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Effect of Music Intervention on Pain, Sedation and Vital Parameters During Endotracheal Suctioning among Mechanically Ventilated Patients

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Abstract: ***Background**: Mechanical ventilation often causes discomfort, pain and alteration in the vital parameters. Patients on mechanical ventilator have to undergo painful suctioning procedure, to clean the airway. Non pharmacological intervention such as music intervention helps to improve pain intensity, sedation level and vital parameters in mechanically ventilated (MV)patients who are undergoing suctioning procedure. **Objective**: This study was conducted to assess the effect of music intervention on pain, sedation and vital parameters during endotracheal suctioning among mechanically ventilated patients. **Methods**: An experimental-crossover design was used for the study. Thirty (30) mechanically ventilated patients were selected by using convenience sampling technique. All the 30 mechanically ventilated patients were cross overed and were included in experimental and control group both by lottery method. 15 patients who were taken in experimental group in the morning suctioning session were crossover into control group for the evening suctioning session and vice versa. In experimental group prerecorded flute music was offered to the patients for about 45 min i.e. before (20 min), during (suctioning time) and after (20 min) of ET suctioning. Three Observations i.e.O_1(before 20min of ET suctioning), O_2(during ET suctioning) & O_3(after 20min of ET suctioning) was done for pain intensity, sedation level & vital parameters by using Critical Care Pain Observation Tool (CPOT), Ramsay Sedation Score (RSS) and Vital Parameters Scale (VPS) respectively. Data was collected by Interview, Observation, Records & Reports and Bio-physiological measures and was analyzed with the use of descriptive and inferential statistics. **Results**: Statically significant results were found in pain intensity with in the experimental group ($p=0.000^*$) and between experimental and control at O_2 ($p=0.00^*$) and O_3 ($p=0.00^*$). Significant results were also found in sedation level with in the experimental group ($p=0.000^*$) and between experimental and control at O_2 ($p=0.00^*$) and in O_3 ($p=0.00^*$). In case of vital parameters statistically significant results were found in heart rate ($p=0.001^*$), in SpO_2 ($p=0.040^*$) and in mean arterial pressure ($p=0.014^*$) within the experimental group. **Conclusion**: Music intervention leads to significant improvement in pain intensity, sedation level and in certain vital parameters among the patients during endotracheal suctioning sessions.*

Keywords: Music Intervention, pain, sedation, vital parameters, endotracheal suctioning, mechanically ventilated patients.

1. Introduction

Intensive Care Unit (ICU) is a dedicated area in the hospital where a dedicated, specialist team of health professionals work together to support and care for the critically ill person during a medical emergency or crisis. As a place of critical care, its technology separates it from other areas of the hospital. [1] The critical care unit creates a potential environment for recovery of the patients who have lesser chance of survival. The critical care unit is anxiety producing medical environment for patients and their care givers both. [2] Thus treatment in intensive care unit involves many procedures and constant medical testing for the sake of the patients. [3]

These patients may experience moderate to severe pain due to surgery, trauma, invasive procedures and certain nursing interventions. [4] Pain is an unpleasant sensory or emotional experience associated with actual or potential tissue damage. Most of the critically ill patients need mechanical ventilation to support breathing. [5] In mechanically ventilated patients the invasive ventilator support is provided via either a tracheotomy tube or an endotracheal tube. [6] Suctioning is the mechanical aspiration of pulmonary secretions from patient with an artificial airway in position. Endotracheal and tracheostomy tubes form artificial airways, which bypass the normal physiological process and inhibits the cough reflex. Periodic suctioning is required to clear the secretions and prevent from alveolar collapse. [7] According to various reviews ET suctioning has been identified as the most painful and discomforting sensations in mechanically ventilated patients. [8]

Mechanical ventilation typically causes major distress and anxiety to patients, due to which these patients often experience various adverse events. To prevent these adverse events mechanical ventilated patient needs analgesia and sedation for the relaxation. [9] Appropriate administration of analgesia and sedation is an essential component of the care of mechanically ventilated patients and requires knowledge of the available therapeutic agents and strategies for sedation. The goal of sedation for the mechanically ventilated patient in the ICU is to ensure patient comfort and safety while facilitating patient–ventilator interactions. [10]

