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## Instituting a music listening intervention for critically ill patients receiving mechanical ventilation: Exemplars from two patient cases

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### Abstract

Music is an ideal intervention to reduce anxiety and promote relaxation in critically ill patients receiving mechanical ventilatory support. This article reviews the basis for a music listening intervention and describes two case examples with patients utilizing a music listening intervention to illustrate the implementation and use of the music listening protocol in this dynamic environment. The case examples illustrate the importance and necessity of engaging a music therapist in not only assessing the music preferences of patients, but also for implementing a music listening protocol to manage the varied and challenging needs of patients in the critical care setting. Additionally, the case examples presented in this paper demonstrate the wide array of music patients prefer and how the ease of a music listening protocol allows mechanically ventilated patients to engage in managing their own anxiety during this distressful experience.

### Keywords

music intervention; mechanical ventilation; music therapy

### Mechanical ventilation and the ICU environment

Mechanical ventilation (MV) is a common ICU modality to treat respiratory failure from a variety of causes. In the United States, more than one million persons annually admitted to intensive care units (ICU) receive MV, usually for less than 48 hours.<sup>1</sup> However, approximately 34% of these patients require prolonged ventilatory support (PVS), and this rate is increasing.<sup>1</sup>

Patients on mechanical ventilation often experience distress and anxiety due to many factors including the endotracheal tube, the critical care environment, and the critical illness.<sup>2</sup> Additionally; the presence of the endotracheal tube prevents verbal communication. Both being hospitalized in an ICU and the physiological stress of a critical illness itself presents a great source of distress for patients. The usual treatment for reducing anxiety and distress that arise from mechanical ventilatory support is the administration of intravenous sedative agents. While these medications are indicated at times to reduce stress, promote breathing

comfort and synchrony with the mechanical ventilator, they have numerous side effects, which can delay weaning and prolong ventilator support. There is a need to implement adjunctive, non-pharmacologic interventions that can reduce anxiety in this patient population such as relaxing music. The purpose of this paper is to present the basis for a music listening intervention and to highlight case examples of implementing a music listening intervention with two critically ill, mechanically ventilated patients enrolled in a randomized trial to test anxiety self-management strategies. The importance of continuous, professional assessment of music preferences by a music therapist is emphasized to meet the specialized and unique needs of mechanically ventilated patients in order to facilitate the implementation of the music listening protocol.

## Overview of the Randomized Clinical Trial

The overall aim of our randomized clinical trial is to determine the effect of individually preferred, relaxing music on anxiety self-management in critically ill patients receiving mechanical ventilatory support. Secondary aims are to determine if preferred relaxing music leads to shorter time receiving mechanical ventilatory support, shorter length of ICU stay, and explores the influence of relaxing music on stress in ventilated patients. This study has been approved by the parent Institutional Review Board (IRB) (University of Minnesota) and all of the participating sites' IRBs. Alert, mechanically ventilated patients are recruited from 5 medical centers in the Minneapolis-St. Paul urban area, resulting in a total of 12 participating ICUs.

Patients are approached who are consistently following commands, participating in their daily care, and can provide informed consent. Subjects are randomly assigned to one of three conditions: 1) experimental group of patient-directed music (PDM) listening whereby they listen to music specially assembled by a music therapist that compliments their music preferences whenever they like for as long as they like, 2) active control condition of noise-canceling headphones whereby subjects wear headphones to block out ICU noise whenever desired, and 3) control group of usual ICU care for the respective unit. Equipment (CDs, headphones) is kept at the participant's bedside to enable self-initiation whenever desired. Patients remain in the study as long as they are receiving mechanical ventilatory support in the ICU, for up to 30 days. Anxiety is assessed daily with two paper and pencil instruments; a 6-item shortened version of the Spielberger State Anxiety Inventory<sup>3</sup> and a 100-mm visual analog scale-anxiety.

