The Psychological Influence of a Musical Therapeutic Intervention on Hospitalized Patients

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Abstract

Background: Non-pharmacological interventions appear to be beneficial to a large number of patients and lack the prevalent side effects of medications. Experiences involving music may benefit patients in intensive care.

Objective: To investigate the impact of a musical therapeutic intervention on the physiological parameters and self-reported pain and anxiety levels of intensive care unit patients.

Materials and methods: A single-group, Pretest-Posttest, within-subject design was used to perform the research. The population being studied was made up of a convenience sample. Throughout a 30-minute music therapy session, individuals either got a relaxing treatment or a "song choice" treatment. Patients conducted pain and anxiety self-assessments before and after the intervention, and the music counselor monitored how they were doing both times.

Results: Following the intervention, respiratory rate, pulse rate, and self-reported pain and anxiety levels decreased significantly (all $P< .001$). The level of oxygen saturation did not change significantly. Outcomes varied between the two intervention groups; patients who received the relaxation intervention frequently fell unconscious.

Conclusions: In intensive care units, the results of this study support the use of active music therapy as a non-pharmaceutical intervention. This study may open the door for further extensive and diversified future studies on music therapy in hospitals with intensive care..

Keywords: Non-pharmacological interventions, intensive care unit patients, music therapy, physiological parameters

1. Introduction

Having stress is a widely recognized indicator for the initiation and development of a variety of physical and psychological issues, including tumors, depression, panic attacks, and tiredness. Many of individuals use tranquilizers around the globe to deal with pressure and the challenges of the modern world, but these drugs have a number of dangerous consequences, include dependence on them and addiction. In order to prevent and control stress, it is crucial to investigate the impact of alternatives to drugs treatment methods utilizing the unique features of musical therapy with a musical counselor in an integrative setting is how the practice of music therapy is distinguished. This sets music therapy apart from other forms of musical therapy, which are typically provided by physician or medical specialists and are known as music therapeutics (de Witte et al.,2022). As an opportunity to fulfil the person's psychological, intellectual, and social demands, musical therapy incorporates music activities in a therapeutic relationship. It is an evidence-based and artistic healing line of work. Music therapists primarily worked in behavioral health environments, educational institutions, elderly homes, and their own businesses, according to a recent global poll among official professionals from institutions related to the World Federation (Stegemann et al., 2019). A group of performers playing in hospital's patient rooms was the initial recorded instance of musical treatment. According to healthcare employees, an advantage includes relief from pain and "calming and stimulating effects". Musical treatment is described as "the clinical

and evidence-based use of musical techniques to achieve specific objectives within a therapeutic connection by an authorized practitioner who has finished an authorized music therapy program" by the American Music Therapy Organization (Lam et al., 2022). Improvisational music therapy (IMT) and singing or listening songs are two the present in-depth study evaluation's main focus is on various sorts of music treatment. Music therapy has been experimentally shown to be a successful treatment for mental as well as physical ailments. A professional music counselor uses auditory encounters strategically to further therapeutic objectives. It also suggests that MTp, the individual receiving treatment, and music will develop an attachment. Some comprehensive studies have found that using MT can enhance the quality of sleep, lessen anxiety and fatigue, and trigger a state of relaxation without the need for drugs. MT has been proven to have beneficial impacts on discomfort, stress, comfort in the body, mental mood, communication with others, and religious well-being in patients receiving hospice therapy. By producing dopamine, which MT can increase feelings of satisfaction and calmness and decrease cortisol levels and tensions.Listening to music has been highly helpful in reducing anxiety and the related stress reaction. Classical music has It was widely acknowledged as being useful at reducing stress, because of its peaceful and soothing rhythm. In medical centers, enjoying music has been shown to lessen medical client's intervention-related anxieties and stress (Packyanathan et al., 2019) .The utilization of different musical instruments in music therapy is intended to enhance the individual's well-being on two levels. Recent graduated individuals who have autism, and other populations in need of medical and psychological assistance are the primary focus of MT.Performing music is not the only component of music therapy. There are two sorts of therapy cycles: short- and long-term. A wide range of concepts and methods are used during the course of therapy. A thorough strategy for treatment must be created shortly after the therapy goal has been identified. An option that satisfies everyone's psychological demands and enjoyment patterns is music psychotherapy as an adjunct to mental health guidance, and activity (Mao, 2022)..