Suctioning procedure can lead to alteration in the vital parameters of the patient. Stimulation of the vagus nerve during suctioning may lower the heart rate, potentially causing bradycardia and impacting cardiac function. Therefore, there are number of complications which may

arise with artificial airway suctioning during mechanical ventilation like bronchospasm, cardiac arrest, cardiac arrhythmias (premature contractions, tachycardia, bradycardia, heart blocks), hypertension or hypotension, pain and anxiety, tracheal mucosal trauma, pulmonary haemorrhage or bleeding and respiratory arrest. [11]

Various studies have shown that non-pharmacological interventions used alone or in conjunction with pharmacologic interventions have the potential to reduce the pain, complications or discomfort associated with the endotracheal suctioning procedure. Non pharmacological interventions have been recognized as valuable and inexpensive alternative or adjuvant to pharmacologic approaches to pain management during suctioning. [12]

The practice of music intervention, which is one of the non-pharmacological interventions is used since ancient times to improve physical and mental welfare of the patient and to reduce the procedural pain. Music can be used to relieve procedural pain like positioning the patient, endotracheal suctioning, care of wound etc. Various studies have supported that music intervention has improved mood and pain connected with medical procedures and chronic illnesses and helped to improve quality of life. [13]

Intravenous sedatives are often used to promote relaxation and relieve anxiety among ventilated patients, but various studies have shown that use of sedation is associated with delayed weaning from MV, increasing care costs and time spent in hospital. These potent medications are often administered at high doses for prolonged periods and are associated with adverse effects such as bradycardia, hypotension, immobility, weakness and delirium. Studies advocates that patient in music group did not require additional sedation whereas patients in control group require sedation to allow sufficient patient ventilator coordination. Music intervention in ICU patient reduces anxiety and sedative exposure both. [14]

Aktas Y Y, Karabulut N. (2015) conducted a study to evaluate the effect of music therapy in endotracheal suctioning of mechanically ventilated patient between May 2010 and June 2013 in Ordu Medical Park Hospital Cardiovascular Surgery Intensive Care Unit. The study sample consisted of 66 patients (33 experimental and 33 control) who complied with the criteria of inclusion for the study. Data was collected using the 'Patient Information Form', 'Critical-Care Pain Observation Tool', 'Ramsay Sedation Scale' and 'Form of Physiological Parameters'. The results of this study implies that music therapy is an effective practice for nurses attempting to reduce patients' pain and control sedation level in patients on mechanical ventilators during endotracheal suctioning. [15]

Isabel A etal. (2016) conducted a systematic review of the literature to clarify the importance of music therapy in intensive care patients. A systematic review of the literature by mobilizing the descriptors "Music Therapy", "Critical Patients" and "Nursing care", use the method peak. Ten databases were selected in-between 2011 and 2016. It was found that most of studies consider music therapy effective on clients by decreasing pain, anxiety, regulating blood pressure, cardiac and respiratory frequencies due to various medical procedures in Intensive Care Unit. It also allows to lower sedation and analgesic levels, in patients. The key to implement this therapy is to educate the health teams about the impact and benefits of music therapy in patients. It was concluded that music therapy can be used like a non-pharmacologic therapeutic instrument to improve relaxing and reduce anxiety in clients in intensive care, promoting their recuperation [16]

Loewy J etal. (2013) conducted a study to assess the effects of music therapy on vital signs, feeding, and sleep in mechanically ventilated premature infants. A randomized clinical multisite trial of 272 premature infants with respiratory distress syndrome, clinical sepsis, and/or SGA (small for gestational age) served as their own controls in 11 NICUs. Results concluded that the informed, intentional therapeutic use of live sound and parent-preferred lullabies applied by a certified music therapist can influence cardiac and respiratory function. It was observed that vital signs, sound and lullaby may improve feeding behaviors and sucking patterns and may increase prolonged periods of quiet-alert states in premature infants. Parent-preferred lullabies, sung live, can enhance bonding, thus decreasing the stress parents associate with premature infant care. [17]

Music therapy is a simple, inexpensive and reliable intervention which can be applied in intensive care units for the benefit of mechanically ventilated patients, without risk of unwanted side effects. It is used as a complementary intervention to relieve pain during suctioning procedure. [18] Music listening in patient receiving mechanical ventilation reduces their anxiety, respiratory rate and systolic blood pressure. It also reduces the frequency of sedative administration in mechanically ventilated patients. [19] Thus, the music intervention has a significant effect on pain, sedation and vital parameters of mechanically ventilated patients during endotracheal suctioning procedure, hence it should be used in clinical settings.