## Basis for a music listening intervention for mechanically ventilated patients

Music therapy is a non-pharmacologic modality that can be utilized to manage anxiety and stress and is a therapeutic modality provided by a board certified music therapist. In the music therapy process, patient strengths and needs are assessed in order to develop an appropriate plan of care. Patients in a variety of clinical settings receiving music therapy have shown significant decreases in heart rate, systolic and diastolic pressure, respiratory rates and anxiety.<sup>4, 5</sup> Recent research explored the use of music therapy as a means of managing stress for mechanically ventilated patients being weaned from the ventilator. Hunter et al. reported high satisfaction rates for patients and nurses and that music therapy was successful in treating anxiety associated with weaning from mechanical ventilation.<sup>6</sup>

In contrast to music therapy provided by a specially trained and board certified music therapist, a music listening intervention is a self-administered intervention or one that requires minimal assistance from a music therapist for the patient to listen to music to manage anxiety, stress, pain, discomfort, or to serve as a means of distraction. This type of intervention is designed to empower a patient to utilize the music whenever they may need it and as often as they need it. This type of non-pharmacological and patient directed approach

gives the patient options to manage their symptoms even when a music therapist is not present or available. Music listening interventions are ideal for the ICU environment and mechanically ventilated patients specifically because this type of intervention requires limited energy for the patient to utilize and is a simple intervention for a patient to self-administer. Patient-directed music interventions allow patients to have control over the implementation of the intervention whenever they feel they may need it and it gives them constant access to a non-pharmacological option. This also ensures the patient has constant access to the music, as a music therapist cannot be available 24 hours a day.

Despite the numerous challenges in the chaotic critical care environment and the medical complexity of patients, non-pharmacologic, adjunctive interventions, such as music, can provide the mechanically ventilated patient with alternative and meaningful stimuli while promoting relaxation. Music listening interventions are useful for ICU patients receiving mechanical ventilatory support for many reasons. First, the intervention is not demanding of a patient and it does not require focused concentration on a stimulus, as does imagery or biofeedback. This is important for mechanically ventilated patients since they are critically ill and have low energy states with limited concentration ability. Also, music is a comforting, familiar stimulus that patients can use to distract and calm them during this stressful ICU and mechanical ventilatory experience.

Previous research has shown that as little as 30 minutes of listening to preferred music can induce relaxation and reduce anxiety in ICU patients receiving mechanical ventilatory support.<sup>4,7,8</sup> Music is safe for these patients and no untoward side effects have been reported in those who listened to music. However, not all of the previous investigations provided participants with choice or control over the type of music used. Allowing patients to choose music ensures they are selecting their preferred music not being given music that may be unfamiliar or they may find to be unpleasant, which could cause undue strain. The assessment process the music therapist conducts helps to determine the music that the patient prefers and minimizes any negative responses to music.

More recent research is demonstrating the benefits of a focus on patient selected and patient preferred music.<sup>9,10</sup> Research findings demonstrate that when patients self-select music, this promotes tolerance during distressful procedures and significantly reduces anxiety.<sup>11,12,13</sup> Additionally, the research demonstrates that when patients have a familiarity with the music and have control over the music selection, they have a greater physiological response to the music.<sup>14</sup> Bradt, Dileo and Grocke in a recent Cochrane Review conclude that while music interventions demonstrate a beneficial effect on heart rate, respiratory rate and anxiety, the overall quality of the evidence is not strong. The investigators recommend more research on the effects of music with mechanically ventilated patients when it is offered by a trained music therapist.<sup>15</sup>

## **Importance of assessing music preferences with mechanically ventilated patients**

When implementing a music listening intervention it is important to determine the type or types of music the patient prefers. An assessment of music preferences by a professional music therapist is crucial for determining what type(s) of music to offer. However, a strategy for assessing music preference in a simple yet comprehensive format is needed for patients with energy limitations and communication challenges, such as those who are critically ill and receiving mechanical ventilatory support. In response to this need, Chlan and Heiderscheid developed a music assessment intervention tool (MAT), which is currently being utilized in the above detailed randomized controlled trial.<sup>16</sup>

