

Survey

Implementing and Evaluating a Pilot Therapeutic Music Program in the Intensive Care Unit

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ABSTRACT

Background: Therapeutic music has been shown to provide significant physical and mental health benefits to patients, yet limited information is available on the impact of live classical music in the intensive care unit (ICU) setting.

Objective: The purpose of this initiative was to implement and evaluate a therapeutic music program in the ICU.

Methods: A descriptive survey methodology was used to obtain information from volunteer musicians and clinical nurses. Researchers used a 12-item anonymous web-based survey to collect information on the therapeutic music program's acceptability, appropriateness, and feasibility. The survey also included questions addressing potential barriers to and facilitators of implementing therapeutic music in the ICU.

Results: A total of 15 nursing staff and 6 volunteer musicians completed the online survey. Of the 15 nurse respondents (9 clinical nursing staff, 3 advanced practice, 3 other), a majority (n=10, 66.7%) identified that therapeutic music was acceptable in the ICU. Similarly, a majority (n=11, 73.3%) indicated that therapeutic music was appropriate and feasible. Of the volunteer musicians, all (n=6, 100%) identified several factors that helped to facilitate the program including having an upright piano with large casters (wheels) for enhanced mobility to play music. Most (n=5, 83.3%) identified having a patient and family-centered care environment and supportive ICU staff, and four (66.7%) identified private ICU rooms and trained musicians as useful. Several barriers were also identified, including severity of patient illness and infection prevention concerns (n=5, 83.3%), space limitations in the ICU and patient privacy concerns (n=2, 33.35%), and patients being asleep (n=1, 16.75%).

Conclusions: The results of this initiative indicated that therapeutic music in the ICU was rated as acceptable, appropriate, and feasible. Volunteer musicians reported the ability to provide live music in the ICU to be a beneficial and enjoyable experience. The program has been transitioned to a virtual format using a large iPad on wheels due to COVID-19-related visitation restrictions.

Keywords: Intensive care unit, music, music therapy, complementary therapies.

BACKGROUND

Therapeutic music is increasingly being studied and adopted in healthcare settings, including in intensive care units (ICUs). Previous studies have suggested that therapeutic music in hospital

settings can decrease anxiety, pain, blood pressure, heart rate, and respiratory rate, as well as increase patient satisfaction (Golino et al., 2019; Hole et al., 2015; Mazer, 2010; Mofredj et al., 2016; Petrucci, 2018). Specifically, patients who required mechanical ventilation and were most often cared for in the ICU demonstrated reduced agitation, stress, and need for sedation in response to therapeutic music (Hetland et al., 2015; Chlan et al. 2013b).

Critical care environments, in particular, are filled with anxiety and stress-inducing sounds (Meredith & Edworthy, 1995). Evidence suggests that patients in critical care settings may experience additional stressors as a result of increased noise levels (Wilkins & Moore, 2004). This noise, which includes sounds produced by mechanical ventilators, infusion pumps, and vital sign monitoring equipment, may increase the risk for delirium and disrupt sleep cycles (Chan et al., 2009).

Studies have shown that music, both in general and more specifically in hospitals, can result in positive emotions, improved performance, better cognitive functioning, and decreased stress levels. These positive impacts may also be beneficial to physicians, nurses, and other hospital staff working in stressful ICU environments (Iyendo, 2016; Spence & Keller, 2019). Improving the work environment for hospital staff may benefit healthcare organizations by potentially decreasing staff turnover, increasing job satisfaction, and improving staff relationships (Sonke et al., 2015; Wilson et al., 2016).

Despite the increasing body of research illustrating the benefits of therapeutic music initiatives for both ICU patients and staff, there remains a lack of programs that incorporate high quality, live music in hospitals (Chlan & Halm, 2013a; Kemper & Danhauer, 1983; Maranto, 1993; Wolf & Wolf, 2011). Live music has been shown to have a superior impact on patients when compared to pre-recorded music. Furthermore, live music has been found to decrease tension and anxiety in patients to a greater extent than pre-recorded music (Lucanne, 1983).

Therapeutic music is currently not part of a daily regimen in many settings for patients despite the evidence that it could aid in healing and prevent syndromes such as delirium, which can cause patients and their families unnecessary stress and anxiety (Chlan & Halm, 2013a). The purpose of this initiative was to implement and evaluate a therapeutic music program in the ICU.

