

# EFFECTIVENESS OF MUSIC THERAPY ON PAIN INTENSITY AND PHYSIOLOGICAL PARAMETERS DURING ENDOTRACHEAL SUCTIONING AMONG MECHANICAL VENTILATION PATIENTS IN INTENSIVE CARE UNIT

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## Abstract

In critical care settings like intensive care units (ICUs), endotracheal suctioning is a routine practice for patients who are mechanically ventilated and intubated. The process can cause pain and discomfort for a number of reasons, including physical trauma, mucosal irritation, increased airway resistance, sensory nerve activation, psychological factors, pre-existing conditions, and the frequency of suctioning. including critical care units where patients undergoing procedures like endotracheal suctioning while on mechanical breathing, music therapy has emerged as a likely supplementary strategy. quasi-experimental design was used for the study. 60 patients with higher pain scores were selected for the experimental group (30) and the control group (30). The study aimed to understand the effects of endotracheal suction on pain management. The demographic characteristics were collected by using the demographic tool constructed for the study. The pretest was conducted on 1st day in which pain and physiological parameters were assessed. The music therapy was administered among the patients on each day for 6 days in the morning and evening session before, during and after the endotracheal suctioning. Then post test was conducted on 7th day with same pain rating scale and physiological parameters were assessed. The results revealed that The study results supported music therapy as one of the non-pharmacological intervention and it helped to reduce pain and physiological parameters among patients on mechanical ventilation.

**Keywords:** Endotracheal Intubation, Suctioning, Music Therapy.

## INTRODUCTION

In critical care settings like intensive care units (ICUs), endotracheal suctioning is a routine practice for patients who are mechanically ventilated and intubated. The process can cause pain and discomfort for a number of reasons, including physical trauma, mucosal irritation, increased airway resistance, sensory nerve activation, psychological factors, pre-existing conditions, and the frequency of suctioning. However, the procedure is necessary to remove secretions from the airway in order to maintain adequate ventilation.

In order to maintain patient comfort and reduce unfavorable physiological reactions, it is critical for healthcare professionals to identify and manage pain and discomfort related to endotracheal suctioning. Pain and discomfort during the treatment can be reduced by employing techniques including topical anesthetics, smaller suction catheters, analgesic administration, and the integration of non-pharmacological therapies like music therapy.

In a number of medical contexts, including critical care units where patients undergoing procedures like endotracheal suctioning while on mechanical breathing, music therapy has emerged as a likely supplementary strategy.

Although it is a necessary treatment, endotracheal suctioning can be painful for patients, resulting in heightened physiological reactions such as raised blood pressure and pulse rate.

Patients, especially those on artificial ventilation, may have major physiological changes following endotracheal suctioning. The main causes of these alterations are the airway manipulation and the disruption of regular breathing. Key physiological indicators that might be impacted during endotracheal suctioning include blood pressure, oxygen saturation, heart rate, and respiratory rate.

It is crucial to keep an eye on these physiological indicators when doing endotracheal suctioning in order to gauge how the patient will react to the treatment and guarantee their comfort and safety. In the event that unfavorable changes are noticed, healthcare professionals should be ready to act quickly.

## **METHODS AND MATERIALS**

This study utilized a quasi-experimental design, with a control group and an experimental group in ICU at Saveetha Medical College and Hospital. After obtaining formal permission from the higher authorities 60 patients with higher pain scores were selected for the experimental group (30) and the control group (30).

Patients were informed about the study's objectives and given the opportunity to give their informed consent. The study aimed to understand the effects of endotracheal suction on pain management.

Pretest was done by using structured questionnaire and visual analog pain scale and physiological parameters were assessed. Adult patients on ventilators, with stable hemodynamics, no known hearing impairments, neurological disorders, music therapy history, and ability to understand instructions are included in the study.

The pretest was conducted on 1<sup>st</sup> day in which pain and physiological parameters were assessed. The music therapy was administered among the patients on each day for 6 days in the morning and evening session before, during and after the endotracheal suctioning.

Instrumental music with patient centered approach calming instruments such as piano, guitar, or flute was used in music therapy interventions for relaxation and pain management 5 minutes prior to endotracheal suction and during the suction and after the suction the music was played with consistent volume and tempo for 15 minutes. Then post test was conducted on 7<sup>th</sup> day with same pain rating scale and physiological parameters were assessed.

The results revealed that music therapy as one of the non-pharmacological intervention and it helped to reduce pain and physiological parameters among patients on mechanical ventilation.

## RESULT AND DISCUSSION

**SECTION A:** A description of the demographic characteristics of the experimental and control groups of mechanically ventilated patients.