2. Material and Methods

An experimental-crossover design was used to assess the effect of music intervention on pain, sedation and vital parameters during endotracheal suctioning among mechanically ventilated patients admitted in Intensive Care Units of DMCH, Ludhiana, Punjab. A written permission was taken from Institutional Ethics Committee of DMCH, Ludhiana. Consented patients who were having: age of 18years and above, wakefulness (2 to 3 Ramsay sedation score), no H/O hearing impairment, no H/O drug addiction and admission in ICU for at least 48 hrs. were enrolled in the study. The patients who were excluded from the study were those who were: having unstable hemodynamic condition, receiving high dose of inotropes or neuromuscular blocker medications or medication for chronic pain, receiving more than 2 inotropes, suffering from severe psychiatric condition, diagnosed with head injury, encephalopathy and delirium and not cooperating & not willing to participate in the study. As per inclusion and exclusion criteria, thirty (30) mechanically ventilated patients were selected by using convenience sampling technique. All the 30 mechanically ventilated patients were cross overed and were included in experimental

and control group both by lottery method. 15 patients who were taken in experimental group in the morning suctioning session were crossover into control group for the evening suctioning session and vice versa. **(Fig 1.)**.

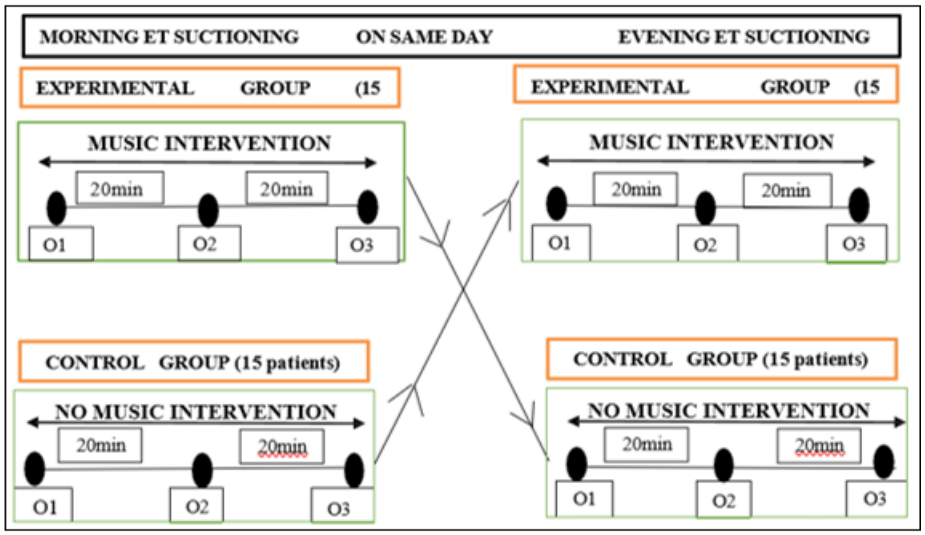

Figure 1: An Experimental Crossover Design

Music intervention was implemented in the experimental group. In this prerecorded flute music was offered to the experimental group patients for about 45 min i.e. before (20 min), during (suctioning time) and after (20 min) of ET suctioning. Following steps were taken into consideration while implementing the music intervention in experimental group

- Take a written informed consent from the patient/ attendants.
- Provide comfortable position to the patient.
- Clean the earpiece of headphone before inserting into the patient's ear.
- Start pre-recorded flute music for about 45 min i.e. before (20 min), during (suctioning time) and after (20 min) of ET suctioning for single session.
- Remove the headphones from patient's ear and clean it again.
- Provide comfortable position to the patient.