2. Related works

According to Knott and Block,(2020)outlines a method for creating virtual music therapy offerings that guides doctor aims for treatment into modes that are suitable, readily available, and most compatible with the requirements and skills of the patient/client. Researchers and physicians must devise the most efficient uses of VMT while taking into account its limitations with regarding patient populations and demand regions due to the serious and protracted scale of this worldwide medical emergency and its complication of conventional treatment patterns. Moreno-Morales et al. (2022) showed that music has a significant capacity to increase mental flexibility and evaluate the impact of music therapy on overall wellness and state of mind. Marquez-Garcia et al. (2022) examined the existing research and its methodology-related constraints before proposing a paradigm for judging the success of musical treatment as an Autism treatment. They recommended the development of a common structure that should make use of neurological imaging instruments as a goal indicator for modifications brought about by the use of music as well as a mix of cognitive and behavioral outcomes, as opposed to testing techniques that focus only on the main signs. Giordano et al. (2022) examined to minimize distress and promote wellness in clinical employees who serve COVID-19 patients, the impact of music therapy (MT) as a therapeutic strategy was assessed. Individuals got remotely responsive MT treatment over 5-week duration after getting enrolled as an outcome of genuine approval. MT was used to assess their degrees of fatigue, melancholy, fear, and concern both before and after MT intervention. A quick noticeable change in the psychological state of the individuals was noticed. Evaluation. Giordano et al.(2022)was done on the impact effects of MT on anticipatory apprehension in teenagers with leukaemia undergoing intensive diagnostic tests .The patients were given the option of receiving either the MT treatment or normal care as their prior to surgery IP preparation. Choi et al. (2022) Examined how collection music therapy helps people with mental illnesses with connections, despair, and stress. Warth et al.(2022) examined the "Song of Life" music treatment intervention's effectiveness with reference to the emotional and psycho-spiritual aspects of one's life.Fallek examined suitability and efficacy of implementing musical therapy to patients A major metropolitan medical facility's four inpatient rooms were studied. Clients in the medical critical care, palliative care, transplant, and other wards that were debilitated or impaired had only a single bedtime lesson from a music therapist. Archambault et al. (2022) evaluated the possibility for MAP programs conducted by a music clinician at a children's and adolescents' inpatient mental health facility in order to improve state of mind. Leonard(2019)

examine the purpose of a lower limb cycling workout to promote range of motion (ROM) was to investigate the impact of music therapist/physical therapist combination therapy using actual musically-supported activity on discomfort and activity compliance..

3. Methods

Everyone involved gave their informed approval, and the Inova Health System institutional review board authorized the research

3.1 Sample

By The investigation was conducted in a regional clinic in the northern part of DC, USA, with a Magnetic designation, a 12-bed adults medical-surgical ICU, and a Beacon Award-winning American Association of Critical-Care Physicians. The action was conducted throughout the entire day, mainly around the hours of 10 AM and 3 PM.As an additional convenience group for the study, 50 people who can converse in English were hospitalized to the ICU were enlisted. An ST elevation heart attack, cardiopulmonary arrest, bleeding from the intestines, difficulty breathing, kidney failure, and migraine were among the most frequently diagnosed conditions. No limitations were placed upon an individual's gender, colour, or ethnicity.

These parameters were used to exclude people:

- Popularly known as music therapy with an awakening goal being in airborne or special contact isolation,
- speaking a language other than English,
- having decisional impairment,
- receiving ventilatory support,
- being pregnant, being currently a prisoner,
- having been declared brain dead,
- getting unsteady low blood pressure or bradycardia,
- being enrolled in a different study,
- Or being unable to provide consent are among the exclusion criteria.

129 participants were found ineligible because they met the excluded specifications, and 54 individuals refused to take part.)