**SECTION B:** Evaluation of pain levels experienced by mechanically ventilated patients in the experimental and control groups during endotracheal suctioning.

**SECTION C:** The impact of music therapy on patient pain levels during endotracheal suctioning in the experimental and control groups of mechanically ventilated patients.

**SECTION D:** Correlation between the level of pain experienced by mechanically ventilated patients during endotracheal suctioning and specific demographic factor.

**Section A** The analysis revealed that that most of the mechanical ventilated patients, 15(50%) in the experimental and 14(46.7%) in the control group were aged between 51 – 60 years, 24(80%) in the experimental group were female and 15(50%) in the control group were male and female respectively, 19(63.4%) in the experimental and 12(40%) in the control group had no formal education, 30(100%) in the experimental and 28(93.3%) in the control group were married, 30(100%) in both the groups had undergone surgery previously, 19(63.3%) in the experimental and 10(33.3%) in the control group had undergone neuro surgery, 30(100%) in the experimental and 39(96.7%) in the control group were under natural ventilation, 26(86.7%) in the experimental and 22(73.3%) in the control group had SIMV mode of ventilation, 16(53.3%) in the experimental and 17(56.7%) in the control group were under ventilation for 10 to 19 days and 21(70%) in the experimental group had GCS score between 8 – 10 and 16(53.3%) in the control group had the GCS score of between 11 – 13.

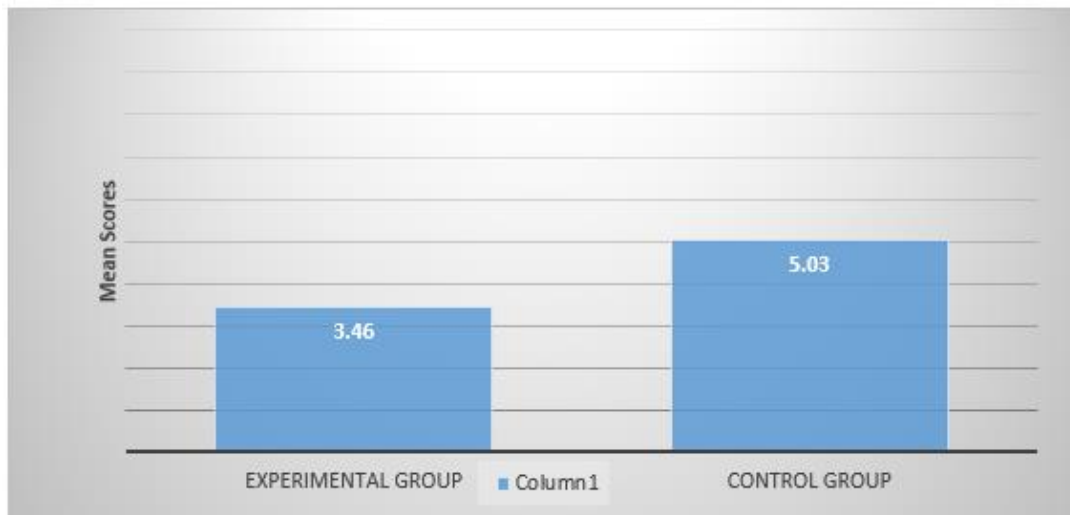
**Section B** The analysis reveals that experimental group, 19(63.33%) had mild pain and 11(36.67%) had moderate pain whereas in the control group, 16(53.33%) had moderate pain and 7(23.33%) had mild and severe pain respectively.

**Section C** the mean score of pain in the experimental group was 3.46±1.40 and post test mean score was 5.03±1.65. The mean difference score was 1.57. The calculated student independent ‘t’ test value of t = 3.956 was statistically significant at p<0.001 level. This clearly shows that after administered with music therapy the pain was significantly reduced among the mechanical ventilated patients during endotracheal suctioning in the experimental group than the patients in the control group who had undergone normal hospital routines measures.

**N =60 (30+30)**

Group	Post Test		Mean Difference score	Independent ‘t’ test & p-value
	Mean	S.D		
Experimental Group	3.46	1.40	<b>1.57</b>	<b>t =3.956 p=0.0001, S***</b>
Control Group	5.03	1.65		

\*\*\*p<0.001, S–significant



**Figure 1: Comparison of post test level of pain among mechanical ventilated patients during endotracheal suctioning in the experimental and control group**

The table and figure depicts that the mean score of pain in the experimental group was  $3.46 \pm 1.40$  and post test mean score was  $5.03 \pm 1.65$ . The mean difference score was 1.57. The calculated student independent 't' test value of  $t = 3.956$  was statistically significant at  $p < 0.001$  level. This clearly shows that after administered with music therapy the pain was significantly reduced among the mechanical ventilated patients during endotracheal suctioning in the experimental group than the patients in the control group who had under gone normal hospital routines measures.