METHODS

Therapeutic Music Program

The program was developed and implemented at Vanderbilt University Medical Center (VUMC), an 864-bed, level one trauma and academic center in Nashville, Tennessee, with over 65,000 inpatient admissions annually. After reviewing the literature for examples of music programs, a multi-professional project team with interest and expertise in music met to outline the mission and vision of the program with input from the ICU medical director. The team included an intensivist who holds a degree in jazz piano performance, a school of music faculty member, two funded researchers (one who is a clinician psychologist from the Music Cognition Lab and Music Mind & Science program), and a

critical care nurse researcher. In collaboration with Blair School of Music at Vanderbilt University, volunteer musicians were recruited using email and the university newsletter. A project website was also developed with short videos highlighting the project team leaders speaking about the therapeutic music program.

<https://nursing.vanderbilt.edu/projects/musicicu/index.php>. A piano was donated by a local piano rescue establishment (<https://www.nashvillepianorescue.com/>), painted by a local artist (<https://www.aarongrayum.com/>), and modified to have large rolling wheels to enable easy movement of the piano into the patients' rooms (Figure 1). The chief hospital epidemiologist was consulted regarding any required cleaning of the piano, and a storage area was identified to keep the piano when not in use.

Volunteer musicians completed an online application and were processed by the volunteer services office to be on-boarded as a hospital volunteer. A formal orientation was developed and held with the musicians to review aspects of care in the ICU as well as plans for the therapeutic music program. Information on what to expect in an ICU setting including the importance of adhering to hand hygiene, infection prevention, and patient privacy and confidentiality were reviewed. After the orientation session, a schedule was developed to have 1-2 musicians scheduled to provide live music several days a week. Musician volunteers had a variety of training backgrounds and played piano, flute, violin, viola, or cello during each session.



Figure 1. *Decorated piano used for music*

One member of the project team accompanied each musician to the ICU for several sessions until they were oriented to the format and process. Musicians were scheduled for 2 to 3-hour sessions to play live classical music, often in the late afternoon. Patients and/or their family members were approached and offered the opportunity to hear the live music. The musician selected the live classical music based on their repertoire and ability to play the songs (See Table 1 for a sample list). Musicians played two to three pieces for each patient in their ICU room. For patients in isolation, volunteers played music outside the patient's room in the hallway of the ICU. When positioned in the hallway, ICU staff could also hear the music, which was a welcome enhancement to their daily workflow.

Program Evaluation

To evaluate the therapeutic music program, a pilot study was conducted to

Table 1. Sample Live Music Titles in ICU Playlist

Composer	Music
Johann Sebastian Bach	<ul style="list-style-type: none"> • Brandenburg Concertos (Bach works catalogue 1046-1051) • Cantata No. 147 “Herz und Mund und Tat und Leben” (Bach works catalogue 147) • English and French Suites (Bach works catalogue 806-817) • Goldberg Variations (Bach works catalogue 988) • Toccata and Fugue in D minor (Bach works catalogue 565) • Air from the Orchestral Suite No. 3 (Bach works catalogue 1068) • The Well-Tempered Clavier (Bach works catalogue 846-869) • Prelude and Fugue in E-flat major (Bach works catalogue 552)
Ludwig van Beethoven	<ul style="list-style-type: none"> • Moonlight Sonata (No. 2, Opus 27)
Frederic Chopin	<ul style="list-style-type: none"> • Fantaisie-Impromptu (Opus 66) • Nocturnes
Arcangelo Corelli	<ul style="list-style-type: none"> • Concerto grosso in F Major, No. 12, Opus 6: Adagio
Claude Debussy	<ul style="list-style-type: none"> • La Mer
Georg Friedrich Handel	<ul style="list-style-type: none"> • Water Music • Arrival of the Queen of Sheba (from “Solomon”)
Joseph Haydn	<ul style="list-style-type: none"> • Symphony No. 94 (“Surprise” Symphony)
Wolfgang Amadeus Mozart	<ul style="list-style-type: none"> • Piano concertos (fast movements) • Aria “Dies Bild ist bezaubernd schoen” (from “Die Zauberflote”) • Symphony No. 40 in G minor
Maurice Ravel	<ul style="list-style-type: none"> • Piano Trio in A minor
Camille Saint-Saens	<ul style="list-style-type: none"> • Symphony No. 3 in C minor (Opus 78)
Domenico Scarlatti	<ul style="list-style-type: none"> • Sonatas
Guiseppe Tartini	<ul style="list-style-type: none"> • Adagio cantabile
Antonio Vivaldi	<ul style="list-style-type: none"> • Concerto for strings and cembalo
Charles Marie Widor	<ul style="list-style-type: none"> • Toccata (from Organ Symphony No 5, Opus 42)

Reference: Trappe HJ (2012).

assess the perceptions of nurses on the acceptability, appropriateness, and feasibility of the ICU-based therapeutic music program, as well as identify any facilitators or barriers

noted by nurses and volunteer musicians.

Nurses working in the ICU who were exposed to the music sessions and all volunteer musicians were potential participants in the study. Participants were recruited through convenience sampling via workplace email using a Research Electronic Data Capture (REDCap) survey (Harris et al., 2009). Institutional review board approval from Vanderbilt University was received (#190812).