Three Observations i.e.O_1(before 20min of ET suctioning), O_2(during ET suctioning) & O_3(after 20min of ET suctioning) was done for pain intensity, sedation level & vital parameters by using research tools. Validity and reliability of tool was established. Tool was divided into four parts:

Part A: **Patient's profile** which is further divided two sections:

***Section I* -Socio demographic profile**: It includes 8 items to obtain information about age in years, gender, marital status, occupation, education status, habitat, religion and smoking habit.

***Section II* -Clinical profile:** It includes 10 items to obtain information about weight (kg), diagnosis, duration of hospitalization (days), duration of intubation(days), mode of ventilation, preset rate of ventilator, known case of sepsis, four score, GCS and comorbidities.

Part B: Critical Care Pain Observation Tool (CPOT)-It is standardized tool developed by **Gelinas et al. (2006)**. It was used to assess facial expression, body movements, muscle tension and compliance with ventilator. Maximum score of CPOT tool is 8 and minimum score is 0. Lower score indicates minimal pain

Part C: Ramsay Sedation Score (RSS)- It is standardized tool developed by **Ramsay et al. (1974).** It was used to assess the sedation level (awakefulness and asleep) of mechanically ventilated patients. Maximum score of RSS tool is 6 and minimum score is 1. Lower score indicates minimal sedation.

Part D: Vital Parameter Scale (VPS)-It was self-structured scale which included physiological parameters like heart rate (beats/min), respiratory rate (breath/min), systolic and diastolic BP (mmHg), SpO_2 (%) and mean arterial pressure (mmHg).

Methods used for data collection were interview, observation, records & reports and bio-physiological measures. Data was analyzed with the use of descriptive and inferential statistics. Comparison was done between experimental and control group for pain intensity, sedation level and vital parameters during endotracheal suctioning among mechanically ventilated patients.

3. Results

As per the socio demographic profile of mechanically ventilated patients, majority of patients 12(40%) were falling in age group of 59-78 years, 15(50%) were males and 15(50%) were females, majority of them 27(90%) were married, 13(43.3%) were working, 10(33.3%) were graduates and above, 16(53.3%) were living in urban area, 18(60%) were Sikhs and 5(16.7%) were smokers. **(Table 1)**

Table 1: Frequency and Percentage distribution of mechanically ventilated patients according to Socio-Demographic Profile, N=30

Socio-Demographic Profile	f (%)
Age (in years)	
18-38	6(20.0 %)
39-58	9(30.0 %)
59-78	12(40.0 %)
79-98	3(10.0 %)
Gender	
Male	15(50.0 %)
Female	15(50.0 %)
Marital status	
Married	27(90.0 %)
Unmarried	0(0.00 %)
Widow/ widower	3(10.0 %)
Occupation	
Working	13(43.3 %)
Not working	17(56.7 %)
Education	
Illiterate	4(13.3 %)
Elementary	8(26.7 %)
Secondary	8(26.7 %)
Graduate & above	10(33.3 %)
Habitat	
Urban	16(53.3)
Rural	14(46.7)
Religion	
Hindu	12(40.0)
Sikh	18(60.0)
Smoking habit	
Yes	5(16.7)
No	25(83.3)

Mean age±SD= 56.90±18.443

As per the clinical profile of mechanically ventilated patient's majority of patients 20(66.7%) were falling in the weight category of 50-69 kg and majority 18(60%) were having medical diagnosis. Maximum 21(70%) of them were having duration of hospitalization between 1-10 days and majority 25(83.3%) were having duration of intubation between 1-5 days. Maximum 12(40%) of mechanically ventilated patients were on VCV mode of ventilator **(Fig 2.)**. In maximum 27(90%) of them preset rate of ventilator was 11-15. Half, 15(50%) of mechanically ventilated patients were known case of sepsis, half i.e. 15(50 %) of them were having four score between 9-12, maximum 26(86.7%) were having GCS between 9-15 scores and more than half 16 (53.3%) were having comorbidities when they were enrolled in the study. **(Table 2)**