Section D shows that the demographic variable gender ( $\chi^2=4.342$ ,  $p = 0.037$ ) had shown statistically significant association with post test level of pain among mechanical ventilation during endotracheal suctioning among mechanical ventilated patients at  $p < 0.05$  level and the other demographic variables had not shown statistically significant association with post test level of pain among mechanical ventilation patients during endotracheal suctioning in the experimental group

## CONCLUSION

This study clearly states that Music therapy reduces the pain intensity during endotracheal suctioning among endotracheal intubated patients. It also maintains the hemodynamic status of the patient and improved the saturation of oxygen.

Based on our research, patients on mechanical ventilation may benefit from using music therapy as an adjuvant intervention to control pain intensity and reduce physiological reactions during endotracheal suctioning. When comparing patients who underwent music therapy to those who did not, the results showed a significant decline in pain intensity scores as well as physiological measures including heart rate and blood pressure.

The results of this study highlight the promise of music therapy as a non-invasive and economical means of improving the comfort and overall health of patients on mechanical ventilation who are having endotracheal suctioning. Not only may music therapy help with pain management, but it can also lower stress and anxiety, encourage relaxation, and enhance patient outcomes when incorporated into routine care procedures.

Nonetheless, more investigation is necessary to determine the best time, length, and kind of music intervention as well as its long-term impacts on this population's physiological reactions and pain management. Furthermore, studying the mechanisms underlying music's therapeutic benefits on physiological parameters and pain perception may offer important new perspectives on how best to use and optimize the medium in clinical settings. In summary, our research highlights the significance of incorporating complementary therapies, such as music therapy, into the comprehensive care of patients on mechanical ventilation in order to improve their overall well-being and treatment encounter.

### Bibliography

- 1) Al Sutari M M, Abdalrahim M S, Hamdan-Mansour A M, Ayasrah S M. (2014). Pain among mechanically ventilated patients in critical care units. *JRes Med Sci*;19:726-32.
- 2) Ann Maria Thomas and Deepa Reddy (2022). A systematic review of effect of selected Nursing procedures on pain and hemodynamic Parameters inpatient with mechanical Ventilator. *European Journal of Molecular & Clinical Medicine*, Volume09, Issue08.
- 3) Ayasrah .S (2016). Care-related pain in critically ill mechanically ventilated patients. *Anaesth Intensive Care*,44:4.
- 4) Chen, Y.-F.; Chang, M.-Y.; Chow, L.-H.; Ma, W.-F. (2021). Effectiveness of Music-Based Intervention in Improving Uncomfortable Symptoms in ICU Patients: An Umbrella Review. *Int.J.Enviro.n.Res.Public Health*,18,11500. <https://doi.org/10.3390/ijerph182111500>.
- 5) Duygu Sonmez Duzkaya and Sema Kuguoglu(2020). Assessment of pain during Endotracheal Suction in the Pediatric Intensive Care Unit. *Pain Management Nursing*, Vol 16, No 1: pp 11-19.
- 6) Jacq G, Melot K, Bezou M, Foucault L, Courau-Courtois J, Cavelot S, et al. (2018) Music for pain relief during bed bathing of mechanically ventilated patients: A pilot study. *PLoS ONE*13(11):e0207174. <https://doi.org/10.1371/journal.pone.0207174>.
- 7) Manal M. Al Sutari, et al., (2014). Pain among mechanically ventilated patients in critical care units. *JRes Med Sci*.;19(8):726–732.
- 8) Mukhim, B., Sengupta, M., & lawim, R. (2017). A comparative study to assess the level of pain during nursing procedures in ventilated, unconscious and/or sedated patients. *Manipal Journal of Nursing and Health Sciences*, 3(1), 29-31.
- 9) Neha, Sumita (2017). Effectiveness of music therapy on level of anxiety among patients weaned from mechanical ventilator in selected hospital at Meerut. *International Journal of Science and Research (IJSR)*, Volume7 Issue5.
- 10) Yaman Aktas, Y., & Karabulut, N. (2015). The Effects of Music Therapy in Endotracheal Suctioning of Mechanically Ventilated Patients. *Nursing in Critical Care*,21(1),44-52.
- 11) Yaman Aktaş Y. · Karabulut N. (2019). Relief of Procedural Pain in Critically Ill Patients by Music Therapy: A Randomized Controlled Trial. *Complement Med Res*;26:156–164.
- 12) Yeşim Yaman Aktaş , Neziha Karabulut (2015). The effects of music therapy in endotracheal suctioning of mechanically ventilated patients. *Nurs Crit Care*,21(1):44-52.