Data was collected anonymously during a 4-week period from July 16 to August 10, 2020 using a survey adapted from previous research assessing the impact of a live music intervention for hospitalized patients (Moss, et al., 2007). The Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) statements developed by Weiner et al (2017) was used to evaluate the music program. The AIM, FIM, and IAM are four-item measures of implementation outcomes that are often considered indicators of implementation success (Proctor et al., 2011). Responses are provided on a 5-point Likert scale ranging from completely agree to completely disagree. The survey included four statements related to each area of interest to assess their acceptability, appropriateness, and feasibility. Weiner et al (2017) found these measures to be both valid and reliable when assessing implementation outcomes. The survey also included open-ended questions addressing potential barriers to and facilitators of implementing therapeutic music in the ICU and demographic questions relating to staff clinical position for the nurses and the number of sessions participated in for the musicians. Descriptive statistics were used to analyze the data. Data were summarized and reported in aggregate.

RESULTS

Nursing Respondents

Fifteen nurses responded to the survey, including nine who identified as clinical nursing staff, three as advanced practice nurse practitioners, one as other, and two who did not identify their clinical position.

A majority of respondents (n=10, 66.7%) identified that therapeutic music was both an acceptable and welcome intervention in the ICU. Similarly, a majority (n=11, 73.3%) indicated that therapeutic music was appropriate and feasible in the ICU.

Thirteen respondents (100%) identified having a patient and family centered care environment and ICU leadership open to new approaches to patient care as facilitators to implementation. Ten respondents (76.9%) identified having trained musicians and an upright piano with large casters (wheels) for enhanced mobility as facilitators (Azoulay et al., 2013). Finally, having private ICU rooms was thought to be a facilitator of therapeutic music in the ICU by eight (61.5%) respondents.

At least one respondent identified several barriers to implementing therapeutic music in the ICU. These included the severity of a patient's illness (n=8, 57.1%), noise in the ICU or infection prevention concerns (n=6, 42.9%), space limitations in the ICU (n=2, 14.3%), and patient privacy concerns (n=1, 7.1%). One respondent commented, "I did not observe any barriers. Love the program!! Highly recommend implementation."

However, a second respondent identified a potential barrier, identifying music as a distraction when discussing medical care decisions with other patients and families.

Musician Respondents

Six volunteer musicians responded to the survey with three (50%) of the participants identifying as female, and two (40%) as male gender. Half (n=3, 50%) reported participating in three or fewer sessions, while half (n=3, 50%) participated in four or more.

Musicians were asked to identify facilitators of implementing therapeutic music in the ICU. A majority (n=6, 100%) identified that having a mobile piano to provide therapeutic music was a facilitator. Five respondents (83.3%) identified that having a patient and family centered care environment and supportive ICU leadership were additional facilitators. Having private ICU rooms and having trained musicians provide therapeutic music were also identified as facilitators (n=4, 66.7%).

Musicians identified several barriers to providing therapeutic music in the ICU, including the severity of the patient's illness and infection prevention concerns (n=5, 83.3%). Space limitations in the ICU and patient privacy concerns were additional barriers (n=2, 33.3%). One respondent identified that patients being asleep was another barrier encountered.

Additional feedback provided by the musicians included that they hoped they could continue to play music in the ICU in the future and that they felt providing live music had a positive impact on patients and families in the ICU. Several respondents identified that expanding the live music to other patient care units would be beneficial. Several respondents also suggested playing piano in designated spots within the ICU (hallways, etc.) instead of individual rooms. Several suggested that providing a script for introducing themselves and having a "cheat sheet" for common ICU terminology (especially for signs on a patient's entry door) might help volunteer musicians be more comfortable in the often-unfamiliar ICU setting.

DISCUSSION

The results of the evaluation indicated that nurses identified the therapeutic music in the ICU program as acceptable, appropriate, and feasible; and that volunteer musicians reported the ability to provide live music in the ICU to be a beneficial and enjoyable experience.

Most nurse and musician respondents agreed that therapeutic music in the ICU was acceptable. This response is consistent with previous work by Gatti and Silva (2007) and Moss, Nolan, and O'Neill (2007), which demonstrated that staff responded positively to live music in the hospital setting. This is relevant because staff acceptance, specifically nursing acceptance, is imperative for a successful therapeutic music program in the ICU (O'Sullivan, 1991). Nurses unanimously identified having a patient and family-centered care environment and ICU leadership with an open mind to new approaches to patient care as facilitators of therapeutic music in the ICU. This finding is consistent with previous studies by Porter et al. (2017) and Mogos et al. (2013), which identified strong organizational support as a facilitator to a therapeutic music program.