Mechanically ventilated patients i.e. 16 (53.3%) who were having comorbidities, out of them maximum 9(56%) were diagnosed with hypertension and Diabetes both. **(Fig 3.)**

Table 2: Frequency and percentage distribution of mechanically ventilated patient according to selected clinical profile, N=30

Clinical profile	f (%)
Weight (kg)	
50-69	20(66.7 %)
70-89	6(20.0%)
90-109	2(06.7%)
110-129	2(06.6%)
Diagnosis	
Medical	18(60.0%)
Surgical	12(40.0%)
Duration of hospitalization(days)	
01-Oct	21(70.0%)
Nov-20	9(30.0%)
Duration of intubation (days)	
01-May	25(83.3%)
06-Oct	3(10.0%)
Nov-15	2(6.7%)
Preset rate of ventilator	
Nov-15	27(90.0%)
16-20	3(10.0%)
Known case of sepsis	
Yes	15(50.0%)
No	15(50.0%)
Four score	
0-4	0(0.0%)
05-Aug	1(3.3%)
09-Dec	15(50.0%)
13-16	14(46.6%)
GCS	
01-Mar	0(0.0%)
04-Aug	4(13.3%)
Sep-15	26(86.7%)
Comorbidity	
Yes	16(53.3%)
No	14(46.7%)

Mean weight ±SD= 68.80±18.414

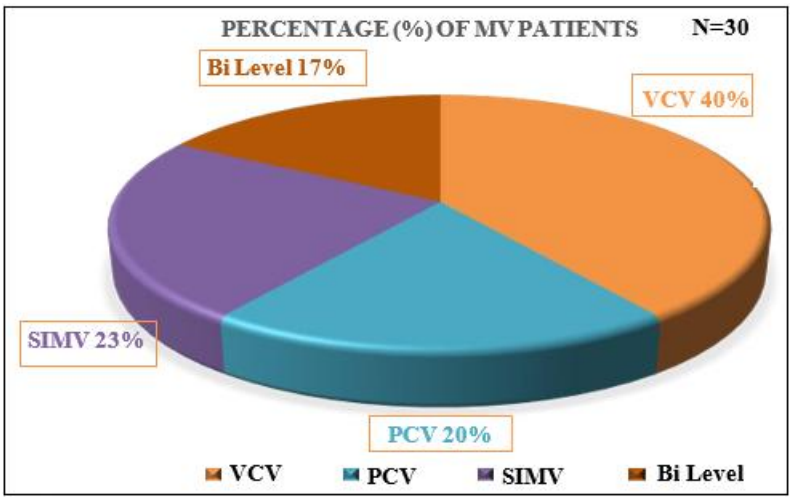

Figure 2: Frequency and percentage distribution of mechanically ventilated patient according to their mode of ventilator

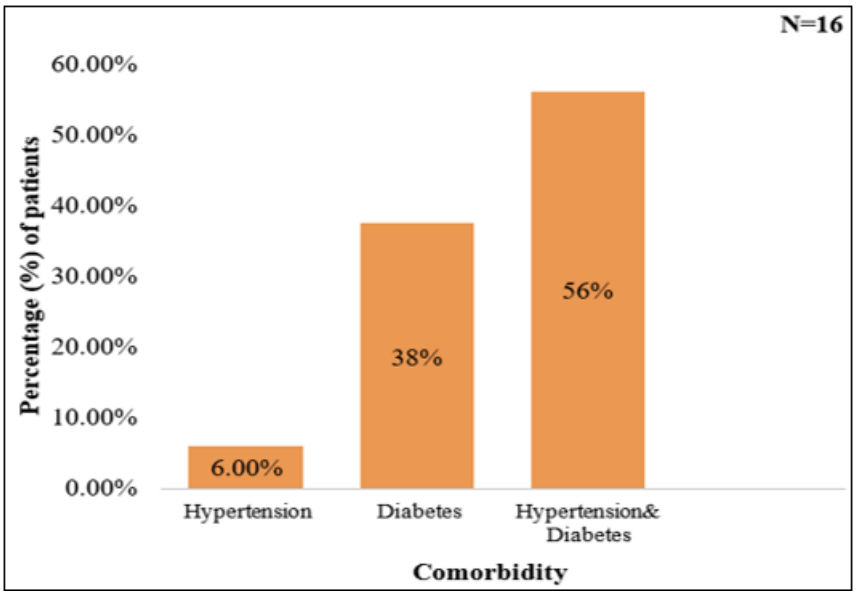

Figure 3: Frequency and percentage distribution of mechanically ventilated patients according to their comorbidit*ies*.

