Music as an intervention for hospital patients: a systematic review

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Authors' objectives
To summarise the best available evidence on the effectiveness of music for hospital patients for reducing anxiety and pain, and for improving satisfaction, tolerance and mood.

Searching
The following databases were searched: MEDLINE from 1966 to 2001; CINAHL from 1989 to 2001; the Cochrane Library (Issue 1, 2001); EMBASE; PsycLIT from 1967 to 1999; DARE; Expanded Academic ASAP; HealthSTAR; AUSThealth databases from 1968 to 1999; and Current Contents (week 27, 1998 to week 26, 2001). The full search strategies were presented in an appendix of the review. The following journals were handsearched: Journal of Music Therapy (1964, volume 1, issue 1 to 2000, volume 37, issue 2), International Journal of Arts in Medicine (1991, volume 1 to 1994, volume 3), Music Therapy (1991, volume 10 to 1994, volume 12) and the Australian Journal of Music Therapy (1996, volume 7 to 1999, volume 10). In addition, Dissertation Abstracts and Proceedings First were searched for unpublished studies, the bibliographies of the included articles were examined, and experts in the field were contacted.

Study selection
Study designs of evaluations included in the review
Only randomised controlled trials (RCTs) were eligible for inclusion in the review. Studies were excluded if the critical appraisal indicated that they were of methodologically poor quality, or if there was inadequate description in the study report to determine specific information about the participants, intervention, outcome measures or research method. Non-English language publications were also excluded.

Specific interventions included in the review
The author states that music, in the context of this review, was considered to be recorded music played via a tape recorder or compact disc player. Studies involving live music were specifically excluded. Music as an intervention was considered to be music played for a patient during a single episode of care, to produce outcomes that were achievable during that session of music. This included music played to patients prior to and following surgery. Studies involving music played to patients as a series of sessions over an extended period of time, and where the outcomes were achieved through participation in the programme of sessions, were specifically excluded.

Participants included in the review
The inclusion criteria for the review specified that the participants in the primary studies must be adult hospital patients.

The included studies concerned either general hospitalised patients who were described as pre-operative, post-operative, cardiac surgical, post-myocardial infarction, or mechanically ventilated, or were studies of music used during a specific procedure. The latter included studies of patients undergoing upper gastrointestinal tract investigations, cardiac surgery, chest tube removal, first post-operative ambulation, bronchoscopy, cataract surgery, urological procedures, lithotripsy, sigmoidoscopy, and orthopaedic and plastic surgery.

Outcomes assessed in the review
The primary studies were eligible for inclusion in the review if they used the following outcome measures relating to response to music.

Anxiety: rating of anxiety (STAI or a visual analogue scale), heart rate, blood-pressure and respiratory rate.

Pain: severity of pain (visual analogue scale), the amount of analgesic used, and the amount of sedative used.
Satisfaction: rating of satisfaction (visual analogue scale).

Comfort: rating of comfort (visual analogue scale).

Mood: rating of mood (visual analogue scale).

How were decisions on the relevance of primary studies made?
Studies identified by the electronic searches were selected for retrieval by comparing the information in the title, abstract or MeSH terms against the inclusion criteria of the review. Studies identified during the searching of bibliographies were selected based on the information in the citation title. The author does not state how many of the reviewers performed the selection.

Assessment of study quality
All included studies were critically appraised using a quality assessment tool, which was reported in an appendix of the review. This focused on selection bias, performance bias, attrition bias and detection bias. Studies assessed as being of ‘good’ methodological quality were considered for inclusion in the meta-analysis. Studies assessed as being of ‘poor’ methodological quality were included in the review as part of the summary tables. The author does not state how the papers were assessed for quality, or how many of the reviewers performed the quality assessment.

Data extraction
The data were extracted from the primary studies using a data collection form developed for this review, and reported in an appendix. The data collected included demographic information about the study population, a description of the intervention, a description of the outcome measures, the study method and the results.

Methods of synthesis
How were the studies combined?
Tabular and narrative summaries were used to describe the key characteristics of the included and excluded studies. Specific areas of focus were the populations investigated, the types of music evaluated, issues related to study quality, and contradictions in results.