The MAT includes a section on biographical data to gather information on age, gender, reason for admission, and length of admission to date. Additionally the assessment tool includes questions regarding whether the individual is a musician, if they enjoy listening to music and if so when they listen to music. The larger portion of the assessment is focused on identifying specific genres and styles of music the patient likes and dislikes as well as instrumentation that is preferred and those sounds that are not preferred. The MAT includes questions to identify specific groups or artists the patient likes and dislikes. This allows the music therapist to further narrow the preferences and what the patient would most like to listen to and to have knowledge of what music the patient would not like to receive. Teasing out these preferences is important as a patient may indicate they prefer country music, but they do not like Garth Brooks or they only like old country music.

The MAT is designed in a checklist format to allow for greater ease and efficiency in gathering the information. Mechanically ventilated patients tire easily, so it is important to be able to gather pertinent and thorough information as quickly as possible. Additionally, an understanding of the limitations of critically ill mechanically ventilated patients is vital. These patients have limited energy and significant communication challenges. These challenges require the music therapist to be effective and efficient in the assessment process. This can be achieved by having a variety of strategies for communicating with patients, which may include simply responding with yes/no responses, mouthing their answers, writing their responses or having family members communicate information for them. It is important that the music therapist possess a vast knowledge of music, musical genres, various groups, artists in these genres as this allows greater ease in gathering the information and making this process less taxing on the patient. Use of the MAT provides efficiency and ease in the assessment process and a method of effectively obtaining information on music preferences.

It is important to note that a critical care or intensive care environment is highly technical and must be navigated carefully, due to the fragile nature of the health status of the patients. The inherent stressful nature of this environment and the critical state of the patient's health also creates a great deal of anxiety for family members and loved ones. Stepping into this setting requires a music therapist to not only understand the nature of mechanical ventilation, how this impacts a patient and their family, strict adherence to any isolation/infection control precautions on the unit prior to entering a patient room, as well as communicating directly with the patient's care team. Thus it is imperative that the music therapist understands this environment and navigates this dynamic setting carefully.

To highlight the powerful impact of music listening interventions with patients receiving mechanical ventilator support, two case exemplars are presented from participants in the randomized trial. The importance of on-going assessment is central to the success of this intervention. Each case further illustrates the impact of patient preferred music and the expertise of the music therapist in addressing the needs of the patients. The music listening protocol for this study is as follows. After randomization to the patient-directed experimental music listening group, the research nurse provides subjects with a set of noise-canceling headphones (Maxell headphones model HP/NPII) and a portable CD/MP3 player (Sony D-NF430 or JWIN JX-CD988), along with a starter set of several cds containing a variety of relaxing instrumental music selections. All equipment is kept within easy reach at the subject's bedside. The research nurse contacts the music therapist immediately after a new subject is randomized to the music listening condition.

The starter set of cds ensures that subjects begin listening to music even prior to the initial visit with the music therapist. The listening device was selected for ease of patient use in operating the equipment is the intervention is self-administered by the patient. The cds

provided for the subjects were burned in MP3 format to allow for greater amounts of music to be included. The music therapist follows a strict adherence to the copyright laws and all music utilized in this study is purchased and original copies of the music maintained. Subjects were invited to begin listening whenever they wanted and for as long as they wanted.

It is important to note for this study, subjects were required to provide their own consent for participation. This requires that patients were receiving little or no sedation that would enable them to consent. This also ensured that subjects would be able to operate the portable MP3 player independently, since this music listening protocol was a patient directed protocol. The music therapist assessed subjects within 24 hours of enrollment in the study. During this initial assessment the music therapist would work to discover the subjects' music preferences, beginning with discovering their preferred genres and then artists and groups within those genres. The following day that music would be delivered and added to the subjects' music collection. Each day during the subjects' enrollment in the study the music therapist would continue to reassess their music preferences and continue to bring any additional music the subject identified they would like. This entails that everyday the music therapist would meet with the subject and ascertain if they were listening to and enjoying their music and inquire about any new or additional music they may like to receive. This ongoing assessment also allowed for the fact that as subjects listened to their music, they may begin to recall other music they like and could then request this music as well. Since these subjects were critically ill, they were not always be able to recall all the music they prefer at the time of the initial assessment. Therefore, providing an ongoing assessment allowed the music therapist to be thorough in providing their preferred music and to assist in facilitating their music listening experience.

