Critical care patients often experience significant pain and anxiety.1 These symptoms may be rooted existentially as patients endure fear and uncertainty, but disease and treatment sources are other common offenders, as are noxious environmental stimuli. Unrelieved pain induces a generalized sympathetic response (increasing heart rate, blood pressure, respiratory rate, and peripheral resistance), disturbs sleep and appetite patterns, and heightens anxiety. Anxiety can also increase the perception of pain. Thus, these symptoms often go hand in hand, interfering with the healing process.

On any given day, nurses exert considerable time and energy employing interventions to enhance comfort and ultimately, the patient’s experience. Some of these are dependent functions—namely, administering pharmacological agents—whereas many others are nonpharmacological approaches within autonomous nursing practice such as therapeutic listening, emotional support, family presence, repositioning, distraction, or integrative therapies. The purpose of this clinical review is to explore an integrative therapy, the use of music, for symptom management in the acute/critically ill population. Music listening interventions can be used to reduce stress/anxiety, pain, depression, and feelings of isolation; foster relaxation; improve mood and movement; facilitate expression of emotion; provide meaningful stimuli; alleviate boredom by offering diversion; and buffer noise. Although music may have many applications in the clinical setting, this review addresses the following PICO question: How effective are music interventions at reducing pain and/or anxiety in critically ill patients?

Method

The strategy included searching MEDLINE and CINAHL. Key words included music therapy, music intervention, anxiety, pain, critically ill patients, and intensive care units. The search was limited to original research published in English in the past 7 years.

Results

Main findings of the 13 studies retrieved are outlined in Table 1. Of these, 1 was a case-control feasibility study, 1 was a case-control experimental study, 1 was quasi-experimental, 9 were randomized clinical trials (RCTs), and 1 was a meta-analysis/systematic review. Retrieved studies tested music during mechanical ventilation/weaning trials, turning, femoral sheath removal, and the postoperative cardiac surgery recovery process.

Recommendations for Practice

Of the papers included in this review, the overall level of evidence was B or C, with only 1 A level meta-analysis (Table 2). Other than the meta-analysis by Bradt et al,5 most of the studies tested music for symptom reduction (pain and/or anxiety) over immediate time periods not exceeding 60-minute intervention sessions. These studies report mainly significant, small decreases in physiological indicators of relaxation (heart rate, respiratory rate, blood pressure). However, the clinical significance and impact on patients’ outcomes of these transient reductions has not been determined. Only 1 study2 reported the significant effects of music on anxiety and sedative exposure over an average course of 5 to 6 days of mechanical ventilatory support. This study is the type of study that Bradt and colleagues6 called for in the conclusions of their systematic review/meta-analysis. Other limitations of the
Many studies did not build on previous investigations to advance the quantity and quality of the evidence in a specific area. A lack of consistent use of instruments to measure pain and anxiety was also apparent across the reviewed papers.

Music listening was effective in reducing pain scores in some cardiac surgery patients who had moderate levels of pain. State anxiety was consistently reduced across studies. However, the benefits of anxiety reduction on salient patient outcomes such as weaning trials, time to extubation, and cost need reviewed papers include the small sample sizes that were not based on power analysis calculations.