When two or more comparable RCTs were identified, the results were pooled in a meta-analysis. The comparability of the studies was considered in terms of the study population, intervention and outcome measures utilised. The studies were grouped into those involving general hospitalised patients and those conducted during procedures, and by outcome measure. The odds ratio was used as the summary effect measure for dichotomous data. For continuous data, the summary effect measure was the weighted mean difference when the same scale was used (e.g. blood-pressure), and the standardised mean difference (SMD) where different scales were used (e.g. in the measurement of anxiety). The 95% confidence interval (CI) was calculated for each study.

The initial analysis involved pooling all studies in each category that contributed to the specific outcome of interest. A subgroup analysis was undertaken to determine the effectiveness of music in the following specific hospital populations: pre-operative patients, intra-operative patients, post-operative patients, cancer patients and post-myocardial infarction patients.

A sensitivity analysis was conducted to evaluate the impact of studies excluded during the critical appraisal process on the findings of the review.

How were differences between studies investigated?
Heterogeneity between comparable studies was assessed using the chi-squared test and by visual inspection of those results presented graphically.

Results of the review
Of the 29 RCTs that met the inclusion criteria, 10 were excluded as a result of the critical appraisal process. The
remaining 19 studies (1,032 participants in total) comprised 9 studies (438 participants) of general hospitalised patients and 10 studies (594 participants) conducted whilst patients were undergoing unpleasant or invasive procedures.

The author states that, based on the findings of this review, music in general hospitalised patients can reduce the perceived anxiety of patients (SMD -0.71, 95% CI: -0.97, -0.46); produce a small reduction in the respiratory rate (SMD -2.42, 95% CI: -3.95, -0.88); and improve the mood of patients (SMD -0.62, 95% CI: -1.05, -0.19). In addition, music does not have any impact on either a patient’s heart rate or systolic blood-pressure.

Based on the findings of this review, the use of music during unpleasant or invasive procedures has no significant impact on patient anxiety, heart rate or systolic blood-pressure, or the rating of the severity of pain.

There was very little evidence related to the use of music for specific populations, and the findings of the subgroup analysis did not differ substantially from those of the main data synthesis.

The sensitivity analysis did not significantly change the findings of the meta-analysis.

**Authors’ conclusions**

This review highlighted a considerable amount of evidence supporting the use of music for adults during hospitalisation. Most notable in these findings was that music is primarily beneficial for the reduction of anxiety. Music appears to have minimal impact on the physiological outcomes such as blood-pressure and heart rate. However, the studies demonstrated a reduction in respiratory rate when music is played to patients, but whether this is a consequence of reduced anxiety is unclear. In addition, many areas have been subject to inadequate evaluation because of the small sample sizes of many studies and the lack of replication.

**CRD commentary**

The objectives of the review were clearly and concisely stated, and the review question was further defined in terms of the intervention, participant characteristics, outcome measures and study design. The search strategy was comprehensive and well reported. Publication bias was not formally assessed but appropriate attempts were made to identify unpublished studies. However, the exclusion of non-English language studies may have resulted in incomplete retrieval of the available data set.

The primary studies were critically appraised and methodological quality was used as a criterion for inclusion in the meta-analyses. However, although the method of critical appraisal was briefly described, it did not use a published or validated quality assessment tool. In addition, the derivation of quality thresholds, which were used to select studies for inclusion in the meta-analyses, was unclear. Few details of the characteristics of the participants in the primary studies were reported. This lack of detail makes it difficult to determine the extent to which the findings of the review may be applied to similar hospitalised populations. The data synthesis was appropriate and was conducted rigorously, although the criteria for inclusion in the meta-analyses were unclear.

In general, the review was well conducted and clearly reported. However, the lack of reported checking procedures, along with the single author status of the report, raises questions of the possible introduction of bias in the review process. In addition, the author's conclusions seem unduly positive in the light of the reported results, the small number of included studies in each category, and the small size and uncertain generalisability of the included studies.

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

**Practice:** The author states that this review has demonstrated the effectiveness of music as an intervention to reduce anxiety in hospital patients. However, for patients undergoing invasive procedures, it appears that music has little to offer.

**Research:** The author states that further research is needed in a number of areas. In particular, research should focus on the following:

- the impact of music on the severity of pain, and on patient satisfaction and mood;
the impact of music on sedative and analgesic use;
the effectiveness of music for reducing anxiety during unpleasant procedures, and for improving the patients’ tolerance of these procedures; and
the effectiveness of music in specific populations, including peri-operative, cancer and cardiac patients, for all outcomes evaluated in this review.

Further exploration into the potential cumulative effects of music during hospitalisation is also warranted.

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