Subjects and nursing staff were reminded that the subject could determine when, how long and what they wanted to listen to at any given time. The music and portable disc player were kept within reach for the subject to use whenever they chose to and at their convenience. The music listening intervention was available to subjects at all times during their enrollment throughout the study.

### **Music listening intervention: Case exemplar #1**

David was a 50-year-old Caucasian male admitted to the ICU for mechanical ventilatory support due to acute respiratory distress syndrome, previous to a heart and lung transplant. Over the years since the organ transplants, David had developed several co-morbid conditions from the numerous anti-rejection medications, including renal failure requiring frequent kidney dialysis. When the music therapist first met with him to assess his music preferences, he was able to roughly write names of groups and artists that he preferred. His energy level was very low and he struggled to write, so he would only write a portion of the group or artists name and the music therapist had to ascertain who he was referring to in the limited information he was able to provide. This required the music therapist to monitor his energy level and to limit the number of questions asked to not put undo strain on David. During the initial assessment, David indicated he liked Creedence Clearwater Revival, rhythm and blues (including B. B. King and Eric Clapton). He also indicated at this time that he did not like country music. Due to his limited energy this was as much information that could be gathered at this time.

The music therapist returned the next day with the music David requested. He immediately wanted to begin listening to this music and indicated through hand gestures that he would like the music therapist to place it in the MP3 player for him. During each subsequent and daily visit by the music therapist David requested additional and more specific music each

time. David began to trust that the music he preferred and requested would indeed be included in the music listening protocol and that participating in the research protocol would not limit his music choices or that he would be given music that the researcher(s) determined he should listen to.

Each day the music therapist delivered new music to him he asked her to put a new compact disk in the portable MP3 player and he would begin listening to this new music immediately. The music therapist continued to assess his music preferences during each daily visit for any new music he might like. On one visit he indicated he liked Johnny Cash, although he had previously indicated that he did not like country music. The ongoing assessment of his music preferences permitted the music therapist to tease out the nuances of his likes and dislikes in order to maximize his listening as a method to self-manage anxiety. The daily interactions with this study subject highlight the crucial aspect of on-going assessment when implementing music listening interventions over a prolonged period. The interactions during this ongoing assessment also allow the music therapist to provide the subject with some information and coaching on how the music listening protocol can be helpful and times when they may find it helpful.

While it is evident that most patients have an understanding or intuitively know that listening to music is enjoyable, they do not have an understanding of the many other functions of music. When the music therapist is providing the subject's music, this is an opportunity to inform them on how music can be helpful to them during this hospitalization. Additionally, while subject's that are mechanically ventilated may be receiving sedative or pain medications, it is important to reiterate this information during subsequent visits. Helping the subject develop this understanding of the music, not only further empowers them to use this patient directed tool, but can also help them understand that while many aspects are beyond their control, listening to the music is one thing they can do to help themselves.

Since David's hospitalization was a prolonged stay, he was enrolled in the study for the maximum 30 days. The ongoing assessment process further allowed the music therapist to explore the depths of his music and listening preferences. This provided the music therapist with a great deal of information to compile just over 30 cds for David to utilize during his hospitalization. This gave him a wide array of options for when he wanted to listen to music, and ensured that he would have the music he wanted to listen to as well. So little during this hospitalization was under his control, but he had control over his music. It was evident by his facial expressions, gratitude, and frequent use of the protocol that the music gave him comfort and pleasure