**About the Authors**

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**Table 1**

**Evidence summary for effect of music**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Design, intervention, and sample size</th>
<th>Intervention effects&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlan et al&lt;sup&gt;2&lt;/sup&gt;</td>
<td>RCT Patient-directed music vs self-directed noise-cancelling headphones vs usual care (2 times/day) N = 373 ventilator patients (12 ICUs, 5 hospitals)</td>
<td>N/A +: At any time point, music subjects had anxiety scores 19.5 points lower than usual care group (95% CI, -32.2 to -6.8) (Visual Analog Scale–Anxiety) +: By day 5, anxiety was reduced by 36.5% in music group +: Compared with usual care, music group received 2 fewer sedative doses, with 36% reduction in sedation intensity</td>
<td>B</td>
</tr>
<tr>
<td>Ozer et al&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Quasi-experimental (nonrandomized 2 group pretest, posttest) Patient-selected music via earphones vs rest period (30 minutes) N = 90 valve or coronary artery bypass graft patients on first postoperative day</td>
<td>+: Posttest mean pain intensity =1.2 music, vs 2.2 control (Verbal Pain Intensity Scale) +: Pain intensity decreased from pretest (2.13) to posttest (1.2) in music group Physiological parameters: +: Oxygen saturation increased from pretest (91.7) to posttest (93.7) in music group 0: sBP, dBP, HR, and RR within or between groups</td>
<td>C</td>
</tr>
<tr>
<td>Saadatmand et al&lt;sup&gt;4&lt;/sup&gt;</td>
<td>RCT Nature-based sounds via headphones (single 90-minute session) N = 60 patients receiving mechanical ventilation</td>
<td>N/A +: Control group had 4.5 times higher odds of being more anxious than experimental group (FACES Scale) +: Control group had 11.2 times higher odds of having higher RASS agitation scores Physiological parameters: +: Mean sBP/dBP and HR lower at all time points for experimental group (30, 60, 90 min)</td>
<td>B</td>
</tr>
</tbody>
</table>

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Abbreviations: ACTH, adrenocorticotropic hormone; dBP, diastolic blood pressure; DHEAS, dehydroepiandrosterone sulfate; DRG, diagnosis-related group; HR, heart rate; ICU, intensive care unit; IL-6, interleukin 6; N/A, not assessed; PTCA, percutaneous transluminal coronary angioplasty; RASS, Richmond Agitation and Sedation Scale; RCT, randomized clinical trial; RR, respiratory rate; sBP, systolic blood pressure; STAI, State-Trait Anxiety Inventory.

<sup>a</sup> Key: + = beneficial effect (P < .05), - = adverse effect, 0 = no effect (P > .05).
<table>
<thead>
<tr>
<th>Reference</th>
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<th>Level of evidence</th>
</tr>
</thead>
</table>
| Korhan et al<sup>5</sup> | Case-control, experimental repeated measures Classical music listening via headphones vs control (60 minutes) N = 60 patients receiving mechanical ventilation                                                                 | Physiological parameters:  
   +: Progressive decrease in sBP, dBP, RR over time in experimental group (30, 60, 90 min)  
   0: HR or oxygen saturation between groups over time | B                                                             |
| Bradt et al<sup>6</sup>  | Meta-analysis/systematic review (randomized and quasi-RCTs) Music intervention vs standard care N = 8 trials with 213 patients receiving mechanical ventilation                                                                 | Physiological parameters:  
   +: State Anxiety standardized mean difference = -1.06  
   Physiological parameters:  
   +: Mean difference: HR = -4.75; RR = -3.18  
   +: Changes in hormone levels: DHEAS, growth hormone, IL-6, epinephrine  
   0: Mean difference: sBP = -2.7; dBP = -4.51; oxygen saturation = -0.71  
   0: Stress hormones (prolactin, norepinephrine, ACTH, cortisol) | A                                                             |
| Hunter et al<sup>7</sup> | Case-control feasibility pilot study with matched controls (age, sex, DRG) with patients treated on pulmonary step-down unit within past 2 years Tailored music sessions 3 times a week during weaning (45-60 minute sessions of playing/improvisation, passive listening, music-assisted relaxation, guided imagery) N = 61 enrolled (51 completed mean of 4 music sessions) 126 nurse perception surveys on intervention assimilation | Physiological parameters:  
   +: Patients less anxious/stressed than expected (nonstandard tool); appraised music sessions as helpful/would participate again  
   +: Nurses reported patients less anxious and nurses less stressed/more satisfied; perceived music sessions valuable  
   Physiological parameters:  
   +: HR and RR reduced from pre-post music session (within subject analysis) | C                                                             |
| Han et al<sup>8</sup> | RCT CD music session via headphones (collection of >40 choices of Western classical music, Chinese traditional or Chinese folk) vs headphones only vs resting quietly with or without headphones (30 min) N = 137 patients receiving mechanical ventilation | Physiological parameters:  
   +: Anxiety lower (STAI) in music and headphones group, and when analyzed pre-post single group  
   Physiological parameters:  
   +: HR, sBP, dBP reduced in music group pre-post within group analysis  
   +: Interaction effect with mean HR and RR reduced over time in music group  
   -: Oxygen saturation | C                                                             |
| Cooke et al<sup>9</sup> | Cross-over RCT Music via earphones before/after turning vs control (15 min) N = 17 ICU patients (2 hospitals)                                                                                                                     | 0: 0-10 pain scale  
   0: FACES anxiety scale                                                                                       | C                                                             |
| Chian et al<sup>10</sup> | Repeated measures RCT Patient-selected music via headphones (60 min) vs rest N = 10 ventilator patients                                                                                                                              | Physiological parameters:  
   +: HR reduced slightly in music group until 60 min after baseline, but HR also reduced in rest group during 60-min period  
   0: Stress hormones (corticotrophin, cortisol, epinephrine, norepinephrine) no difference between groups | B                                                             |
control and familiar, pleasant music enhances the effectiveness of the music intervention. We are unable to make any other specific recommendations on the frequency and length of music listening as settings and patients’ preferences may differ. A general rule of thumb for relaxation and anxiety reduction purposes is music listening a minimum of twice to be determined. Music is a powerful distractor that can be used to occupy the brain channels with a pleasant stimulus rather than a pain signal or anxiety-producing thoughts. Patients need to be offered choices for music listening; different symptom interpretations may call for various genres of music depending on whether the patient desires simple distraction or relaxation. For purposes of relaxation, simple music composition containing 60 to 80 beats per minute is suggested.2 For clinicians in intensive care units who are interested in implementing music with their patients, yet have no knowledge of music, we suggest consulting a music therapist for assistance. The American Music Therapy Association (www.amta.org) is a good place to start for locating a consultant.