Interestingly, almost all of the musician volunteers surveyed also identified both a patient and family-centered care environment and ICU leadership open to new approaches to patient care as facilitators of implementing therapeutic music in the ICU. The shared emphasis on having a patient and family-centered care environment as well as ICU leadership open to new patient care methods is a potentially important finding of this study as it may help identify other healthcare environments that are particularly well suited for therapeutic music implementation.

Having highly trained musicians provide the therapeutic music was also identified as a facilitator by most nurses and volunteer musicians, consistent with findings by Moss et al. (2007). About two-thirds of surveyed nurses and volunteers also found that private ICU rooms were facilitators of music in the ICU, which was also identified in a previous study by Porter et al. (2017).

The most significant barrier to therapeutic music in the ICU was reported to be the severity of a patient's illness with 57.1% of nurses and 100% of volunteer musicians selecting it as a barrier. This is consistent with the findings of Holm et al. (2012), who examined the attitudes and experiences of nurses using music as part of their care following the death of adult ICU patients. Nurses in that study also felt that the use of music should be situational and was not appropriate for all patients and families. O'Sullivan (1991) also found that music could be a distraction to staff; however, more recent work by Sonke et al. (2015) found that only 6% of staff described being negatively distracted by music.

Other barriers identified by staff included noise in the ICU, infection prevention concerns, space limitations in the ICU, and patient privacy concerns. When designing and implementing a therapeutic music program in the ICU, these issues warrant consideration. The previous suggestion of introducing live music to common areas may be impeded because of the excess noise created in the ICU, potentially masking alarms (Bolton et al., 2018). Furthermore, music in common areas lacks personal and multisensory elements, which patients appear to benefit from during one-on-one sessions.

This pilot evaluation study had several limitations, including a small sample size and the use of a convenience sample. An unforeseeable limitation to the study was the early discontinuation of the pilot due to the COVID-19 pandemic. In addition, the pandemic prevented immediate evaluation, resulting in a four-month lapse between the last therapeutic music session and the survey being sent to staff and volunteers. This delay might have impacted the recall of the intervention and could also have resulted in a smaller number of respondents.

The program has since been relaunched in a virtual format in the ICU using a large iPad (Apple, Cupertino, CA, USA) on a stand with wheels. The increased integration of video conferencing in response to the pandemic presents an opportunity to provide virtual live therapeutic music to patients given the current limitations to in person access to ICU patients. Future research will further examine the impact of the virtual therapeutic music program in the ICU, including patient and family perceptions of benefit.

The therapeutic music program in the ICU has proven beneficial for patients as well as ICU clinicians and volunteer musicians. Key considerations for other ICU settings interested in implementing a formal therapeutic music program include garnering the support of stakeholders including the ICU staff, networking with local schools of music or entities such as a local orchestra to recruit volunteer musicians, coordinating the onboarding and orientation of the musicians, and organizing the scheduling of music sessions in the ICU (Table 2). Having the support of the hospital volunteer's office was most beneficial in assisting in ensuring that the musicians had the required background checks and immunizations necessary for volunteers.

Table 2. Key Considerations for Starting a Therapeutic Music Program in the ICU

Key Considerations for Starting a ICU Therapeutic Music Program	
1.	Gain the support of stakeholders including ICU clinicians and hospital administrators
2.	Assess options for recruiting musicians including use of local schools of music or orchestras
3.	Determine how the volunteer musicians can be on-boarded. Using the hospital volunteer's office may be useful in ensuring that volunteers are processed with any required background checks and immunizations
4.	Plan for an orientation session for the volunteer musicians, many of whom may not be familiar with an ICU setting. Consider including information on what to expect in the ICU, types of patients, the need for privacy and confidentiality, and how to perform hand hygiene upon entering and leaving each patient's room.
5.	Establish how volunteer musicians will be oriented to the program format. Consider accompanying each musician for several sessions until they feel comfortable in the ICU environment, and with providing live music to critically ill patients.
6.	Identify how a music schedule will be established. Consider use of an online calendar such as Google Calendar where musicians can self-schedule session times.
7.	Conduct periodic evaluations of the therapeutic music program with input from ICU clinicians, patients, family members, and the volunteer musicians.

CONCLUSIONS

The results of this initiative indicated that therapeutic music in the ICU was rated as acceptable, appropriate, and feasible. Volunteer musicians reported the ability to provide live music in the ICU to be a beneficial and enjoyable experience. The program has been transitioned to a virtual format using a large iPad on wheels due to COVID-19-related visitation restrictions. As a relatively understudied intervention with multiple potential benefits, therapeutic music in the ICU holds much potential, including impacting critically ill patients by attenuating cognitive and neuropsychological outcomes.

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