3.2 Study design

The study used a single-group, within-subject, retest-posttest design. The responders had access to a single, 30-minute therapeutic session with a music professional that was certified by the board of directors. Heart rate, breathing rate, and bloodstream saturation in oxygen of the person, as well as their level of feeling stressed and uncomfortable as expressed on a scale of one to five. With values which ranged from 0 to 10 were noted by the music therapists prior to the meeting. The music counselor chose one of two music therapy approaches shortly after determining the client's desires: a relaxation/guided visualization approach or a "song choice" strategy. For contrast with prior to intervention data, the patient's body measurements had been once more taken after the music therapy session, as well as self-reported discomfort and stress rates..

3.3 Intervention

The treatment was either a facilitated imagery/relaxation session with a live band or a "song choice" event with a live band, where the attendee sang or listened to their preferred tune or songs and then explored the song's lyrics with the music therapist. The person's urgent requirements were determined by the musical therapist, who chose one of the subsequent two approaches. Guidance /Relaxation imagery. For an enjoyable listening session, the client and music counselor jointly selected songs or specific musical styles that the musician would perform onstage (on guitar). The person receiving treatment was given instructions on how to relax, including how to breathe deeply or utilize only visualization. The individual's present pulse and/or breathing rate will be used to determine the audio's pace, amount, and strength. The beat is then altered to encourage a relaxing reaction. This

procedure involves matching the music's pace, or beat per minute, with the individual's heart best rate or respiration rate initially. Then, the strength and volume of the music are gradually decreased in an effort to properly align the individual's cardiac rate (or breathing rate) with the rhythm of the song.The body's patterns sync up with the beats and the force of the music in a process called as "entrainment." This can be accomplished simply by using actual music that is delivered "in the heat of the moment" by a music professional. Through concentration on the music and methods of relaxation, this type of therapy aims to lessen tension and/or perceive pain and increase calm by song selection. The individual and the music counselor talked about the individual's present mental and physical situations. The music Therapist led a discussion on the topic of using songs or music to aid with the conveying of emotions or ideas. The client had the option of selecting a tune or songs, or letting the music counselor make the selection. The individual was invited to sing along with or pay close attention to the phrases as the music counselor performed the song or songs for them. The client was invited to talk about the music's phrases, the emotions they evoked, or whatever the song represented for them personally. The objectives of this type of therapy are to facilitate expressing themselves and the use of songs and music for dealing with hospital stays, therapy, and recover. They also include fostering a beneficial and empathetic connection among the music therapy provider and the individual receiving treatment

3.4 Measurement

Prior to and immediately following the music therapy session, a music instructor took an exact readingfrom the person's the hospital bedside monitors of their heartbeat rate, respiration rate, and the level of oxygen saturation. Prior to the following music therapy a meeting, the participant claimed emotional factors such as discomfort and nervousness, on a scale that varied from 0 to 10. On data collecting form created by the investigators, physiological information in addition to the people's self-reported anxiety and discomfort were collected

3.5 Procedures

The staff nurse in charge and nurses from the ICU worked with the investigative team to find people who might participate in the research. One musical therapy meeting was planned after obtaining the client's permission. The music counselor visited the client's room after gathering the participant's background demographics, identified himself, and described what the music session of therapy would include. The subject was then given a discomfort and stress evaluation form and instructed to rate current level of discomfort and stress on a scale from 0 to 10.Their side monitor was then used by the music counselor to gather physiological information for heart rate, rate of breathing, and a saturation level of oxygen level. In parallel, the music clinician evaluated the client's present requirements and desired level of involvement .The therapist for music used this data to choose the kind of music therapy to utilize. Music treatment was carried out by music counselor. Following the encounter, the music counselor spoke with the patient for 3 to 4 minutes (oral analysis) according with typical musical treatment procedure. After the meeting, the music specialist once more requested the subject to fill out the data collecting form with his or her degree of discomfort and stress. The music counselor also gathered biological data from the within the room monitoring following the performance.

