

“This Won’t Hurt a Bit”: Is There a Role for Music in Bedside Procedures?

ABSTRACT: Music has played a long and storied role in clinical healing. However, the integration of music into clinical practice has been slow to gain traction, despite a recent meta-analysis demonstrating association of music interventions with clinically meaningful improvements in health-related quality of life. There is growing evidence that music has an active role in reducing patient pain and anxiety as well as affecting physiologic parameters, such as heart rate and blood pressure, in an ICU setting. Past studies have shown that incorporation of music into procedures in the operating room, radiology suites, and catheterization labs has reduced concurrent pharmacologic sedation requirements. In the age of patient-centered personalized medicine, we propose a call to action to implement an easily accessible, attainable checklist item offering a personal choice of music for patients during standardized bedside procedural training, to reduce anxiety, pain, and pharmacologic sedation and potentially improve clinical outcomes.

KEY WORDS: bedside procedures; education; intensive care unit interventions; music; nonpharmacologic sedative

Bedside procedures such as central line placement and paracenteses, which are central to resident training in multiple specialties, can be a source of patient anxiety. Patients are often hyperaware of their surroundings and may feel a lack of control over their environment (1). These procedures, especially in ICUs, are often performed on unstable patients in urgent settings, with little time for anxiolytic medications to take effect. Furthermore, anxiolytics such as benzodiazepines can cause alterations in blood pressure and respiratory rate that can delay and complicate procedures. In this setting, it may be useful to look toward nonpharmacologic adjuncts or even alternatives to pharmacologic medications, such as music, to address patient anxiety and fear during ICU bedside procedures.

Music has played a long and storied role in clinical healing. Music therapy emerged as a dedicated profession after the first and second world wars, where both amateur and professional musicians attended Veterans hospitals to perform for current and former soldiers who had suffered physical and emotional trauma during combat (2). However, the integration of music into medical practice has been slow to gain traction in clinical practice, despite a recent meta-analysis demonstrating association of music interventions with clinically meaningful improvements in health-related quality of life (3). In this article, we review the evidence for potential therapeutic benefits of music—an easily administered, nonpharmacologic, noninvasive, and inexpensive tool—in critical care and procedural medicine and offer a call to action to integrate music into procedural training during residency.

Although the therapeutic role of music has largely been confined to music therapy and rehabilitation, there is growing evidence that it might have a place more generally in clinical medicine, even in the most acute of settings, such as

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KEY POINTS

Question: Is the incorporation of music into bedside procedural medicine in the ICU feasible and a possible alternative to pharmacologic sedation?

Findings: Multiple randomized control studies and meta-analyses in ICU settings support the role of music in affecting important physiologic parameters such as blood pressure, respiratory rate and heart, and lower subjective perceived pain and anxiety in patients. Further studies performed in operative and interventional settings support the use of music as an adjunct or alternative to pharmacologic sedation periprocedurally.

Meaning: There is support for utilizing music to improve patient perceptions of pain and anxiety surrounding bedside procedures in the ICU, as well as postprocedural outcomes.

an ICU. Multiple randomized control studies (RCTs) have shown that exposure to music for as little as 30 minutes can lead to a reduction in subjective patient anxiety levels, lower heart rate and systolic and diastolic blood pressure, and lower levels of serum and salivary cortisol (4–7). These physiologic effects are not limited to passive musical interventions, for example, listening to music; active musical interventions administered by a licensed music therapist have been shown to lower respiratory rate and heart rate, as well as subjective pain and anxiety levels (8). Although other nonpharmacologic interventions (such as aromatherapy) have been associated with favorable physiologic parameter changes in an ICU setting, music has been shown to have the greatest effect in past RCTs comparing multiple nonpharmacologic interventions (9). Overall, multiple studies lend support to music as a nonpharmacologic method of affecting hemodynamics and other important vital signs.

Most research regarding the incorporation of music in an ICU setting, in addition to studying changes in physiologic parameters, has been focused on reduction of pain and anxiety. Two systematic reviews have shown that administration of music to patients in the ICU reduces anxiety and stress, despite heterogeneity in musical intervention design and timing (10, 11). Work in this area has not been conclusive: another

meta-analysis showed that there was no significant change in anxiety scores when comparing a musical exposure with a simple noise cancellation group (12). Another study in a surgical ICU showed that although pain, based on a numeric rating score, was decreased compared with the control arm, there was no significant difference in opioid intake, distress, or anxiety scores between the control and music listening groups (13). Nonetheless, given the majority of positive findings, work focusing on ICU design has suggested that the incorporation of carefully selected music into patient rooms provides a more supportive environment for patient's families (14, 15). A future trial is planned to evaluate the efficacy of music intervention compared with a noise cancellation control on delirium and coma duration in mechanically ventilated critically ill older adults (16). From this review of original clinical trials, systematic reviews, and meta-analyses, it is evident that further work in the area is needed.