As David's ICU stay progressed and his medical condition deteriorated, he began to experience muscle weakness and became less able to communicate via writing. His family then provided the music therapist with lists and suggestions of other music that he liked or was a part of his personal music collection at home. The input from his family allowed the music therapist to continue to build his music listening collection despite the communication challenges and his failing medical status. This did require the music therapist to adapt the ongoing method of assessment and communication to David's changing needs and abilities

The personalized music collection became a means of coping and comfort for this patient in the face of his declining medical status. He was able to use his music collection choices as a source of personal control despite his grave medical prognosis. David's need for frequent hemodialysis was an event fraught with great stress and anxiety due to the effect of this necessary medical treatment on his blood pressure. David would become extremely anxious prior to his frequent dialysis treatments and would request an anti-anxiety medication, which

would unfortunately cause his blood pressure to drop during dialysis. Another medication would then need to be administered to increase his blood pressure to a more acceptable range. This became a vicious cycle of anxiety and administration of a variety of medications during each dialysis treatment.

David's nurses began to understand how much he enjoyed listening to the music and using the listening protocol. They had observed him using the protocol time and time again and noted how it helped him relax. One day with coaching from his nurse, David was able to focus his attention on listening to a favorite CD instead of the stressors surrounding dialysis. David was able to use the music as a means of distraction and relaxation as he navigated his dialysis treatment. This shift in his focus afforded him the ability to manage his stress and anxiety during the treatment, which prevented the need for the anti-anxiety medication and then subsequently the medication to increase his blood pressure. This would not have been possible without the expert guidance and assembly of the individually preferred music for this study participant.

The effectiveness of the music listening protocol for David was evident in his frequency of use of the music and his willingness and ability to use the protocol during his dialysis treatments to manage his stress and anxiety. Unfortunately, David's condition continued to deteriorate and he passed away in the ICU.

## Music listening intervention: Case exemplar #2

Bob was a 71 year old male admitted to the ICU following a spinal fusion and decompression surgery eventually requiring mechanical ventilation due to respiratory failure. Unfortunately, Bob was from out of state and was visiting family in Minnesota when he required the surgical procedure and hospitalization. Bob had a very tenuous course in the ICU with many setbacks and complications, which do occur at times in patients who are so ill. Bob was already in the ICU for 10 days prior to being enrolled in the study and had received a tracheostomy tube due to his need from a prolonged ventilatory support.

He and his wife reported he was an avid music listener and he enthusiastically embraced the patient-directed music listening intervention. He had mentioned on several occasions that he did not enjoy watching television, which led to many long days in the ICU once his medical condition stabilized. When the music therapist met with him, he was eager to share his music preferences and he appeared to welcome and enjoy these interactions. He communicated that his preferred music was classical and jazz, more specifically including Dave Brubeck, Diana Krall, Mozart, Bach and Beethoven, along with several others.

Bob was not able to speak due to his intubation; his preferred method of communicating was to mouth the words for the music therapist. The music therapist would then speak his response so he could confirm to her understanding of what he was trying to communicate. The process required the music therapist to quickly learn the nuances of what he was trying to say. Additionally, Bob enjoyed these opportunities to share his music preferences and it was important for the music therapist to be mindful of how much energy he was expending and not engaging him to the point of exhaustion.

Since Bob did not spend time watching television, he spent long periods of time listening to music. The music therapist understood that Bob was a long time music enthusiast and that he found greater pleasure in listening to music. Since he was already motivated to listen to the music, helping him understand the benefits to listening to music further fostered his listening and gave him at least one way to help himself during this hospitalization. While Bob had always loved music, learning about how listening to music could be beneficial to

him was new information. He welcomed this information and the music listening protocol became a primary, self-administered, therapeutic tool for him.

The music listening became his way of coping with the stresses of being critically ill, his lengthy and tumultuous hospitalization and dealing with hospital staff. Listening to music allowed him to be distracted from the stressors of the hospital environment and from his physical discomfort, listening to music he likes gave him a great sense of pleasure which positively impacted his challenging hospital experience. Just prior to Bob's discharge from the hospital, he commented that the music is what helped him make it through his lengthy and difficult hospitalization.

