

# Systematic Review on the Effectiveness of Music Therapy on Anxiety and Vital Signs of Patients with Mechanical Ventilation

Fitria Yuliana<sup>1</sup>, Kusnanto<sup>2</sup>, Ilya Krisnana<sup>2</sup>

<sup>1</sup> Magister Student of faculty of Nursing Airlangga University

<sup>2</sup> Faculty of Nursing Airlangga University

firiayuliana57@gmail.com, kusnanto\_ners@yahoo.com, ilyakrisnana28@gmail.com

**Keywords:** music therapy, music intervention, anxiety, mechanical ventilation, critical care.

**Abstract:** The purpose of this studies to examine the effect of music therapy on decreased anxiety levels and changes in vital signs in patients with mechanical ventilation. The sample of the journal reviews are the patients with mechanical ventilation in the intensive care unit. They are divided into intervention groups and control groups. The data collection is done by giving treatment of natural music instrument with music player and headset. Then the data was taken before and after treatment with anxiety measurement using Spielberger State-Trait Anxiety Inventory, VAS (visual analog scale), and measurement of vital signs of blood pressure observation, MAP (mean arterial pressure), pulse, respiratory rate (RR), oxygen saturation (SpO<sub>2</sub>). T-test data analysis technique is used to compare mean pre and post treatment in one group, test of difference between groups using chi square test. While Mann-Whitney test, multivariate analysis of variance (MANOVA) are used to adjust research data's scale. All of the journal reviews showed the results that client's anxiety level decreased after giving the music therapy intervention. Vital signs showed statistically significant differences between treatment group and control group where vital signs were more stable in the treatment group than in the control group.

## 1 INTRODUCTION

Anxiety is a natural condition that has ever experienced by every human being, where the individual feels fear or loss of confidence the effects of the stressor that comes from within himself and his environment. Patients admitted to hospitals due to severe major illness should be treated in ICU chambers and should use hemodynamic monitors as well as respirators or ventilators. The noise of the noise can be one of the stressors that make the patient feel anxious in the ICU room, especially the patient with the level of consciousness compositis or full awake. In patients with prolonged use of mechanical ventilation, there is an increased risk of mortality, morbidity and duration of care in the intensive care unit (ICU), and deterioration in quality of life (Mohammed S. Elbouhy, et al, 2014). The causes of patients experiencing difficulties during the weaning process, around 10-25% are due to undergoing mechanical ventilation processes of patients may experience fear, agitation, discomfort, immobility, dyspnoea,

confusion, communication problems and inability to relax (Hunter et al., 2010).

If anxiety is not managed properly, it can disrupt the patient in the recovery process and prevent the breathing exercise from mechanical ventilation. Failure in mechanical ventilation weaning experiments can cause fear in patients to affect the patient's psychological state (anxiety) and the patient's physiological (vital signs) function (Liang, Z et al, 2016). Anxiety can also trigger sympathetic nerve activation, which can lead to tachycardia, increased respiratory rate, increased blood pressure, and airway narrowing, and leads to fatigue (Thomas, 2003; Wong et al., 2001). Interventions by exploring the use of Nature-based sound therapy can provide a nonpharmacological approach to reducing anxiety during the weaning process, by listening to nature-based sound through headphones, as effectively reducing anxiety in patients using mechanical ventilation by reducing potential danger of physiological response (Aghaie, B et all 2013).

## 2 METHOD

This method begins with a search journal using the PICO framework, then determines the keywords: "therapy, music intervention, anxiety, mechanical ventilation, critical care" to search for journals in English through multiple databases such as E-Resources, Sage Journal, Pro Quest, Google Scholar, Science Direct. The study population was patients treated in intensive care room.

Intervention in the review of this research is the provision of natural sound music therapy or instrument sound by using music player and headphones. the implementation of music therapy listening interventions from several journals reviewed 30 to 90 minutes with an average sound pressure level of 25-50 dB. Measurement of anxiety using Spielberger State-Trait Anxiety Inventory questionnaire, VAS (visual analog scale). And measurement of vital signs from blood pressure observation, MAP (mean arterial pressure), pulse, respiratory rate, oxygen saturation (SpO<sub>2</sub>).