For pain intensity it was found that:
At O_1 in experimental group, 29(96.7%) of mechanically ventilated patient were having unacceptable pain >2 and only 1(3.3%) were having minimal pain <2 whereas in control group all 30 (100%) were having unacceptable pain >2.

At O_2 in experimental group, 15(50%) of mechanically ventilated patient were having unacceptable pain >2 and 15(50%) were having minimal pain <2 whereas in control group all 30 (100%) were having unacceptable pain >2.

At O_3 in experimental group, 0(0%) of mechanically ventilated patient were having unacceptable pain >2 and all 30(100%) were having minimal pain <2 whereas in control group all 30 (100%) were having unacceptable pain >2. Hence it is concluded that, in experimental group intensity of pain was decreased after the use of music intervention. **(Table: 3)**

In experimental group mean of pain intensity in O_1 was 3.20±0.551, in O_2 was 2.53±0.571 and in O_3 was 1.20±0.483 while in control group mean in O_1 was 3.37±0.669 in O_2 was 4.50±0.820 and in O_3 was 3.30±0.651. There was a significant decrease in the mean of pain intensity in experimental group. Thus, statically significant results were found in pain intensity with in the experimental group ($p=0.000^*$) and between experimental and control at O_2 ($p=0.00^*$) and O_3 ($p=0.00^*$). **(Fig 4)**

Table 3: Frequency and percentage distribution of mechanically ventilated patients among experimental and control group according to pain intensity in O_1, O_2, O_3., N= 30

Paint Intensity	Experimental Group			Control Group		
	O_1	O_2	O_3	O_1	O_2	O_3
Score	f %	f %	f %	f %	f %	f %
Minimal Pain <2	1 (3.3%)	15 (50.0)	30 (100)	0 (0.0)	0 (0.0)	0 (0.0)
Unacceptable Pain >2	29 (96.7)	15 (50.0)	0 (0.0)	30 (100)	30 (100)	30 (100)

Maximum Score= 8
Minimum Score = 0

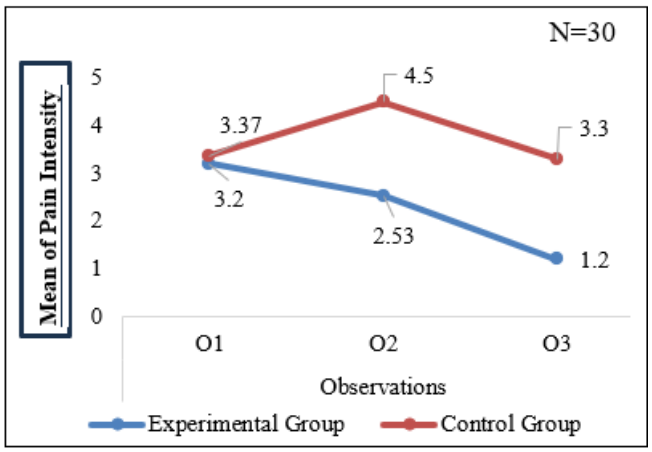

Figure 4: Comparison of mean of pain intensity in mechanically ventilated patients between experimental & control group in observations: O_1, O_2, O_3

For sedation level it was found that:
At O_1 in experimental group, 26(86.7%) of mechanically ventilated patient were having moderate (1-3) sedation level and 4(13.3%) were having deep (4-6) sedation level and in control group 25(83.3%) of mechanically ventilated patient were having moderate (1-3) sedation level and 5(16.7%) were having deep (4-6) sedation level.

At O_2 in experimental group, 29(96.7%) of mechanically ventilated patient were having moderate (1-3) sedation level and 1(3.3%) were having deep (4-6) sedation level and in control group 27(90.0%) of mechanically ventilated patient were having moderate (1-3) sedation level and 3(10.0%) were having deep (4-6) sedation level.