## Discussion

For both David and Bob the music listening intervention served as a valuable means of coping with and managing their challenging and prolonged hospitalization experiences. The ongoing assessment process was an important component for them as well. David needed time to trust that the music he requested would be what was provided to him, that he wouldn't be given music someone else thought he should listen to. Further, the ongoing assessment process provided for additional interactions, which fostered rapport and a greater level of trust. As it became evident to David that he would receive the music he requested, he was more forthcoming with his requests. Each day the music therapist brought him the latest music he had requested, he gestured to listen to it immediately. The expressions of joy and contentment on his face as he began to listen to this new music communicated the pleasure and comfort it gave him during this challenging time.

As David's health began to decline, his ability to respond and interact varied from day to day. Therefore, the daily, ongoing assessment and follow up were necessary to ensure that a comprehensive evaluation of his preferences to provide the music he wanted and needed to foster the ongoing implementation of the listening intervention. The music listening became a way for him to continue to manage the health challenges he faced, so while he could not control what was happening to his health, he could listen to music he liked to cope with the reality of his situation.

In comparison, upon the initial assessment, Bob was so eager to immediately engage in sharing his music preferences and in utilizing the music listening intervention. His affective shifted when the music therapist visited him each day, as he enjoyed receiving the new music that was delivered during these visits. The nursing staff and his wife frequently commented on how happy Bob was when the music therapist visited. He welcomed any opportunity to not only share his music preferences, but also request additional music. His passion and love of music had long been his primary means of entertainment and enjoyment in life and during his hospitalization it was his primary method for distraction, coping, and relaxation.

While the process of assessment varied in these two cases, the consistent and daily assessment served an important part of discerning, fine-tuning and providing their preferred music. Additionally, helping both David and Bob further understand that listening to the music was more than just an enjoyable experience, that the music could serve as a helpful tool for relaxation and comfort during this challenging time. Informing, educating and coaching them on how to use the music further fostered the use of the listening intervention and their sense of empowerment during their mechanical ventilation.

Due to their fragile health status, the assessment process needed to be ongoing and flexible in order to adjust to David and Bob's changing needs, and to address their desire for new and additional music. An important consideration when working with patients in a critical



care environment is they may only be able to share small amounts or pieces of information here and there as communication itself is difficult and taxing due to the mechanical ventilation. Therefore, the initial assessment will not likely be comprehensive, as they do not have the energy to respond. Subjects' may also find it difficult to recall information at times due to receipt of pain or sedative medications, or because of the stressful nature of the experience. Therefore assessing and collecting information in an ongoing manner allows the music therapist to be thorough in what information is gathered over time. The assessment must be ongoing in order to gather and obtain a complete and comprehensive understanding of the subject's music preferences. The ongoing assessment ensures the music therapist can be responsive to changes that can occur for the subject on a daily basis and help them tailor their use of the music to their changing needs in this dynamic environment.

## Summary

A music listening intervention is a tool that can be implemented as a patient directed protocol with the assistance of a board certified music therapist. The music therapist can assess the music preferences of the patient, supply the music for patient use and teach the patient and staff how and when to implement the listening intervention to best meet their needs. This non-pharmacological intervention can be a successful tool for patients to actively engage in managing symptoms, anxiety and distress, as well as provide distraction from the stressful critical care environment. The music therapist serves a vital role in not only obtaining information regarding individual music preferences, but in helping patients and staff understand when it can be helpful to implement the listening protocol, how to best do so and understand why this is valuable option for the patient.

Music listening can be a powerful intervention for patients with limited energy, such as those who are critically ill and receiving ventilator support, and can provide a simple, yet effective means of personal control during a very stressful experience. With guidance and support of a trained music therapist, patients, their family members and nursing staff can better understand and experience how music can be more than just a nicety in the critical care environment. The music therapist can help educate and foster understanding of the benefits and uses of music during this time, so that music becomes a non-pharmacological necessity in managing the stress and anxiety mechanical ventilation.

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