## 3 RESULT

### 3.1 Influence of music on Anxiety level

According to Aghaie et al (2013) study results revealed that the intervention group had much lower levels of anxiety and agitation than the control group, was found between the anxiety score ( $p < 0.002$ ) The estimate of the regression parameters for the group variable was 1.33. This means that the chances of having an anxiety score higher in the control group. And statistical results for agitation ( $p < 0.001$ ) in the two groups. The estimated regression parameter for the variable group is 2,927, which means that the control group is likely to have high scores on agitation. Measurements of anxiety and agitation levels were assessed using the Face Anxiety Scale (VAS) and Richmond Agitation Sedimentation Scale.

In the Saadatmand study, et al (2013), there was found a significant difference between the anxiety scores of the two groups ( $p < 0.001$ ). Means The estimated regression parameter for the variable group is 1.496. This means that in the control group anxiety scores opportunities have a higher value. Anxiety levels were recorded using Face Scale Anxiety (VAS), the degree of agitation measured using the Richmond Agitation Venetian Genetic Scale (RASS) Score. There was a significant

difference between the agitation score in the two groups ( $p < 0.001$ ). The estimated regression parameter for the variable group is 2.418. This means that the chances of the control group having higher agitation scores. The study used anxiety measurements from Spielberger's State-Trait Anxiety Inventory. Results from the study of wong et al (2001) showed that music therapy was more effective in reducing anxiety than rest periods that were not disturbed by statistical results ( $P < .01$ ). Subjects (respondents) who received music therapy reported significantly less anxiety with posttest results (10,1) than subjects (respondents) in the control group (16.2) (Chlan, 2009). From several studies that have been done, the results obtained that music intervention can reduce the level of anxiety in patients with mechanical ventilation.

### 3.2 The effect of music on the hormone cortisol

To see deeper levels of anxiety experienced by patients other than the visual scale, as well as questionnaires, some researchers used the cortisol hormone indicator. In the Chlan study, et al 2012 measured anxiety by looking at the UFC values suggesting that controlling the severity of disease, gender, and normal UFC values (29-45 mg / day), the results of the UFC analysis showed no significant differences between treatment groups as well as control during undergoing mechanical ventilation. However, in the results of the study from Beaulieu-Boire, et al 2013 said that a significant reduction in blood concentration of cortisol and prolactin and a significant increase in the ratio of adrenocorticotrophic hormone (ACTH) / cortisol during listening to music compared with listening shamMP3. Blood cortisol decreased after listening to music ( $815 \pm 126$  pre-vs.  $727 \pm 98$  nmol / L post-music-MP3,  $P = .02$ ) but not in the placebo control arm ( $741 \pm 71$  before vs.  $746 \pm 68$  nmol / L post-sham-MP3,  $P = 0.83$ ).

### 3.3 Influence of music on vital signs.

The influence of music intervention on hemodynamics, according to Liang Z, et al (2016) There was a significant decrease in clinical symptoms for shortness of breath and anxiety ( $p = 0.04$ ). And a significant decrease of respiratory frequency (RR) with results ( $p < 0.01$ ) and heart rate with results ( $p = 0.02$ ). Significant changes do not show any formic artery pressure (MAP) or arterial oxygen value (SpO<sub>2</sub>). In the second

experiment, researchers reported a significant decrease in HR, RR, systolic and diastolic BP ( $p < 0.05$ ) when music was administered for the same valency compared to controls (no music).

Saadatmand, et al (2013) suggested, mean systolic blood pressure was significantly lower in the intervention group on all four at the time of measurement ( $p < 0.001$ ). The mean pulse rate decreased significantly ( $p < 0.001$ ) between the two groups according to the time of administration. In the treatment group the heart rate decreased and tended to be more stable than the control group. The results showed statistically significant results ( $p < 0.001$ ) Respiration frequency between the two groups, in the respiratory treatment group became slow and deeper than the control group. Results from the study of wong et al (2001) that blood pressure and respiratory rate did not show significant differences in both treatment and control groups at the same time. However, a significant difference was observed at the end of the intervention (after 30 minutes) between the 2 conditions of the group that listened to music and the resting group with the outcome of music therapy superior to the rest period.