Beyond the adult ICU, the efficacy of music interventions in procedural and critical care medicine has been shown in a wide demographic variety of critically ill populations. Pediatric oncologic patients undergoing invasive bedside diagnostic procedures, such as bone marrow biopsy and lumbar puncture, who were provided with a short music session prior to the procedure, had significantly lower preoperative anxiety scores compared with the control group. Although early case and small cohort studies on musical interventions in clinical settings have shown promise, RCT data are still sparse. The Music Use for Sedation in Critically ill Children trial, a pilot RCT investigating the effect of a classical music intervention on reducing sedation and analgesia requirements for patients in the pediatric ICU, showed significantly reduced daily sedation intensity requirement as well as decreased heart rate (17).

Although there is limited research regarding the effect of music on bedside procedural anxiety and pain in the ICU specifically, there is more robust evidence surrounding the efficacy of music as an adjunct to pharmacologic sedation in procedural medicine outside the ICU. Use of music during interventional radiology procedures has been shown to reduce concurrent pharmacologic sedation requirements (18). Music played 20 minutes before and up to an hour after invasive coronary angiography significantly reduced use of midazolam (19). Multiple RCTs of exposure to music have shown reduced heart and respiratory rates,

lower levels of pain and anxiety, reduced sedation usage, and reduced procedural time for colonoscopies (20–22). During cystoscopy, distraction methods such as listening to music and real-time visualization of the cystoscopy reduced both postprocedural heart rate and blood pressure as well as pain, and increased satisfaction among patients (23). Of note, not all trials have shown benefit: when administering music only versus midazolam only to patients undergoing pelvic and lower limb surgery with targeted spinal anesthesia, there were no differences in vital sign changes between the two arms (24).

The positive effects of music appear to persist even during times of greatly altered consciousness, such as under general anesthesia in an operating room. Pre- and perioperative musical interventions significantly reduced postoperative opioid requirement and intraoperative propofol and midazolam requirements with no significant effect on length of stay (25). A combined intervention of preoperative education as well as music prior to coronary artery bypass grafting reduced anxiety, blood pressure, and heart rate both pre- and postoperatively, and decreased length of hospital stay. The positive effects of music appeared to persist even after surgery, with one study demonstrating a reduction in postoperative pain and recovery time when music was played during operation under general anesthesia (26). Although these procedural and surgical studies have largely been conducted in controlled environments such as operating rooms, radiation suites, and cardiac catheterization labs, it is plausible that these same effects could be realized at the bedside in the ICU.

In sum, music has been shown to affect physiologic parameters in similar ways to sedative medications such as benzodiazepines or opioids, lower patient anxiety and stress levels peri- and postprocedurally, and lead to potential faster procedure recovery times. Based on this review of evidence, routine incorporation of personal choice of music could enhance the practice of bedside procedures for hospitalized patients in the ICU or other acute care settings. Notably, with the omnipresence of smartphones and easily accessible on-demand music streaming services, this type of intervention is a feasible one.

How might this be achieved? We propose a call to action to incorporate this approach into commonly used checklists for procedures, to implement the offering of music as part of standard procedural training

for residents (27, 28). Examples of ways steps in which periprocedural music might be included in a procedural checklist are: 1) the availability of music and a device to play it on, 2) giving a choice of whether to use (and what type of) music to the patient, 3) the timing of administration—pre-, intra-, or post-procedurally, and 4) the length of administration. Subsequently, the feasibility and acceptability of this could be determined by conducting a survey amongst both residents, with questions about ease of and frequency of offering music periprocedurally, and patients, with questions regarding pain and anxiety scores that the above cited studies have used.

There are limitations to this proposal. For example, sedated patients may not be able to choose music, and the use of music may be distracting to the operator. It is also true that the body of evidence surrounding music used specifically for procedures is limited and has largely been studied in less critically ill populations. Nonetheless, the above are exploratory steps that could be taken to introduce music as a potential intervention for procedural practitioners in an ICU setting. The hope is that such an intervention could help to achieve the types of outcomes described by one patient who was offered music during procedures in a qualitative study:—“[Music] took my mind off what was going on in the environment...the music helped me escape to my own little world... This sentiment was echoed by another patient, who noted, “It seemed that I had met an old friend who comforted me, protected me, and helped me in passing a frightful time” (1). In the age of patient-centered, personalized medicine, we believe that implementing music for patients during bedside procedures has enough preliminary evidence to warrant an overall next step of testing its feasibility in the setting of procedural training.

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