Investigators employed various methods for testing music, with differences among the studies on the frequency of intervention and the length of the listening sessions. The delivery of the experimental music intervention varied depending on the illness severity of the patients involved, aims of the study, and available resources. A small number of studies followed up patients for multiple hospital days or repeated the interventions over the course of hospitalization.2,13,14 Many of the studies incorporated some element of patients’ choice in selecting the music. Such choice is very important to the success of any music intervention, as choice can enhance control and familiar, pleasant music enhances the effectiveness of the music intervention. We are unable to make any other specific recommendations on the frequency and length of music listening as settings and patients’ preferences may differ. A general rule of thumb for relaxation and anxiety reduction purposes is music listening a minimum of twice
daily for 20 to 30 uninterrupted minutes in a comfortable environment and position in bed, encouraging the patient to self-direct how long and frequently he or she would like to listen to preferred music selections. Because music preferences can be broad, patients or family members can be encouraged to bring in favorite selections from home.

Overall, music is a safe intervention; no adverse effects have been reported. However, one needs to carefully consider the method of delivery. We suggest the use of headphones or ear buds to ensure that music is delivered for the targeted, individual patient. Ambient sound can be perceived as noise or a noxious stimulus by some patients or family members. Because of their manual dexterity or visual acuity, some patients may require assistance with use of equipment depending on illness acuity and familiarity with equipment. The effect of music on unconscious patients or those with impaired awareness or alertness in the acute/critical care setting is not known and music interventions should not be implemented until further research has been conducted.

Music should never be used in place of medications but can be implemented as an adjunctive intervention. Patients should always be asked first if they would like to try listening to some music or if they even enjoy listening to music for distraction or relaxation. Music has immediate benefits and can be implemented safely as an adjunct to the usual medical plan of care. Thus, music interventions are just another way nurses can make a difference in the patient experience.

FINANCIAL DISCLOSURES
None reported.

REFERENCES


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