3.6 Statistical analysis

The SAS and R software were used to carry out the statistical assessment. The prior to intervention and post intervention pain and metabolic stress levels were compared using the paired t test.For the main, a single-group design was used to evaluate the information. Then, a number of additional analyses were carried out, including segmentation by therapy category, whether or not members of the family were present, age, and gender. Individuals nodded off throughout the session are incapable of expressing themselves about therapy, discomfort and stress levels. A total of three analyses were done on these data gaps. Initially the set of observations with values that were lacking was eliminated, and a t-test was run with the data that was present. Secondly the smallest value on the scale, 0 (represent the patient's capacity to asleep), was used for single imputation of the missing values. Third, numerous imputation studies were carried out. In these investigations, the missing information was substituted in accordance with regression models that connected the data that was lacking to the known data and were chosen via a step-wise regression method. The process of imputation was carried out 1000

times, and outcomes were compiled utilizing Rubin's approach. . Table 1 shows an overview of the respondents' clinical and demographic data

Table 1: An overview of the respondents' clinical and demographic data

Characteristic	$Value^a$
Race	
White	42
Black	6
Asian	3
Hispanic	2
Other	5
Sex	
Women	35
Men	21
Age, median (range),y	65
Days in intensive care unit	
1	28
2	19
3	5
4-8	8

4. Result

50 adult participants overall gave their permission to take part in the trial. The average age of those surveyed was 60 years (range, 22-85 years), and the majority were Caucasian (n = 35, 75%) and female (n = 30, 62%). The mean duration of stay at the time of the treatment was 3.2 days, with almost half of those who participated (n = 28, 50%) having spent a single day in the ICU. 20 individuals were having continuous infusions: 5 got a drug called vasopressor to treat low blood pressure, and 15 were getting analgesic for suffering. No significant distinctions were seen among the two therapies when comparing expressed anxiety and discomfort. Notably, 5 individuals fall sleep during the relaxation treatment compared to 3 after the music selection treatment. As a result, the estimated scores for resting patients on their own assessments in the additional analysis for the music choice therapy are more like the ones in the original research than they are for the calming treatment. These disparities in relation to client gender as well as age after observing significant variations in pretestposttest breathing and cardiac rates. Despite the exception of a greater impact size in women for BP, which decreased by an average of 6.90 beat per minute, there were no disparities between men and women. Men showed a mean decline of 4.15 beats per minute. There were no apparent distinctions among the patient categories that were younger as well as older when the data were divided by age (patients with ages higher or lower than the median of 62 years). Members of the family frequently attended the therapy session, which was unexpected given the study's design. Families were given the option to stay for the entire meeting or leave at any time, in keeping with the hospital's families-cantered ethos. We looked at the effects of having a family member present throughout

the treatment when the choice was available. The existence or absence of close relatives had no apparent distinctions. When relatives participated, the mean decrease in self-reported pain was 1.15points and the average drop in feelings of anxiety was 3.02 points .Excluding the presence of relatives, the mean reduction in pain reported by participants was 1.15 points without the presence of relatives, there was a 2.46 point average decline in self-reported anxiousness. Physical and self-identified measure both during primary and secondary evaluations are identifies and depicted in table 2 and 3 and shown in figure 1,2,3 and 4.
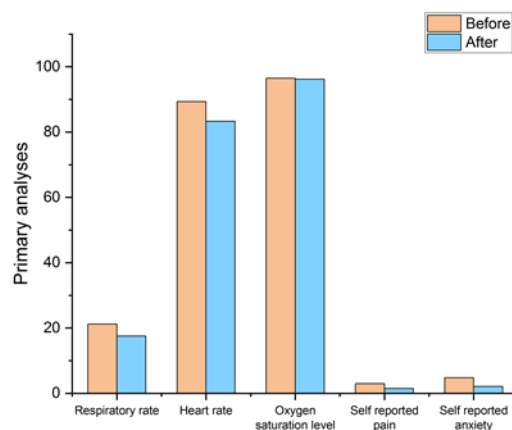

Figure 1: Primary analysis report of physical and self-identified measures
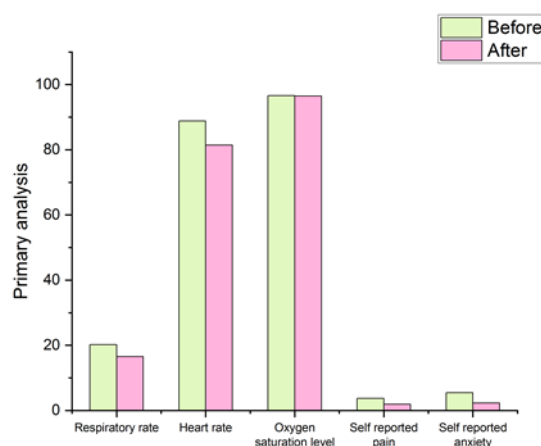