#### 4 CONCLUSION

The anxiety felt by the patients in the intensive care room by mechanical ventilation creates a physiological effect and an unpleasant psychological experience for the patient. Like the endotracheal tube, the patient can not speak, eat, or swallow. Psychological stress includes unknown and thirsty fear, insomnia, anxiety, pain, immobility, noise, confusion, loneliness, helplessness, sensory and overload deficiencies, inability to match the breath pattern with the ventilator, and the fear during suctioning the endotracheal tube. Anxiety is associated with increased heart rate and blood pressure and other changes that can have a negative impact on treated patients (Chlan, 2009). Music interventions can reduce stress response, reduce anxiety of patients with mechanical ventilation, and encourage overall relaxation responses by reducing stress-inducing stimuli, and synchronizing body rhythms such as breathing and heart rate, and positively influencing emotional feelings from listening to music. This relaxation response can lower the heart's workload and oxygen consumption, which increases ventilation more effectively and accelerates ventilator weaning (Hetland et al, 2015). The musical effects given to the patient have benefited from the action of suppression on the

sympathetic nervous system, resulting in decreased adrenergic activity. Potentially, music may also trigger the limbic system in the brain to release endorphins, neu-rotransmitters that play an important role in enhancing safety (Liang Z, et al., 2016), while those associated with cortisol hormone according to the results of Chlan's study, (2012) revealed that while music does not reduce cortisol significantly, cortisol is seen from stress integrative biomarkers ie UFC (urine-free cortisol) .While listening to music is an activity aimed at stress reliever The process of listening to music will cause a decrease in adrenaline so as to decrease the level of anxiety then stimulates the expenditure of endorprin, phenylethilamine that affects the mid brain secrete GABA (gamma-aminobutyric acid) and beta endorprin to eliminate pain neurotransmitters that can cause analgesic effects and affect the mood that eventually occurs relaxation.

#### REFERENCE

- Aghaie, B., Rejeh, N., Heravi-Karimooi, M., Ebadi, A., Moradian, S. T., Vaismoradi, M., & Jasper, M. (2014). Effect of nature-based sound therapy on agitation and anxiety in coronary artery bypass graft patients during the weaning of mechanical ventilation: A randomised clinical trial. *International Journal of Nursing Studies*, 51(4), 526–538.
- Beaulieu-Boire G, Bourque S, Chagnon F, Chouinard L, Gallo-Payet N, Lesur O. (2013). Music and biological stress dampening in mechanically-ventilated patients at the intensive care unit ward-a prospective interventional randomized crossover trial. *Journal of Critical Care*, 28, 442–450
- Chlan L, (1998). Effectiveness of a music therapy intervention on relaxation and anxiety for patients receiving ventilatory assistance. *Heart and Lung: Journal of Acute and Critical Care*. Vol 27, No. 3
- Chlan L, (2009). A Review of the Evidence for Music Intervention to Manage Anxiety in Critically Ill Patients Receiving Mechanical Ventilatory Support. *Archives of Psychiatric Nursing*, vol.23, No. 2 (April), pp 177–17
- Chlan L, Engeland W, Savik K (2013). Does music influence stress in mechanically ventilated patients?. *Intensive and Critical Care Nursing*, (29), 121-127
- Gullick J, Kwan X (2015). Patient-directed music therapy reduces anxiety and sedation exposure in mechanically-ventilated patients: A research critique. *Australian Critical Care*, (28), 103–105

- Hetland B, Lindquist R, Chlan L (2015). The influence of music during mechanical ventilation and weaning from mechanical ventilation: A review. *Heart and Lung: Journal of Acute and Critical Care*, xxx, 1-10
- Liang Z, Ren D, Choi J, Happ M, Hravnak M, Hoffman L (2016). Music intervention during daily weaning trials—A 6 day prospective randomized crossover trial. *Complementary Therapies in Medicine*, (29), 72–77
- Mofredj A, Alaya S, Tassaioust K, Bahloul H, Mrabet A (2016). Music therapy, a review of the potential therapeutic benefits for the critically ill. *Journal of Critical Care*
- Saadatmand, V., Rejeh, N., Heravi-Karimooi, M., Tadrissi, S. D., Zayeri, F., Vaismoradi, M., & Jasper, M. (2013). Effect of nature-based sounds' intervention on agitation, anxiety, and stress in patients under mechanical ventilator support: A randomised controlled trial. *International Journal of Nursing Studies*, 50(7), 895–904
- Wakim J, Smith S, Guinn C (2010). The efficacy of music therapy. *Journal of PeriAnesthesia Nursing*, Vol 25, No 4 (August) : pp 226-232
- Wong H. L. C, GradDip, Nahas V.L, Molassiotis (2001). Effects of music therapy on anxiety in ventilator-dependent patients. *Heart & Lung*, Vol. 30, No. 5