 20 to 200 participants.

Psychological indicators of pre-procedural state anxiety.
Data were available on psychological responses for 9 studies, all of which used the Spielberger State Trait Anxiety Index outcome measure. Five of the studies with unpaired data (8 studies) reported a significant reduction in anxiety in patients listening to music compared with a control. Three of the studies with paired data (5 studies) reported a significant reduction in anxiety following music listening.

Pre-procedural physiological status outcomes.
Blood pressure: 10 studies reported blood-pressure readings. Studies with unpaired data (5 studies) found no significant differences. Three of the studies with paired data (4 studies) found significant post-intervention reductions in systolic blood-pressure; a fourth found reductions but not of statistical significance.

Pulse rate: 9 studies reported data on pulse rate and music listening. One of the studies with unpaired data (8 studies) reported a significant reduction in the intervention group. For studies with paired data (6 studies), a variety of conflicting results were found with no clear statistical trend for increase or decrease in either the control or intervention group.

Respiration rate: 6 studies reported data on this outcome. Three of the studies with unpaired data (5 studies) found a significant decrease in the respiration rate of patients listening to music compared with controls. Three of the studies with paired data (4 studies) reported significant reductions in respiration rate for music listening patients.

Heart rate variability analysis: one study found that heart rate variability significantly changed in the intervention group, indicating increased vagal tone and relaxation.

Authors’ conclusions
Overall, psychological outcomes show reduced anxiety as a result of music listening interventions. There were inconsistent effects on the measured physiological parameters, and a lack of clarity on how these might relate to anxiety reduction.

CRD commentary
The research question was clearly expressed. The search strategies and databases were relevant and likely to have identified the available literature. Efforts were made to search for unpublished literature, which may reduce the chance of publication bias affecting the review, although no formal assessment was performed. The inclusion and exclusion criteria were appropriate and adequate for the research question, with the validity assessment being carried out and incorporated into the review process. Sufficient details about the primary studies were given to ensure generalisability of the conclusions. There were insufficient details of the data extraction process to judge how this was carried out. A meta-analysis was not carried out because of the variation between the included studies. However, a narrative synthesis was presented, reporting paired and unpaired data by relevant outcome measure; this may have been inappropriate as
some participants were represented in both the paired and unpaired summaries, therefore potentially misleading as to the strength of the positive tendencies in the results. Overall, the conclusion of this relatively robust review, that music listening is beneficial for pre-procedural anxiety, is reasonable but the choice of synthesis method might have overstated the benefits.

**Implications of the review for practice and research**

Practice: The authors stated that there is sufficient evidence to suggest patients should be able to participate in music listening before procedures, given the relative ease of implementation and lack of associated costs or side-effects. Patients are encouraged to have a free choice of musical style given the lack of evidence for any particular music genre.

Research: The authors stated that, in the light of largely positive findings, further studies are required to more tightly define the optimum duration and style of music used in such interventions. Careful replication of previous studies would enable a formal meta-analysis to be carried out and is recommended.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.