Figure 2: Secondary analysis report of physical and self-identified measures

Table 2: Physical and self-identified measure both during primary and secondary evaluations

	Mean (95% CI)			
Variable	Before	After	*Mean difference* [a] (95% CI)	P *value* [b]
Secondary analyses with imputations (n=52)				
Self-reported pain, points (MI)	3.29	1.34	1.95	<.002

|				
Self-reported anxiety, points (MI)	4.95	2.11	2.85	<.001
Self-reported pain, points (SI)	3.29	1.35	1.96	<.001
Self-reported anxiety, points (SI)	5.90	1.65	3.35	<.0.01
Primary analyses				
Respiratory rate, breaths per minute (n = 52)	22.25	18.55	3.66	<.002
Oxygen saturation level, % (n = 52)	97.26	98.15	0.14	.55
Heart rate, beats per minute (n = 52)	90.35	95.41	5.95	<.002
Self-reported anxiety, points (n = 40)	5.92	3.11	2.75	<.001
Self-reported pain, points (n = 40)	5.15	2.11	2.75	<.002
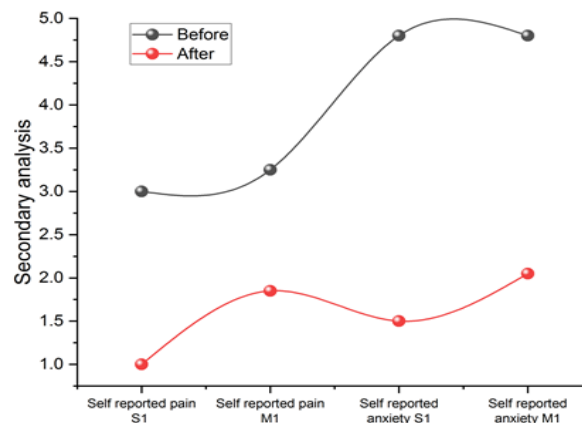
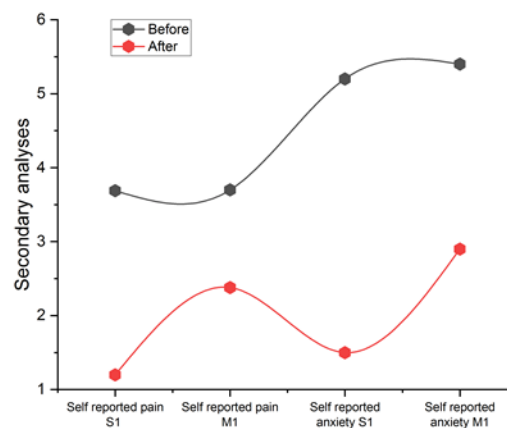*Figure 3: Primary analysis of physical and self-reported measures presented by intervention type*

Figure 4: Secondary analyses of physical and self-reported measures presented by intervention type

Table 3: Physical and self-identified measure primary and secondary analyses given by treatment type

| Variable | Relaxation/imagery intervention (n=28) | | | | Song choice intervention (n=24) | | | |
| | Mean (95% CI) | | | | Mean (95% CI) | | | |
	Before	After	Mean $difference^a$ (95% CI)	P value^b	Before	After	Mean $difference^a$ (95% CI)	P value^b
Primary analyses								
Respiratory rate, breaths per minute	21.25	16.63	3.65	<.002	23.39	19.73	4.68	<.001
Oxygen saturation level, %	98.90	97.662	0.31	.47	98.66	98.72	-0.05	88
Heart rate, beats per minute	90.93	83.97	82.55	<.001	89.55	86.59	2.94	<.001
Self-reported anxiety, points	6.81	6.45	2.31	<.001	5.31	2.96	3.47	<.001
Self-reported pain, points	4.81	2.90	1.07	.001	3.66	1.61	1.31	<.001
Secondary analyses with imputations								
Self-reported pain, points (SI)	4.81	2.25	2.58	<.002	3.65	1.48	1.22	<.001
Self-reported anxiety, points (MI)	6.44	3.31	3.15	<.001	5.29	1.88	2.45	<.001
Self-reported anxiety, points (SI)	6.45	1.48	4.98	<.001	4.31	1.81	3.5	<.001
Self-reported pain, points (MI)	4.81	3.29	1.41	<.002	3.68	1.48	1.22	<.001