At O_3 in experimental group, all 30(100%) of mechanically ventilated patient were having moderate (1-3) sedation level

and 0(0 %) were having deep (4-6) sedation level and in control group 26(86.7%) of mechanically ventilated patient were having moderate (1-3) sedation level and 4(13.3 %) were having deep (4-6) sedation level. **(Table: 4)**

In experimental group mean of sedation level in O_1 was 3.13±0.346, in O_2 was 2.37±0.615 and in O_3 was 2.37±0.490 while in control group mean of sedation level in O_1 was 3.17±0.379 in O_2 was 3.10±0.305 and in O_3 was 3.13±0.346. There was a significant decrease in the mean of sedation level in experimental group. Thus, statically significant results were found in sedation level with in the experimental group ($p=0.000^*$) and between experimental and control at O_2 ($p=0.00^*$) and O_3 ($p=0.00^*$). **(Fig 5)**

Table 4: Frequency and percentage distribution of mechanically ventilated patients among experimental and control group according to sedation level in O_1, O_2, O_3, N=30

Sedation level		Experimental group			Control group		
		O_1	O_2	O_3	O_1	O_2	O_3
	Score	f (%)	f (%)	f (%)	f (%)	f (%)	f (%)
Moderate	1-3	26 (86.7)	29 (96.7)	30 (100)	25 (83.3)	27 (90.0)	26 (86.7)
Deep	4-6	4 (13.3)	1 (3.3)	0 (0.0)	5 (16.7)	3 (10.0)	4 (13.3)

Moderate sedation=1-3
Deep sedation =4-6

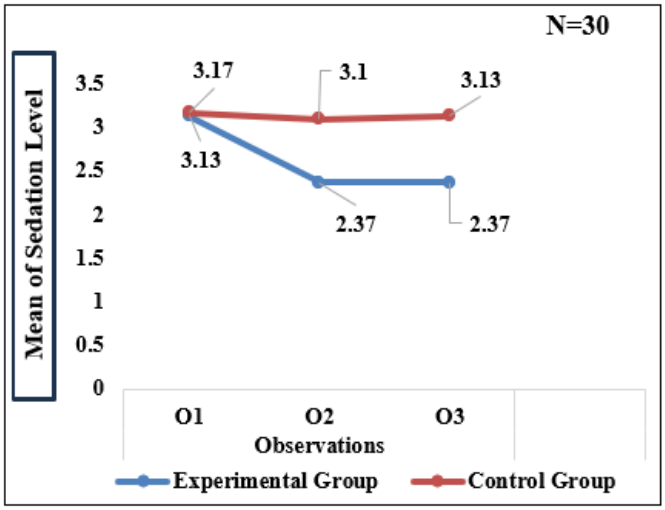

Figure 5: Comparison of mean of sedation level in mechanically ventilated patients between experimental & control group in observations: O_1, O_2 & O_3

For vital parameters it was found that:
In case of vital parameters statistically significant results were found in heart rate ($p=0.001^*$), in SpO_2 ($p=0.040^*$) and in mean arterial pressure ($p=0.014^*$) within the experimental group, but no significant result was found for any of the vital parameters between the two groups i.e. experimental and control group in observations O_1, O_2 & O_3

4. Discussion

Treatment in intensive care unit involves many procedures and constant medical testing for the sake of the patients. Mechanical ventilation and procedures like endotracheal suctioning associated with mechanical ventilation often causes discomfort, pain and alteration in the vital parameters of these patients. Periodic suctioning is required to clear the secretions and prevent from alveolar collapse. According to various reviews ET suctioning has been identified as the most painful and discomforting sensations in mechanically ventilated patients. Appropriate administration of analgesia and sedation is an essential component of the care of mechanically ventilated patients and requires knowledge of the available therapeutic agents and strategies for sedation. The goal of sedation for the mechanically ventilated patient in the ICU is to ensure patient comfort and safety while facilitating patient–ventilator interactions. Suctioning procedure can stimulate the vagus nerve and may lower the heart rate, potentially causing bradycardia and impacting cardiac function. Therefore, there are number of complications which may arise with artificial airway suctioning during mechanical ventilation. According to several studies non pharmacological intervention such as music intervention helps to improve pain intensity, sedation level and vital parameters in mechanically ventilated (MV)patients who are undergoing suctioning procedure.