5. Discussion

A The objective of this research sought to determine how two sessions of music therapy impacted patients in an intensive care unit's self-reported discomfort and stress levels as well as three physiologic measurements (heart rate, respiration rate, and saturation of oxygen level). Individuals who took a part in one musical treatment session expressed feeling less discomfort and anxious, and their heart and breathing rates also decreased. However, there were no modifications in their saturation of oxygen levels. When we looked at each intervention separately, we found that the reactivity profiles were identical, with the pulse rate as the only distinction: individuals who got a calming treatment experienced a higher reduction in heartbeat rate than respondents who obtained the tune choices treatment. The involvement of music instructor, who react to patient "in the present moment" in connected forms, may have contributed to the beneficial results regarding pulse and breathing rate among individuals undergoing the calming treatment. The counselor may firstly decide on the course of action

based on client's present needs. Secondly, the music sound and rhythmic components could be changed by the clinician throughout the interaction in an effort to help the individual calm. A person may "entrain," with their respiration and heart rate aligning with the songs, if the speed and level of the tunes correspond to the patient's heartbeat rate or breathing rate then altered. Client's physiology could shift as a result of this procedure. There were certain discrepancies found despite the fact that both therapies appeared to be having a good effect on individuals' physiological characteristics. Individuals who underwent the calming treatment saw a higher reduction in their heartbeat than those who underwent the music selection treatment. In contrast to the music selection treatment, a greater number of patients dozed off after the calming treatment than after the latter. This outcome would suggest that those who received the song selection treatment participated more actively in the entire session (actively listening, singing) than patients who received the calming action, which might have had an impact on the level of calm felt during the course of the session. However, because breathing rates dropped in both therapies at comparable rates, modifiers of this advantage

The existence of a music clinician and the adjustability of the therapies are further supported by modifications to expressed stress and discomfort perception. Using the counselor could customize the treatment by having the freedom to choose the music treatment and how the musical parts were given an individual's present requirements. Other individuals chose the easing treatment enabling people to enter an increasingly tranquil and peaceful state of their mind and body with the help of the music. While some people considered the music selection activity to be especially useful (listening to or humming alongside meaningful songs) as a method to to resolve mental health problems.The results of this research also revealed that there were no significant changes in individuals' reaction to the treatment depending on their age (median, 62 years), their gender, or whether or not a relative was present.

6. Limitations

Despite the fact that these outcomes point to advantages of attending only one music therapy period, the investigation had several drawbacks. An absence of a checkpoint or the contrast between the two category restricts the intervention results and prohibits an open comparison of the therapeutic outcomes of music therapy against music listening. Clarifying variations and identifying the circumstances in which every action may be beneficial to a client require immediate evaluation of different therapies, particularly regulators that affect efficacy. Additionally, the use of just one postintervention assessment restricts our knowledge of how long the effects of every treatment last. Due to the fact that the music instructor was the one who gathered the client's own information on anxiety and discomfort, there was a chance for partiality. The fact that the trial was carried out in just one emergency setting within a nearby clinic is an additional drawback. The investigation was initially meant to include individuals on artificial breathing, but due to limited resources, nurses in critical care were unable to participate. By doing so, it might have been possible to evaluate the patients prior to and following the treatment using established nursing assessment techniques..

7. Conclusion

Non pharmacological activities, such as those in accordance with music, are being employed increasingly frequently as ICU medical professionals try to rely less on pharmaceuticals to meet clients' requirements. The outcome of this research show significant reductions in pain, anxiety, heartbeat rate, and breathing rate can be attained with just one music therapy session, despite inconsistent outcomes from studies of music-based therapies in the ICU. The availability of a music therapist who can adapt an action to the patient's sudden physiological and psychological needs may be a key factor in the variance in outcomes of these treatment.

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