Present study gives the evidence that music intervention leads to significant improvement in pain intensity, sedation level and in certain vital parameters among the patients during endotracheal suctioning sessions. Statically significant results were found in pain intensity with in the experimental group ($p=0.000^*$) and between experimental and control at O_2 ($p=0.00^*$) and O_3 ($p=0.00^*$). Significant results were also found in sedation level with in the experimental group ($p=0.000^*$) and between experimental and control at O_2 ($p=0.00^*$) and in O_3 ($p=0.00^*$). In case of vital parameters statistically significant results were found in heart rate ($p=0.001^*$), in SpO_2 ($p=0.040^*$) and in mean arterial pressure ($p=0.014^*$) within the experimental group, but no significant result was found for any of the vital parameters between the two groups i.e. experimental and control group in observations O_1, O_2 & O_3

Similar experimental survey was done by Aktas YY, Karabulut N. (2015) on the effects of music therapy in endotracheal suctioning of mechanically ventilated patients. Study was conducted between May 2010 and June 2013 in Ordu Medical Park Hospital Cardiovascular Surgery Intensive Care Unit to determine the effect of music therapy on pain intensity, sedation level and physiological parameters during endotracheal suctioning of mechanically ventilated patients in cardiovascular surgery intensive care unit (ICU). The study sample consisted of 66 patients (33 experimental and 33 control) who complied with the criteria of inclusion for the study. Data was collected using the 'Patient Information Form', 'Critical-Care Pain Observation Tool', 'Ramsay Sedation Scale' and 'Form of Physiological Parameters'. The mean scores of the Ramsay Sedation Scale during endotracheal aspiration were respectively 1·88 and 1·55 in the experimental and control group and the difference

between the groups was statistically significant (p = 0·003). The mean score of Critical-Care Pain Observation Tool during endotracheal suctioning in the experimental group was found to be lower statistically than those of the control group (p < 0·001). There were no significant differences before, during and 20 min after suctioning between the two groups with regard to systolic blood pressure, diastolic blood pressure, heart rate and oxygen saturation (p > 0·05). The results of this study implies that music therapy is effective practice for nurses attempting to reduce patients' pain and control sedation level in patients on mechanical ventilators during endotracheal suctioning.

Another systematic review was done by Isabel A etal. (2016) to clarify the importance of music therapy in intensive care patients. Ten databases were selected in-between 2011 and 2016. It was found that most of studies consider music therapy effective on the patients by decreasing pain, anxiety, regulating blood pressure, cardiac and respiratory frequencies due to various medical procedures in Intensive Care Unit. It also allows to lower sedation and analgesic levels, in the patients. The key to implement this therapy is to educate the health teams about the impact and benefits of music therapy in the patients. It was concluded that music therapy can be used like a non-pharmacologic therapeutic instrument to improve relaxing and reduce pain in patients in intensive care units and promoting their recuperation.

5. Conclusion

The study findings revealed that for pain intensity: statically significant results were found within the experimental group ($p=0.000^{*}$) and between experimental and control at O_2 ($p=0.00^{*}$) and O_3 ($p=0.00^{*}$); for sedation level: statically significant results were found within the experimental group ($p=0.000^{*}$) and between experimental and control at O_2 ($p=0.00^{*}$) and in O_3 ($p=0.00^{*}$) and in case of vital parameters: statistically significant results were found in heart rate ($p=0.001^{*}$), in SpO_2 ($p=0.040^{*}$) and in mean arterial pressure ($p=0.014^{*}$) within the experimental group, but no significant result was found for any of the vital parameters between the two groups i.e. experimental and control group in observations O_1, O_2 & O_3. This study concluded that there is significant improvement in pain intensity, sedation level and in certain vital parameters among the mechanically ventilated patients who have received music intervention in endotracheal suctioning sessions (before, during and after).

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Ethical Approval: Approved

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